

Federal Court



Cour fédérale

Date: 20220624

Docket: T-151-16

Citation: 2022 FC 507

Ottawa, Ontario, June 24, 2022

PRESENT: The Honourable Mr. Justice Roy

BETWEEN:

ANGELCARE CANADA INC.
AND
EDGEWELL PERSONAL CARE CANADA ULC
AND
PLAYTEX PRODUCTS, LLC

Plaintiffs/
Defendants by counterclaim

and

MUNCHKIN, INC.
AND
MUNCHKIN BABY CANADA, LTD.

Defendants/
Plaintiffs by counterclaim

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AMENDED JUDGMENT AND REASONS
(Original Judgment and Reasons issued on April 7, 2022)

I. Introduction

[1] This is an action for infringement under the *Patent Act*, RSC 1985, c P-4 launched by Angelcare Development Inc., Edgewell Personal Care Canada ULD, Playtex Products, LLC and Angelcare Canada Inc. (“the Plaintiffs” or “Angelcare”) against Munchkin, Inc. and Munchkin Baby Canada, Ltd (“the Defendants” or “Munchkin”). The Defendants are in turn Plaintiffs by counterclaim, as they allege that the patents-in-suit are all invalid, invoking a number of grounds of invalidity.

[2] The parties are competitors in the Canadian and international markets of baby care products and, in particular, diaper pails and diaper pail cassettes (“cassette”). As the name would indicate, diaper pails are effectively garbage pails purposed for the disposal of soiled diapers. Diaper pail cassettes are used in tandem with diaper pails; the cassettes store plastic material, otherwise called plastic tubing or film, that acts as a garbage bag for soiled diapers. This material lines the interior of the diaper pail and facilitates the disposal of soiled diapers once the diaper pail is full.

[3] At issue is the infringement and validity of six patents, all relating to either diaper pail cassettes or assemblies between cassettes and the diaper pails with which they are used. The Plaintiffs seek a declaration that Canadian Patent Nos. 2,640,384 (“the 384 Patent”); 2,855,159 (“the 159 Patent”); 2,936,415 (“the 415 Patent”); 2,936,421 (“the 421 Patent”); 2,937,312 (“the 312 Patent”) and 2,686,128 (“the 128 Patent”) are owned by the Plaintiff Angelcare Canada Inc. and are valid and subsisting (the six patents are reproduced in an annex to these reasons for judgment). Moreover, the Plaintiffs seek a declaration that the Defendants have infringed, either directly or by inducement, each of these patents by the manufacture and sale of four generations of cassettes, as well as two types of diaper pails. The Defendants deny any infringement and counterclaim that all six patents are invalid on various grounds: anticipation, obviousness, overbreadth, insufficiency, lack of utility, and, in the alternative, double-patenting.

A. *The Parties*

(1) The Plaintiffs and the Evolution of Angelcare's Corporate Structure

[4] Angelcare Development Inc. was incorporated pursuant to the *Canada Business Corporations Act*, RSC 1985, c C-44 ("CBCA"), with a place of business in Candiac, Quebec, Canada (Second Amended Agreed Statement of Facts ("ASF"), para 1). Until the amalgamation described at paragraph 10 below, Angelcare Development Inc. was in the business of baby-care products, which it developed, designed, manufactured, or has had others manufacture on its behalf and which it marketed in nearly 60 countries (Fifth Amended Statement of Claim ("SoC"), para 2; ASF, para 3).

[5] Angelcare Canada Inc. ("Old Angelcare") was also incorporated pursuant to the *CBCA*, with a place of business in Candiac, Quebec, Canada. Until its amalgamation described at paragraph 10 below, it sold and distributed baby-care products in Canada (SoC, para 3.2).

[6] Edgewell Personal Care Canada ULC ("Edgewell Canada") is incorporated pursuant to the laws of the province of British Columbia under the *Business Corporations Act*, SBC 2002, c 57, with a place of business in Vancouver, British Columbia, Canada (SoC, para 3; ASF, para 5). Until the asset acquisition described at paragraph 8 below, Edgewell Canada sold and distributed baby-care products in Canada, including diaper products under the Diaper Genie brand (*Ibid*; ASF, para 6).

[7] Playtex Products, LLC (“Playtex Products”) is incorporated under the laws of the state of Missouri, United States of America, with a place of business in Saint Louis, Missouri (SoC, para 3.1; ASF, para 7). Playtex Products is involved in this litigation insofar as it currently appears as one of the owners of the 128 Patent at issue (ASF, para 8). Playtex Products has requested that the Canadian Intellectual Property Office record the transfer of the 128 Patent to Angelcare as of December 7, 2020 (ASF, para 8). Playtex Products is also an affiliate of Edgewell Canada (ASF, para 9).

[8] On December 18, 2019, Angelcare Development Inc.’s parent company, Le Holding Angelcare Inc., purchased Playtex Products’ and Edgewell Canada’s parent’s assets related to the development and commercialising of their Diaper Genie line of products (SoC, para 3.3; ASF para 10). During this acquisition, Playtex Products assigned the 128 Patent to Old Angelcare. (ASF, para 62).

[9] Until the December 18, 2019 acquisition, Angelcare Development had cassettes marked under the Diaper Genie brand manufactured on its behalf and sold them to Edgewell or its corporate predecessors for distribution and sale in Canada (ASF, para 4). However, after December 18, 2019, Old Angelcare began to progressively take over Edgewell Canada’s commercial activities related to Diaper Genie products in Canada (ASF, paras 15-17). As of December 8, 2020, Edgewell no longer sold or had any commercial activities in Canada in relation to the Diaper Genie products (ASF, para 17). During the trial, the corporate representative for Angelcare, Mr. Doug Sweetbaum, testified that Angelcare now performs all

activities related to the Diaper Genie line of products in Canada (Sweetbaum, Trial Transcripts (“TT”) Vol. 5, p. 73:4-22).

[10] On October 1, 2020, Angelcare Development Inc., Old Angelcare, and another corporate entity, Angelcare Monitors Inc., were amalgamated under the *CBCA* and continued under the name Angelcare Canada Inc. (“Angelcare”), with a place of business in Montreal, Quebec, Canada (ASF, para 13). All property held by these three former corporate entities, including the patents at issue, became the property of Angelcare (SoC, para 3.5). Angelcare continues to be liable for these former corporate entities’ obligations (*Ibid*). As such, Angelcare takes over from Angelcare Development Inc. and Old Angelcare the causes of actions, claims, and liabilities in the present litigation (*Ibid*). Subsequent to this amalgamation, the corporate entities Angelcare, Edgewell Canada, and Playtex Products became the Plaintiffs in this case.

(2) The Defendants

[11] The Defendant, Munchkin, Inc. (“Munchkin”) is incorporated pursuant to the laws of Delaware, United States of America, with a registered office in Van Nuys, California, United States of America (ASF, para 18). Munchkin sells baby-care products which are manufactured on its behalf, including diaper pails and cassettes (ASF, para 19; SoC, para 4).

[12] The Defendant, Munchkin Baby Canada Ltd. (“Munchkin Canada”), is a subsidiary of Munchkin (ASF, para 21). It initially incorporated pursuant to the *CBCA*, but was discontinued as a federal corporation on August 26, 2019 and continued this same date under British Columbia’s *Business Corporations Act*, with a registered place of business in Vancouver, British

Columbia, Canada (ASF, para 20). Munchkin Canada distributes and sells baby-care products in Canada (ASF, para 22).

B. *The Alleged Infringing Products*

[13] The Plaintiffs allege that the Defendants have directly infringed their patents by having manufactured, on their behalf, and selling four generations of cassettes and two diaper pails, the PAIL and the STEP. Additionally, they allege that the Defendants have induced infringement by encouraging users to assemble the alleged infringing cassettes with both the Defendants' own diaper pails and the Plaintiffs' diaper pails.

(1) The Defendants' Cassettes

[14] Munchkin began developing the First Generation cassette in January 2012, with the final design approved in August 2012 (ASF, para 66). Mr. Kevin Johnson, who testified at trial, was the lead designer for Munchkin on this project (Johnson, TT Vol. 20, p.53:22-25). He was tasked with the goal of designing a cassette that would fit inside, and function with, the Plaintiffs' Diaper Genie pails (*Ibid*, p. 54:1-55:8; Dunn, TT Vol. 22, p. 14:23-27). To assist with this task, Mr. Johnson had access to Diaper Genie Elite and Essentials diaper pails and Diaper Genie cassettes at his office (Johnson, TT Vol. 21, p. 15:8-19:23). Mr. Steve Dunn, the CEO of Munchkin Inc., imposed a single constraint on Mr. Johnson's design process: he asked Mr. Johnson to ensure his design did not infringe a patent relating to a tear-off strip on the cover of the Diaper Genie cassette (*Ibid*, pp. 28:6-29:28; Dunn, TT Vol. 22, pp. 14:23-15:5).

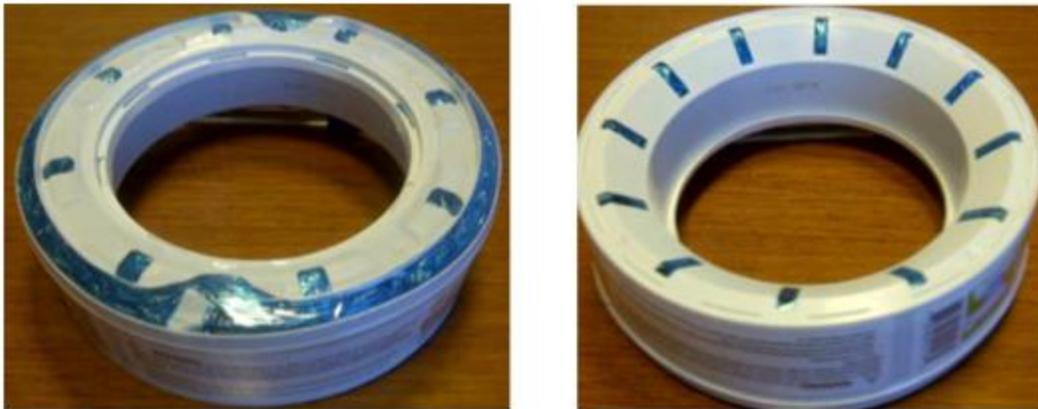
[15] Mr. Johnson identified three key features on the First Generation cassettes. One was the eight intermittent locks connecting the cassette lid to the cassette body. These are mechanical interfaces on the outer perimeter of the cassette with little underlocks that engage with the outer perimeter of the cover, connecting the cassette body to the cassette cover (Johnson, TT Vol. 20, pp. 55:24-56:9). The second was the twelve slots on the inner surface of the bottom of the cassette that help release air pressure when the cassette is being stuffed with film and reduced the amount of injection-moulded polypropylene material needed to manufacture the cassette (*Ibid*, 56:10-27). The third was the angled bottom of the cassette, which he believed would accommodate soiled diapers that might expand when being inserted into the diaper pail through the cassette's central opening (Johnson, TT Vol. 20, p. 57:5-26). The film is dispensed from a gap closer to the central opening of the cassette's cover than to the cover's outer periphery, what has been referred to at times as an interior gap as opposed to an exterior gap.



[16] Munchkin's First Generation cassettes became available in Canada under the Nursery Fresh label, a Munchkin brand, in August 2013 and under Target's UP & UP private label brand in September 2013 (ASF, para 67). These cassettes were discontinued under the UP & UP label

in January 2015 and under the Nursery Fresh label in September 2016, with the exception of the Generation 1 starter cassettes sold with the PAIL and STEP diaper pails (ASF, para 70). Until Munchkin launched its own PAIL and STEP diaper pails in March 2016, these cassettes were only compatible with the Plaintiffs' Diaper Genie Essentials, Elite, Complete, Mini, and Expressions diaper pails (ASF, paras 69; 90).

[17] Munchkin began developing its Second Generation cassette in March 2014 (ASF, para 72). Mr. Johnson was again lead designer on this project and was tasked to make them compatible with the latest Diaper Genie pails, which had been recently redesigned (Johnson, TT Vol. 20, p. 71:19-73:5). The Plaintiffs' Diaper Genie redesign consisted of the addition of "the snap-on ring" in February 2014 that made the First Generation Munchkin cassettes incompatible with the snap-on-ring of the Diaper Genie pails (ASF, paras 106-107). This snap-on ring raised the First Generation Munchkin cassettes too high up in the cassette's holder and prevented the intermediate lid that normally covers the cassette from being shut properly (Johnson, TT Vol. 20, p. 71:19-73:5). Mr. Johnson made the Second Generation cassettes compatible with the Diaper Genie redesigned pails by changing the angle on the bottom of the cassette (Johnson, TT Vol. 20, p. 75:14-20). Another notable change was having the cassette's cover attach to the inner diameter to the cassette, with the film dispensed closer to the outer wall of the cassette (outside gap), as well as recesses on the cover for users to insert their fingers and more easily grab the film (*Ibid*, pp. 74:25-75:13).



[18] The Second Generation cassettes became available in Canada in November 2015 and were only compatible with the Diaper Genie Essentials, Elite, Complete, Mini, and Expressions diaper pails until the launch of Munchkin's PAIL and STEP diaper pails in November 2016 (ASF, paras 74; 90). The Second Generation cassettes were likely no longer available on the market as of February 5, 2020 (ASF, para 76).

[19] Munchkin's Third Generation cassette was developed in early 2015 (ASF, para 78). Both Mr. Johnson and Mr. Dunn testified that the redesign from the second to the third generation was limited to the addition of a plastic blister cap which alters the packaging of the product without changing in any way the structural features of the cassette of the second generation (Johnson, TT Vol. 20, pp. 79:17- 81:27; Dunn, TT Vol. 22 *in camera*, pp.6:17-7:5). This was done to improve the cassette's aesthetic appeal to customers and create a higher perceived value, in response to a remark made by one of the retailers to whom Munchkin sold its cassettes (*Ibid*). Structurally, the Third Generation cassette was identical to the Second Generation cassette (Johnson, TT Vol. 21, p. 44:2-11; Dunn, TT Vol. 22 *in camera*, p. 7:2-5; ASF, para 78).



[20] The Third Generation cassettes became available in Canada in August 2017 (ASF, para 81). They were sold under three labels: Arm & Hammer, a brand owned by Church & Wright and with whom the Defendants partnered for the commercialization of some of their diaper products, Nursery Fresh (the Defendants' own label) and President's Choice, a private label of the retailer Loblaws that is also sold at Shoppers' Drug Mart (ASF, para 79). Regardless of the label under which they were sold, the Third Generation cassettes were all structurally identical (ASF, para 80). These cassettes were compatible with the Defendants' PAIL and STEP diaper pails, as well as the Plaintiffs' Diaper Genie Essentials, Elite, Complete, Mini, and Expressions diaper pails in Canada (ASF, para 82).

[21] Munchkin began developing its Fourth Generation cassette in February 2019. They were prompted by the present litigation to redesign their cassettes to dispel any beliefs that their products infringe patents (Johnson, TT Vol. 20, p. 81:10-21; Dunn, TT Vol. 22 *in camera*, pp. 7:2-8:10). Mr. Johnson again acted as lead designer, with Munchkin's legal team participating to ensure that their goals were met (Johnson, TT Vol. 20, pp. 81:22-82:5). Mr. Johnson testified that the most significant change between the Third Generation and Fourth generation cassettes was eliminating the angled wall at the bottom of the cassette and replacing it with a larger,

diagonal wall (*Ibid*, pp.83:20-84:3). This created more space for the diaper's insertion through the cassette into the diaper pail (*Ibid*). Mr. Johnson explained that they also reduced the amount of slots in the bottom of the cassette from twelve to four and made them more pronounced by adding walls on the inside of the slots (*Ibid*, pp. 82:21-83:12; 84:4-86:1). This functioned to push back the film off the surface of the cassette, creating a void between the bottom of the cassette and the film (*Ibid*). This was intended to assist users in fitting the cassette more easily into the Munchkin diaper pails' holders, which contains four raised ribs in the bottom of the cassette holder. The four ribs fit into the four slots at the bottom of the cassette, thus allowing for the cassette to stay in place while the closing mechanism of the Munchkin pails is activated. The same plastic film was used in this model as for all previous generations of cassettes, except they added length of film (*Ibid*, p. 84:11-20).



[22] The Fourth Generation cassettes became available in Canada in February 2020 and remain so currently (ASF, para 87). They were initially sold under the Arm & Hammer, Nursery Fresh, and President's Choice labels, but are presently only sold under the former two brands (ASF, para 85). All Fourth Generation cassettes are structurally identical, regardless of the label under which they are sold (ASF, para 86). These cassettes are compatible with the Defendants'

PAIL and STEP diaper pails and the Plaintiffs' Diaper Genie Essentials, Elite, Complete, Mini, and Expressions diaper pails (ASF, para 88).

(2) The Defendants' Diaper Pails

[23] Munchkin launched two diaper pails in March 2016: the PAIL and the STEP diaper pails (ASF, para 90). These pails are essentially the same, save for the presence of a foot pedal on the STEP pail, whereas the PAIL has no such step pedal (ASF, paras 90-91). That difference is irrelevant as to this case: it does not make a difference as to the infringement and invalidity allegations. Munchkin was motivated to create these diaper pails to improve upon their previous, discontinued Arm & Hammer diaper pail, and to create a product that would be able to fit both their previous plastic film refills, the "snap, seal and toss" bags, and their cassettes into the same pail (Dunn, TT Vol. 2, pp. 11:25-12:28; Johnson, TT Vol. 20, p. 52:9-17; Carvelho, TT Vol. 20, pp. 6:10-7:8). There was a desire to improve the aesthetic appeal and to use more robust materials to increase its perceived value (*Ibid*). These pails would also allow Munchkin to increase retail prices and create a larger margin of profit for retailers (Dunn, TT Vol. 22, p. 13:1-4; Carvelho, TT Vol. 20, p. 7:4-8). Mr. Johnson testified to having been intimately involved in the design, with the lead designer on the project reporting directly to him (Johnson, TT Vol. 20, p. 52:3-8).



[24] The notable design feature of the PAIL and STEP diaper pails is its closing mechanism, which is the same as that found in Munchkin's original Arm & Hammer pail (Johnson, TT Vol. 20, p. 52:18-23). The closing mechanism on the PAIL and STEP diaper pails have a rotating gear system that is activated when the lid closes (Johnson, TT Vol. 20, pp. 37:8-39:14; Bailey, TT Vol. 17, pp. 158:4-161:20). The plastic film is caught between the 'blades' or 'petals' of the star-shaped orange opening to the diaper pail. With the film in place, a rotating gear mechanism located beneath the holder transfers movement to this star-shaped orange opening that itself has a corresponding gear. It is the star-shaped orange part's rotation that twists up the bag to seal it shut.



[25] Munchkin’s PAIL and STEP diaper pails continue to be sold in Canada exclusively by third-party online retailers Amazon.ca, Walmart.ca and Well.ca (ASF, para 92). When these pails are sold, they come with a Fourth Generation Munchkin cassette that is inserted into the pail’s cassette holder (ASF, para 93).

(3) Infringement by Assembly: The Plaintiffs’ Products

[26] The Plaintiffs Edgewell and Playtex, as well as their predecessors-in-interest and affiliates (collectively, the “Playtex Group”) sold diaper pails under the Diaper Genie brand prior to Angelcare’s acquisition of this portion of their business. Some of the allegations of infringement at issue before the Court concern assemblies between the following Diaper Genie diaper pails and the Defendants’ cassettes.

[27] The Playtex Group began selling the Diaper Genie Essentials diaper pail with a flat cassette holder in 2011 (ASF, para 105). This was a rebranding of the Diaper Genie II (Morand, TT Vol. 2, pp. 140:7-141:2; Morand, TT Vol. 3, p. 200:4-7), which the Playtex Group began

selling in 2006 (ASF, para 102). In February 2014, the Playtex group added a snap-on protrusion to the holder for the cassette located in the pail, altering the shape of its cassette holder and making it complementary to the “chamfer-bottomed cassette” (ASF, para 107).

[28] The Playtex Group began selling the Diaper Genie Elite with a snap-on protrusion in February 2014, making it complementary to a chamfer-bottomed cassette (ASF, para 108).

[29] In November 2015, the Playtex Group began selling the Diaper Genie Elite with, instead of an added snap-on protrusion, had a protrusion moulded directly into the cassette holder (ASF, para 109). This pail is also known as the Diaper Genie Complete (*Ibid*).

[30] The Playtex Group launched its Diaper Genie Mini diaper pail, a smaller version of the Diaper Genie diaper pail, containing a cassette holder with a moulded protrusion to fit a chamfer-bottomed cassette, in October 2013 (ASF, para 110).

[31] In October 2016, the Playtex Group began selling the Diaper Genie Expressions diaper pail, which has a moulded protrusion complementarily shaped to fit a chamfer-bottomed cassette (ASF, para 111).

II. The Patents

[32] The six patents at issue relate to cassettes as well as their assembly within diaper pails. Five of the six patents are from a single family of divisional patents, which I will term the “Angelcare Patents”: the 384 Patent, the 159 Patent, the 421 Patent, the 312 Patent and the 415

Patent. They bear the same title: “Cassette and Apparatus for Packing Disposable objects into the Elongated Tube of Flexible Material”. The other is the 128 Patent, which stands independent of the Angelcare family but nonetheless claims an invention relating to diaper pail cassettes and their use within diaper pails.

[33] Collectively, these patents make 128 Claims, 113 of which the Plaintiffs are asserting in this action and 117 of which the Defendants seek to have declared invalid (some claims not asserted by the Plaintiffs in this case have their validity challenged nonetheless by the Defendants).

A. *The 128 Patent*

[34] The 128 Patent is entitled “Cassette for Dispensing Flexible Tubing Therefrom” and the application was filed on May 2, 2008. It lists Stephen Mowers, John Rousso, and Michael Jackson as the inventors. The Patent claims a United States priority date of May 4, 2007 from application US11/800,324. It became open to public inspection on November 13, 2008 and was issued on January 8, 2013.

[35] Notably, the 128 Patent was initially owned by Playtex Products. The rights in this patent were subsequently acquired by Angelcare in the context of the October 18, 2019 acquisition. As it stands, the agent for Playtex Products has requested that the Canadian Intellectual Property Office record the transfer of the 128 Patent to Angelcare as of December 7, 2020 (ASF, para 8).

[36] The 128 Patent makes 23 claims, of which the Plaintiffs allege infringement of the following eight claims in this case: 11 to 13, 16, 18, 19, 22 and 23. The Defendants allege invalidity of these same claims. They also allege the invalidity of Claims 1, 2, 20 and 21 despite the fact that the Plaintiffs do not allege their infringement by Munchkin. Prior to the claims themselves, the Patent provides information on the background of the invention, identifying the problems the Patent aims to solve, as well as a summary of the invention itself. There is also a detailed description of the preferred embodiments, illustrated in 13 figures appearing subsequent to the claims.

[37] The Patent's disclosure makes clear that this Patent relates to disposal waste products, including soiled diapers. The disclosure focuses on soiled diapers, identifying sanitary issues and odour problems as the problems many diaper disposal systems aim to solve. One such system, expressly mentioned in the background of the invention, is the Diaper Genie (128 Patent, p. 1:19). The 128 Patent explains that this and similar inventions suffer from a significant drawback for consumers: users may accidentally install the diaper cassette upside-down (128 Patent, p. 1:26-29). I will refer to this as the "improper orientation problem". This causes a variety of problems, one of which is that the upside-down cassette is exposed to the soiled diaper being inserted into the pail, causing "potential sanitary problems" (128 Patent, p. 1:29). This is a reference to the possibility that the soiled diaper may leave traces of its contents on the cassette body when it is inadvertently exposed, as it is placed upside-down (Powell, TT Vol. 6, p.115:6-21; Morand, TT Vol. 2, pp. 161:23-162:117). The other problems associated with the cassette's improper orientation are the overabundance of plastic tubing that will be dispensed, as well as

the difficulty users will face in identifying how much plastic tubing is left coiled inside the cassette (128 Patent, p.1:29-32).

[38] The disclosure identifies a second problem, this one relating to its shipping, storage, and display in retail outlets. Since cassettes are normally stacked one on top of the other in these settings, either in boxes or on store shelves, their shape can make them susceptible to toppling over or more difficult to stack (128 Patent, pp.1:33-2:5). I will refer to this as the “stackability problem”.

[39] The 128 Patent, as expressed in the patent’s disclosure, thus aims to solve the following issues: the improper orientation problem and the stackability problem (128 Patent, p. 2:6-8).

[40] The disclosure addresses the solution to the improper orientation problem in its description of the assembly between the cassette and the receptacle in the diaper pail that receives it. It describes embodiments of the invention where “alignment features” in the receptacle are “matingly engageable” with features in the cassette’s bottom such that it minimizes the likelihood that the cassette will be improperly installed or otherwise assures that the cassette is positioned upright (128 Patent, pp. 4:17-19, 4a:1-12).

[41] The disclosure describes a solution to the stackability problem through the use of what are termed “first registration features” and “second registration features” (128 Patent, pp. 2:20, 2:21). The first registration features are features on the cover of the cassette, while the second registration features are those on the bottom of the cassette (*Ibid*, p. 2:20-26). The first and

second cassette registration features are “matingly engageable” with one another in such a way that allows the cassettes to be stacked one on top of the other and resist shifting relative to each other (see, e.g., *Ibid*; 128 Patent, p. 4:12-16). These first and second registration features are described as being a series of recesses and protuberances which are “complementarily shaped” to engage one another (see, e.g., *Ibid*, pp. 2:27-30, 3:1-3; 4:30-33). The disclosure delves into a series of embodiments that describe different ways the first and second registration features may be shaped and fit together harmoniously, providing numerous options for facilitating the shift resistance and stackability of cassettes (128 Patent, pp. 2:27-4:16).

B. *The Angelcare Patents*

[42] The Angelcare Patents are a series of divisional patents that claim different facets of a cassette for dispensing flexible tubing and its assembly into a diaper pail system. The 384 Patent is the primary application, with the 159 Patent as the first divisional application. The 421 Patent, the 312 Patent and the 415 Patent are divisional applications of the 159 Patent.

[43] The filing date for the Angelcare Patents is October 3, 2008 and they all claim October 5, 2007 as the priority date from European application EP 07019571.4 (“EP 571”). All of the Angelcare Patents, save the 312 Patent, were laid open for public inspection on April 5, 2009.

[44] Angelcare Development Inc. is listed as the owner on all of the Angelcare Patents. Indeed, these patents were initially owned by Angelcare Development Inc. prior to the amalgamation on October 1, 2020 that saw Angelcare Development Inc. continued under

Angelcare. As discussed above, Angelcare now holds all of Angelcare Development Inc.'s property, including the rights in the Angelcare Patents.

(1) History of the Angelcare Patents' Invention

[45] All of the Angelcare patents list Michel Morand as the sole inventor. Mr. Morand testified at trial to the development of the products that eventually led to the patents-in-suit.

[46] Mr. Morand's relationship with Angelcare started in the early 2000s when he met Claude Maufette, a peer in industrial design who had been working on a diaper pail for Maurice Pinsonnault, the founder of Angelcare (Morand, TT Vol. 2 pp. 37:1-38:10). Mr. Morand joined in on the project, agreeing to work for half of his usual professional fees in exchange for royalties on products sold (*Ibid*; 38:11- 47:5). Mr. Morand worked on diaper pail systems and similar systems for "kitty litter" disposal, as both relied on similar technology (*Ibid*, p. 39:2-23). Notably, both of these systems include cassettes: ring-shaped devices that contain and dispense plastic film (*Ibid*). This plastic film (otherwise referred to as 'plastic tubing' or simply 'bags' during various witnesses' testimony) functions as a bag into which soiled diapers or kitty litter are disposed of and stored in their respective pail systems.

[47] Mr. Morand testified that, at the time when he was brainstorming ideas for these products, Playtex's Diaper Genie Twistaway ("DG Twistaway") was the main player on the market that inspired his work (Morand, TT Vol. 2, pp. 39:24-40:16). He explained that this system operated to twist up diapers in plastic film individually, akin to sausage links (*Ibid*, pp. 50:8-54:15). Mr. Morand discussed the Twistaway's flaws, saying that the plastic film was also

difficult to cut, making it challenging to remove a full bag of dirty diapers from the pail, and that it was generally not a user-friendly system (*Ibid*, p. 55:6-21). This method of wrapping diapers failed to prevent odours from escaping, as the plastic film material itself let the odour leak through (*Ibid*, p. 49:15-26).

[48] In designing his initial cassettes with Angelcare, the Litter Locker and the Safety 1st Neat!, Mr. Morand aimed to respond to these flaws, making a simplified design that would be easy for the consumer to use and that responded to the flaws of Playtex's Diaper Genie system (Morand, TT, Vol. 2, pp. 58:18-62:13). He created a cassette with only two parts: the lower interior part and its cover (*Ibid*, p. 60:18-24). He also created a tear-off tab on the cassette's cover that, when removed, gave access to the plastic film stored within the cassette (*Ibid*, p. 62:10-27).

[49] Mr. Morand noticed in developing the Litter Locker system that a regular plastic bag was insufficient to effectively contain odours (Morand, TT Vol. 2, pp. 67:13-68:1). Accordingly, he incorporated a layer of Ethylene vinyl alcohol (EVOH) into the plastic film, creating an odour barrier (*Ibid*, pp. 68:23-69:27). This film, Mr. Morand testified, is what allowed the new Angelcare system to be designed as it was, given that it did not need to wrap up the bags into individualized packets, requiring less plastic film for the Angelcare system than for the DG Twistaway (*Ibid*, pp. 69:28-70:8). This impacted the cassettes' design, allowing them to be much smaller with less plastic tubing stored therein (*Ibid*, p. 70:11-24). These changes meant the cassettes took up less space on both shelves in storage, on retailers' shelves, and during transport (*Ibid*, pp. 120:26-121:13). Additionally, he designed the cassette's cover and bottom with

features that would ensure their stackability, i.e., that they would not topple over when stacked one on top of the other (*Ibid*, pp. 90:18-91:26)

[50] Playtex and Angelcare began collaborating in 2005, subsequent to a trade show in Cologne, Germany, where Mr. Morand and Angelcare presented their Captiva diaper pail system, a redesign of the Safety 1st Neat! and Litterlocker cassette systems (Morand, TT Vol. 2, pp. 123:5-20; 130:6-133:19). This relationship led Playtex to replace its DG Twistaway with the Angelcare system, marketed as the Diaper Genie II and later rebranded as the Diaper Genie Essentials (*Ibid*, pp. 140:7-141:2). It was the improvements upon this system that became the invention claimed in the Angelcare Patents.

[51] One flaw Mr. Morand identified as prompting a new design in the Angelcare-Playtex diaper pails was the propensity for users to install the cassette upside down in the Diaper Genie II (Morand, TT Vol. 2, pp. 160:20-162:28). He stated that he observed this at his child's day care and that this could cause two problems. First, with the cassette upside-down, the plastic film would not come up and over the cover as intended, but instead be dispensed directly downwards. This means that parts of the cassette might be directly exposed to the dirty diapers as they were inserted into the diaper pail, contaminating the cassette and creating hygienic concerns. Second, with the film dispensed directly downwards, it would be dispensed more easily and in greater quantities than if the cassette had been placed in its proper orientation, making this position more wasteful.

[52] Observing the cassette's improper use prompted Mr. Morand to find a solution by redesigning the cassette and the diaper pail to maintain its positive aspects without redesigning the cassette moulds entirely (Morand, TT Vol. 2, pp. 163:1-166:20). Using a series of metal rings to test his design, Mr. Morand altered the shape of the cassette to create an angle at its bottom (*Ibid*, 194:3-13; 196:1-199:11) as opposed to the cassette in use which had a flat bottom. This became the "chamfer-bottomed cassette". He also added a part to the closing mechanism of the diaper pail system such that the mechanism would require the space created by the chamfer-bottomed cassette to move between its open to closed positions (*Ibid*, pp. 224:17-26, 225:10-18). These two features together were designed to make it obvious to the consumer when the cassette was installed upside-down, making it effectively impossible to install incorrectly because if installed incorrectly, the closing mechanism would not allow the cassette to sit improperly, thus preventing the diaper pail's lid to close (*Ibid*, pp. 219:7-24; 223:5-8).

[53] Mr. Morand demonstrated the flat-bottomed cassettes relative to chamfer-bottomed cassettes using the Plaintiffs' products to illustrate the difference in how they could be installed in the older, and newer, generations of the diaper pails, respectively. With the flat-bottomed cassette, consumers could accidentally put the cassette in upside-down and it would fit well into the diaper pail, as it was then designed. The ease of fit with the flat-bottomed cassette meant there was no way to tell, from the consumer's perspective, that something was wrong. Conversely, the redesigned diaper pails have a closing mechanism that raises right up into the space at the bottom of the cassette. Without a chamfer, it becomes impossible to fit in the cassette in the pail (the holder of the cassette situated in the pail) because that cassette prevents the lid from closing properly. The chamfer on the other hand creates the space needed to allow

the cassette to sit comfortably in the holder without the interference caused by the closing mechanism. To demonstrate at trial, Mr. Morand placed the chamfer-bottomed cassette upside-down in the redesigned diaper pails, showing how the closing mechanism and the features of the cassette's holder in the diaper pail cause the cassette to raise up above where it should be, preventing the pail's lid from closing. This would signify to the consumer that it was incorrectly installed, but only in the newer generations of diaper pails that have requisite features, such as the closing mechanism and protrusions in the cassette's holder, that require the additional space created by the chamfered-bottomed cassette (Morand, TT Vol. 3, pp. 194:15-197:11).

(2) Disclosure Common to All Angelcare Patents

[54] All five of the Angelcare Patents have the same basic disclosure, with the 159 Patent containing six additional pages of disclosure that are also reproduced in the subsequent divisional applications (312, 415, 421). All of the Angelcare Patents contain the same eleven figures: Fig.1, Fig. 2A, Fig. 2B, Fig. 3A, Fig. 3B, Fig. 3C, Fig. 4, Fig. 5A, Fig. 5B, Fig. 6, and Fig. 7.

[55] The Angelcare Patents all bear the same title and disclose "an apparatus for packaging disposable material or objects into a tube of flexible plastic material" (384 Patent, p. 1:4-6). It explains that the disposable material it targets is waste material and specifically identifying babies' disposable diapers as an example (384 Patent, p. 1:6-9). It can be reasonably concluded from this disclosure that the "apparatus" mentioned is a diaper pail. The Patents aim at storing the packaged waste material, or diapers, "in a hygienic and substantially odor-free manner, until it is collected" (384 Patent, p. 1:11-12).

[56] The “background of the art” in each explains that existing diaper pails of this type generally have a container with an upper portion that opens, allowing the user to insert soiled diapers, as well as a bottom portion for storage of these diapers (384 Patent, p. 1:14-18). A ring-shaped cassette containing a tube of flexible plastic film material fits into the upper portion of the diaper pail (384 Patent, p. 1:18-20). This film forms an elongated tube that, when knotted at the bottom, functions as a bag inside the diaper pail (384 Patent, p. 1:20-23). The film enters the diaper pail at the upper portion and the user inserts the soiled diaper into the bag formed by the film through the open centre of the cassette and toward the bottom portion of the diaper pail (384 Patent, p. 1:24-28). A device called a “closeable means” (otherwise called a “closing mechanism”) seals the tube of plastic film shut below the cassette, preventing bad odours from escaping while the waste material is stored therein (384 Patent, p. 1:28-30).

[57] The disclosure discusses prior art inventions, notes their drawbacks, and states that the present invention addresses these issues. Canadian patent (No. 1,298, 191) and two Canadian laid-open applications (Nos. 2,383,799 and 2,441,837) both claimed closing mechanisms, but the disclosure explains that these inventions had many parts and are prone to breaking (384 Patent, p. 2:25-26). They are also supposedly not user-friendly since they are difficult to understand at first (*Ibid*, p. 2:26-28). Further, these prior art devices are costly to manufacture and use more film than needed from the cassettes, which again increases the price of use (*Ibid*, p.2:28-29). Some also apparently do not contain the odours of the waste in storage effectively (*Ibid*, p. 2:30-31). Finally, the common disclosure contained in the 384 Patent describes the orientation problem, explaining that “[s]ome cause confusion in their installation, causing improperly oriented cassettes and contamination of the cassette walls” (*Ibid*, p. 2:31-33). While the

disclosure states the invention will address the problems identified in the prior art generally, it is really this last issue, the “improper orientation problem”, that the disclosure discusses solving.

[58] One of the key features discussed in the disclosure is a clearance only at the bottom of the cassette’s central opening (384 Patent, p. 3:13-14). The clearance is described as being in the shape of a chamfer or as having a frusto-conical shape and may extend along the full periphery of the cassette’s central opening (*Ibid*, pp. 3:15-16; 5:6-8; 3:25-27). It may also take on different shapes while still falling within the scope of the invention (*Ibid*, p. 13:25-27). The Angelcare Patents’ disclosure explains that the chamfer-shaped clearance does not significantly reduce the amount of plastic tubing that can be stored within the cassette (*Ibid*, p.13:27-31).

[59] Apart from the clearance, the cassette discussed in the Angelcare Patents’ disclosure is much like the prior art cassettes discussed in the background of the invention (384 Patent, p. 3:3-14). The disclosure describes a cassette that dispenses plastic film stored therein through an annular gap in its cover. Once the user pulls the film up and out of the cassette, they tie a knot in the film and pass it through the central opening. This film, now knotted at the end, forms a bag into which users place soiled diapers by passing them through the cassette’s central opening and into the bag.

[60] The Angelcare Patents’ disclosure addresses the improper orientation problem with a closing mechanism for sealing the tube of plastic film shut that works in tandem with the clearance in the bottom of the cassette (384 Patent, *Ibid*, pp.3:34-4:14). The closing mechanism is located below the holder and is described in one embodiment as having two parts or

“portions”, one which is fixed, the other movable. The movable part, as a default position, rests against the fixed part; this is the closing mechanism’s closed position. The movable part also comprises the surface against which users will push their soiled diapers. In response to the vertical force put on the diaper while being pushed by the user’s hand against it, this part will slide down to an open position, creating a passage between the diaper pail’s opening and the storage area in the bottom of the diaper pail. Once the diaper has been pushed through, the closing mechanism returns to its initial portion. Thus, when the closing mechanism is in the closed position, this passage is also closed. The Angelcare Patents also disclose an alternate configuration of this closing mechanism, where instead of one fixed portion and one movable portion, both portions are movable and are, as a default position, resting against one another in a closed position (*Ibid*, p. 11:9-20). The cassette’s clearance provides the required space to allow the movement of the closing mechanism between its open and closed positions (*Ibid*, pp. 4:10-14, 10:35-11:8). With the cassette installed upside-down, the closing mechanism would not function (*Ibid*). Additionally, the lid on the diaper pail would be prevented from closing should the cassette be installed upside-down (*Ibid*, p. 4:26-30).

[61] Another way the improper orientation is solved is with an “interfering member” situated at the bottom of the cassette’s holder in tandem with the clearance in the bottom of the cassette (384 Patent, pp. 5:9-6:6). This clearance “cooperate[s] with the interfering member”, positioning the cassette in the correct orientation (*Ibid*, pp. 5:36-6:3). Like the closing mechanism solution, the lid on the diaper pail would be prevented from closing should the cassette be improperly oriented (*Ibid*, pp. 5:37-6:6).

- (3) The Added Disclosure of the 159 Patent and Subsequent Divisionals (the 421, the 312, and the 415)

[62] The additional disclosure not found in the original 384 Patent, but present in the disclosure of the four divisional patents, adds six additional pages. These describe ten different “aspects” of the invention, many of which describe similar features as those already disclosed in the original 384 Patent disclosure. I will not repeat these common elements. However, the additional disclosure does describe three new features that I will discuss in more detail below. One of these features is the configuration of the cassette’s cover. It also discusses so-called “projecting members” and “projecting portions” in the diaper pail and how these features interact with the cassette when it is installed in the diaper pail. As well, the additional disclosure describes a tube gathering mechanism much akin to the closing mechanism detailed in the preceding part of the Angelcare Patent’s disclosure.

[63] The additional disclosure states that the cover engages the inner wall of the cassette and extends outwardly toward the outer periphery of the cassette (159 Patent, p. 6:15-17). The plastic film overlies the cassette’s cover when it is dispensed and pulled down through the central opening of the cassette (159 Patent, p. 6A:1-4). In other words, the plastic film is dispensed from the outside of the cover and is pulled above the cover before it is pulled through the central opening of the cassette. In effect, the cassette is thus isolated from the soiled diaper because the film goes over the cover of the cassette, from the outside to the opening through which the film is pulled into the diaper pail. The cover’s periphery is said to have “a convex edge portion and an inwardly recessed edge portion, adjacent to the convex edge portion” (159 Patent, p. 6A:22-24).

[64] The disclosure also discusses the interaction between the cassette's clearance and a projecting portion or member that extends above the bottom wall of the cassette's holder (159 Patent, pp. 6D:12-16; 6E:20-6F:4; 6F:8-26). Both the projecting member and the projecting portion fit into the recessed area (i.e. the clearance) on the bottom of the cassette when it is fully seated in the holder. Accordingly, the additional disclosure describes further the solutions to the improper orientation problem already canvassed in Patent 384.

[65] The tube gathering mechanism seals the tube of plastic film when no diaper is being inserted into the diaper pail (159 Patent, pp. 6D:29-6E:15). It comprises a "closure member" that includes a projection that extends above the bottom wall of the cassette's holder. This is what interacts with the film and is movable relative to the holder's bottom wall to gather the film, effectively closing it. The user inserts a soiled diaper by applying pressure with their hand on this closure member, opening up a space into which the diaper is inserted. A "device" is connected to the closure member that causes the closure member to move relative the bottom wall of the cassette holder, thereby gathering the tube and closing it.

(4) The 384 Patent

[66] The 384 Patent, like the divisional patents, is entitled "Cassette and Apparatus for Packing Disposable Objects into an Elongated Tube of Flexible Material" and was issued on September 9, 2014. It makes 11 claims, all of which the Plaintiffs allege to be infringed by the Defendants, save Claim 11. The Defendants counterclaim that all 11 of the 384 Patent's claims are invalid.

[67] The 384 Patent's primary contribution to the invention disclosed in the Angelcare Patents is the clearance at the bottom of the cassette that pairs with either the movable portion of a closing mechanism, the fixed portion of a closing mechanism, or an interfering member in the cassette's holder to ensure the correct orientation of the cassette in the diaper pail's holder (Plaintiffs' Closing Arguments ("PCA"), para 343; Defendants' Closing Arguments ("DCA"), para 230(a)).

(5) The 159 Patent

[68] The 159 Patent was filed on June 25, 2014 as a divisional of the 384 Patent (ASF, para 34), and as such the above information regarding the filing date displayed on the Patent, the date it was laid open for public inspection, the priority date, the inventor and the owner remains the same. The only difference is the date it was issued, being November 8, 2016.

[69] The 159 Patent has 61 claims, all of which are asserted by the Plaintiffs. The Defendants counterclaim invalidity of these 61 claims.

[70] The 159 Patent is primarily about a projection in the cassette's holder in the diaper pail that fits into the cassette's clearance (PCA, para 355; DCA, para 230(b)). It also describes the design of the cassette's cover (Morelli Second Report, para 270(c)).

(6) The 421 Patent

[71] The 421 Patent's application was filed on July 15, 2016 as a divisional of the 159 Patent (ASF, para 40). It was issued April 11th, 2017.

[72] The 421 Patent makes 19 claims, all of which the Plaintiffs assert. The Defendants counterclaim that all 19 claims are invalid.

[73] The 421 Patent, like the 384 Patent, primarily claims a cassette with a clearance in the bottom that prevents incorrect orientation through its interaction with the closing mechanism or an interfering member (PCA, para 354; DCA, para 230(a)). Like the 159 Patent, it also defines the design of the cassette's cover (Morelli Second Report, para 270(b)).

(7) The 415 Patent

[74] The 415 Patent was filed as a divisional of the 159 Patent on July 15, 2016 (ASF, para 52). It was issued April 4, 2017.

[75] The 415 Patent comprises six claims, all of which the Plaintiffs assert and all of which the Defendants counterclaim to be invalid.

[76] The 415 Patent primarily discloses a closing mechanism with a projecting member that extends above and is movable relative to the bottom wall of the cassette's holder (PCA, para

356; DCA, para 230(c)). This projecting member fits and moves within the recessed area in the bottom of the cassette, otherwise called the clearance.

(8) The 312 Patent

[77] The 312 Patent's application was filed on July 15, 2016 as a divisional of the 159 Patent (ASF, para 40). The Patent shows October 7, 2016 as the date this Patent was laid open for inspection. However, the Plaintiffs submit that this is merely a clerical error, alleging that it was in fact laid open for inspection April 5, 2009, like the rest of the Angelcare Patents (SoC, para 16.20). It was issued on April 11, 2017.

[78] The 312 Patent defines 8 claims. The Plaintiffs assert all 8 of these claims and the Defendants counterclaim the invalidity of these same 8 claims.

[79] The 312 Patent is similar to the 415 Patent. It claims a tube gathering mechanism, with a closure member and a projection that extends above the bottom wall of the cassette's holder (PCA, para 357; DCA, para 230(d)). The closure member requires the clearance in the bottom of the cassette to move and is movable relative to this bottom wall. It seals the tube of plastic film shut when no diaper is being inserted into the diaper pail.

III. Claims Construction

A. *The Person of Ordinary Skill in the Art (POSITA)*

[80] Claims construction is done through the eyes of the person of ordinary skill in the art (“POSITA”) in the field to which the patent relates (*Free World Trust v Électro Santé Inc.*, 2000 SCC 66, [2000], 2 SCR 1024 [*Free World Trust*] at para 44, cited recently in *Guest Tek Interactive Entertainment Ltd. v Nomadix, Inc.*, 2021 FC 276 [*Guest Tek*] at para 51 and *Janssen Inc. v Apotex Inc.* 2021 FC 7 [*Jansen Inc.*] at para 109). They have the qualifications, training, experience and skills required to be the addressees of the patent who are “persons with practical knowledge and experience of the kind of work in which the invention was intended to be used” (*Catnic Components Ltd. v Hill & Smith Ltd.*, [1982] RPC 183 (H.L.) [*Catnic Components*]). They bring with them the common general knowledge in that field and have a mind willing to understand the patents to be construed. They are expected to be sufficiently adept in the field of art to which the patent relates so as to understand the invention and practice it (*Allergan Inc. v Sandoz Canada Inc.*, 2020 FC 1189 (Crampton CJ) at para 56, citing Donald H. MacOdrum, *Fox on the Canadian Law of Patents*, 5th ed (Toronto: Thompson Reuters, 2019) (loose-leaf updated 2020-6) [*Fox on Patents*] at #4.13). Notably, this hypothetical person does not benefit from inventiveness (*Hospira Healthcare Corporation v Kennedy Trust for Rheumatology Research*, 2020 FCA 30 [*Hospira*] at para 79, citing *Beloit Canada Ltd. v Valmet Oy*, [1986] FCJ No. 87, 8 CPR (3d) 289 (FCA) [*Beloit*] at 294). It is worth repeating the often quoted colourful paragraph from *Beloit*:

The test for obviousness is not to ask what competent inventors did or would have done to solve the problem. Inventors are by definition inventive. The classical touchstone for obviousness is

the technician skilled in the art but having no scintilla of inventiveness or imagination; a paragon of deduction and dexterity, wholly devoid of intuition; a triumph of the left hemisphere over the right. The question to be asked is whether this mythical creature (the man in the Clapham omnibus of patent law) would, in the light of the state of the art and of common general knowledge as at the claimed date of invention, have come directly and without difficulty to the solution taught by the patent. It is a very difficult test to satisfy.

[81] The emphasis on ordinariness is present in a number of cases. In Canada, this passage taken from *Consolboard Inc. v MacMillan Bloedel (Sask.) Ltd.*, [1981] 1 SCR 504 [*Consolboard*], at p. 523 continues to constitute the state of our law:

The persons to whom the specification is addressed are “ordinary workmen”, ordinarily skilled in the art to which the invention relates and possessing the ordinary amount of knowledge incidental to that particular trade. The true interpretation of the patent is to be arrived at by a consideration of what a competent workman reading the specification at its date would have understood it to have disclosed and claimed.

[82] The patents in this case all relate to diaper pail systems and cassettes used therein. The parties’ experts agree that all the patents-in-suit would be addressed to the same POSITA (Morelli First Report, para 29, Bailey First Report, paras 50-55).

[83] The parties and their expert witnesses, Mr. Morelli and Mr. Bailey, are generally in agreement on the description of the POSITA to whom all of the patents-in-suit are addressed. They are a person with a university or college-level degree in industrial design or a related field such as engineering (Morelli First Report, para 30, Bailey First Report, para 52).

[84] The parties however disagree on how much experience the POSITA would have and how this ought to be measured. Mr. Morelli described experience in number of years, depending on the educational background of the individual in question. He explained that a mechanical engineer with a four year university degree would not require any work experience, whereas a technician in industrial design with a four year college degree would require one year of experience and an industrial designer with a three year university degree would need two years' experience to be a POSITA (Morelli First Report, para 30). Mr. Bailey for the Defendants explained that the POSITA would have designed two to four plastic-molded and consumable products to gain the necessary knowledge on aesthetic and user interaction, as well as the manufacturing cost optimization trade-offs normally used in the design of low cost consumables (Bailey First Report, para 53), He asserts that these skills would be necessary for a POSITA to be able to independently understand and practice the patented inventions and that product development of disposable products would be widespread among industrial designers, as it is part of their educational training (Bailey Reply Report, paras 18-19). Mr. Morelli disagreed with Mr. Bailey's assertion that experience ought to be measured in terms of products developed, as junior designers work under the supervision of more senior designers, so any designer that had independently designed two to four products would have significantly more experience than the one to whom these patents are addressed (Morelli Second Report, para 31). Moreover, he highlights that the person with the skills necessary to invent the patented products is distinct from the POSITA, who only requires the skills needed to understand and practice it (Morelli Second Report, para 30).

[85] The differences in work experience advanced by the parties are not significant or particularly determinative as it relates to claims construction, as admitted by both parties (PCA, para 6; DCA, para 38). At any rate, I find Mr. Morelli's definition of the POSITA more compelling. Mr. Bailey's focus on aesthetic and user interaction, as well as manufacturing cost optimization trade-offs, seem to be more in line with the considerations associated with developing the invention rather than understanding and practicing it. I agree with Mr. Morelli's opinion that the POSITA requires less skill than the person able to independently develop the patented products and that one may not need to have developed consumable plastic products to gain the POSITA'. The words taken from *Consolboard* and quoted at paragraph 81 come to mind. Indeed the ordinary person of skill lacks inventiveness. She does not possess exceptional skill and knowledge, but is not either the least qualified. In the words of *Fox on Patents*, #4:13 – (c), “(t)he specification is, therefore, addressed to skilled persons who possess sufficient skill and knowledge incidental to the particular art to which the invention relates to render them capable of appreciating the nature of the invention and putting such subject matter into practice.” The POSITA's profile must represent the common denominator of skill shared among those who would be able to understand and practice the patent. Accordingly, the Court takes up the following definition of the POSITA:

- mechanical engineer with a four year university degree
- a technician in industrial design with a four year college degree and at least one year of work experience in product design and development
- an industrial designer with a three year university degree and two years' experience in product design and development

B. *Common General Knowledge*

[86] The common general knowledge (“CGK”) is the technical knowledge that was generally known by the POSITA, as defined, at the relevant time in the field of art or science to which the patent relates (*Apotex Inc v Sanofi-Synthelabo Canada*, 2008 SCC 61, [2008] 3 SCR 265 [*Sanofi*] at para 37). It is only a subset of the state of the art generally and does not include all the information in the public domain (*Ibid; Hospira*, para 84). It is also defined in relation with the POSITA because it constitutes the knowledge of the skilled person at the time. *Fox on Patents* describes it as including “what the person may reasonably be expected to know and to be able to find out. It is all the knowledge which is generally known and generally regarded as a good basis for further action by the bulk of those engaged in the field to which the invention relates” (#4:14 - (b)).

[87] In *Bell Helicopter Textron Canada Limitée v Eurocopter, société par actions simplifiée*, 2013 FCA 219 [*Bell Helicopter*], Court of Appeal wrote:

[64] Common general knowledge does not amount to all information in the public domain. While the common general knowledge of the skilled person certainly includes knowledge of patents, it does not include knowledge of all patents: [...] Nor does it include knowledge of all journal articles or other technical information. [...]

[65] Rather, it is well established that the common general knowledge is limited to knowledge which is generally known at the relevant time by skilled persons in the field of art or science to which the patent relates: [...]. Thus, accordingly, the common general knowledge is with respect to the subset of patents, journal articles and technical information which is generally acknowledged by skilled persons as forming part of the common general knowledge in the field to which the patent relates: [...]

[Footnotes omitted.]

[88] But the CGK is not to be assumed; it must be established by evidence which is measured on a balance of probabilities. The task for the court was summarized by Laddie J in *Raychem Corporation's Patents*, [1998] RPC 31 at p. 40:

The court is trying to determine in a common sense way how the average skilled but non-inventive technician would have reacted to the pleaded prior art if it had been put before him in his work place or laboratory. The common general knowledge is the technical background of the notional man in the art against which the prior art must be considered. This is not limited to material he has memorised and has at the front of his mind. It includes all that material in the field he is working in which he knows exists, which he would refer to as a matter of course if he cannot remember it and which he understands is generally regarded as sufficiently reliable to use as a foundation for further work or to help understand the pleaded prior art. This does not mean that everything on the shelf which is capable of being referred to without difficulty is common general knowledge nor does it mean that every word in a common text book is either. In the case of standard textbooks, it is likely that all or most of the main text will be common general knowledge. In many cases common general knowledge will include or be reflected in readily available trade literature which a man in the art would be expected to have at his elbow and regard as basic reliable information.

[89] The parties are generally in agreement on the common general knowledge of the POSITA. Both experts attest that they would have knowledge of consumer products development and the manufacturing processes for producing such products (Morelli First Report, para 32; Bailey First Report, para 52). This would include knowledge of geometric vocabulary, spatial geometry, technical and three-dimensional drawings, as well as computer-assisted design (“CAD”) software (Morelli First Report, para 32; DCA, para 38). It would also include knowledge about the methodology of the design process, well-known design elements, principles of mechanics and ergonomics, and general notions of safety and user experience (Morelli First Report, paras 32-34; DCA, para 30).

[90] The experts disagreed on the POSITA's experience and knowledge in relation to product line extensions and the legacy issues that accompany the development of such products, as well as the development of disposable or consumable products. Mr. Bailey asserted that the POSITA would have such knowledge and experience, while Mr. Morelli denied that this would be necessary, as it would be too specialized a skillset (Bailey First Report, para 53; Bailey Reply Report, paras 13-15, 18; Morelli Second Report, paras 23-28).

[91] Again, the parties agree that these differences are not material at the claims construction phase (PCA, para 6; DCA, para 38). In any case, Mr. Morelli and the Plaintiffs' characterization of the POSITA, with less specific or developed knowledge and experience than that advanced by Mr. Bailey, is more tenable in view of the evidence available. It bears restating that the person to whom the patents are addressed is someone who is able to understand the invention described therein as someone of ordinary skill in the field to which they relate. The specificity and depth of the POSITA's skill may thus be less than that of the person who actually created the patented invention. Indeed, one of the key markers of the POSITA is that they cannot be inventive, so they are necessarily not the person who is placed to conceive of the patent's subject-matter. Accordingly, while these more specific skills and product development experiences may have been necessary for the person developing the patents-in-suit, it seems more likely that the experience, knowledge, and expertise that is the common denominator between the two experts' positions is where the POSITA lies.

[92] The material differences in the parties' position on the POSITA's CGK relates to the obviousness analysis. Accordingly, these differences will be canvassed below.

C. *Claims Construction*

[93] The claims will define the scope of the monopoly to which Angelcare argues it is entitled (*Patent Act*, s 27(4)). The Supreme Court in *Free World Trust* explains that claims serve a public notice function, defending against uncertainty as to what will or will not be considered infringing activity (paras 50-51). It states at paragraph 44 that “(i)t is the “common knowledge” shared by competent “ordinary workers” that is brought to bear on the interpretation” (para 44). The patent regime, instituted under the *Patent Act*, is a bargain between the patentee and the public (*Whirlpool Corp v Camco Inc*, 2000 SCC 67, [2000] 2 SCR 1067 [*Whirlpool*] at para 37; *Free World Trust*, para 13). Claims construction thus aims to ensure that the patentee’s monopoly is not being extended beyond the bargain that was fairly struck. For that to be true, the claims construction exercise cannot be results-oriented. Thus, the claims construction will be the same for all purposes, whether it be infringement or invalidity.

[94] The language of the claims continues to be important. In *Free World Trust*, the Supreme Court states that “(t)he primacy of the claims language was already rooted deeply in our jurisprudence and should, I think, be affirmed again on this appeal” (para 40). As the Court explains, the adherence to the claims’ language will have the effect of promoting fairness and predictability. But the claims must also be construed in an informed and purposive way. It remains that the text of the claims cannot be ignored. At paragraph 51 of *Free World Trust*, the Supreme Court notes that, “if the inventor has misspoken or otherwise created an unnecessary or troublesome limitation in the claims, it is a self-inflicted wound. The public is entitled to rely on the words used provided the words used are interpreted fairly and knowledgeably.” Indeed, the

Court quoted with approval the following paragraph, as its own paragraph 59 of *Free World Trust*, taken from *Eli Lilly & Co. v O'Hara Manufacturing Ltd.* (1989), 26 CPR. (3d) 1, at page 7 of the decision of the Federal Court of Appeal:

A court must interpret the claims; it cannot redraft them. When an inventor has clearly stated in the claims that he considered a requirement as essential to his invention, a court cannot decide otherwise for the sole reason that he was mistaken.

[95] The Supreme Court of Canada laid out the fundamental principles of claims construction in *Whirlpool* at paras 49-55 and *Free World Trust* at paras 44-54. Chief Justice Crampton, in the recent *Janssen Inc.*, at paragraph 112, summarized some of them as follows:

- i. Claims are to be read in an informed and purposive way, with a mind willing to understand and viewed through the eyes of the skilled reader, as of the date of publication, having regard to the common general knowledge.
- ii. Adherence to the language of the claims allows them to be read in the manner in which the inventor is presumed to have intended, and in a way that is sympathetic to accomplishing the inventor's purpose, which promotes both fairness and predictability;
- iii. The whole of the specification should be considered, in order to ascertain the nature of the invention, and the construction of the claims must be neither benevolent nor harsh, but instead should be reasonable and fair to both the patentee and the public; and
- iv. On a purposive construction, the claim language will show that some elements are essential while others are non-essential. The identification of claim elements as essential or non-essential is made on the basis of the common general knowledge of the worker skilled in the art to which the patent relates as of the patent publication date.

[96] With these legal principles and the above description of the POSITA and their CGK in mind, I now turn to the contested elements in the patents at issue.

(1) The 128 Patent

(a) “*alignment features*”

[97] Mr. Morelli explains that the alignment features are features on the interior surface of the diaper pail that face the first registration features on the bottom of the cassette (Morelli First Report, para 335). He defined the registration features as features on the top and bottom of the cassette that fit together to assist with the upright positioning of the cassette in the receptacle (i.e. the cassette’s holder) (Morelli First Report, paras 335-336). These alignment features fit with the first registration features to ensure that the cassette’s central opening is in line with the opening in the receptacle (i.e. the cassette’s holder), allowing a diaper to be inserted through the cassette and the pail’s opening into the storage area and ultimately assisting in solving the improper orientation problem (Morelli First Report, paras 337, 345; Morelli, TT Vol. 9, 125:13-126:17; 131:5-134:21). Essentially, if the features are not aligned, the cassette will not be in the proper orientation. If the cassette is put upside down, the alignment feature will never meet the registration feature. Mr. Morelli disagrees that these features serve the purpose of “rotational alignment”, as suggested by Mr. Bailey, because the rotational alignment of Mr. Bailey is nowhere to be found in the 128 Patent (Morelli Second Report, para 72; Morand, TT, Vol. 9 pp. 125:13-127:17). Indeed, it is not completely clear what is actually meant other than a cassette would have to be turned in the holder in order to find the alignment and the registration features.

[98] Mr. Bailey testified that “alignment features”, as provided in Claim 11 of the 128 Patent, are the structural features in the receptacle of the diaper pail that fit with the first registration features on the bottom of the cassette when the cassette is rotated (Bailey First Report, para 88(a)). Mr. Bailey distinguishes alignment from orientation, stating that the alignment is an arrangement along the same plane (i.e., the horizontal plane), rather than orientation, which would be an arrangement along a different plane (*Ibid*). By “rotational alignment”, Mr. Bailey seems to suggest that the cassette must be rotated (i.e. turned or “wiggled”) on a lateral plane (i.e. left or right) until the registration features and the alignment features interlock (Bailey, TT Vol. 17, pp. 87:2 - 91:25). This is different from sitting the cassette right-side-up or upside down. Mr. Bailey’s “alignment” is about rotating a cassette horizontally (Bailey First Report, para 88(a)). Again, there is not anything Mr. Bailey could point to in Claim 11, or anywhere in the disclosure of the 128 Patent, to create a general notion of “rotational alignment”. At best, it boils down to the normal wiggling that may be necessary from the features to meet each other. As a matter of fact, that is precisely what he says at lines 18 to 25 of the trial transcript of February 17, 2021 (Vol. 26). The notion of “rotational alignment” comes exclusively from Mr. Bailey looking at the figures, rather than the text of the patent (Bailey, TT Vol. 18, p. 81:1-15). Not only it is not possible to find that notion in the 128 Patent, but it is not even alluded to in the text of Patent 128. Mr. Bailey did not satisfy the Court that the 128 Patent provides for a “rotational alignment” through its figures. The rotational alignment is not in the text of the claims; it is not in the disclosure; it is not in the figures of the 128 Patent. On a purposive construction of the term, it cannot be, in my view, inferred. If there is to be some rotation, it is merely the wiggling of the cassette in the holder that may be needed for the registration features and the alignment features in the holder to meet each other. That was not claimed; that was not alluded too in the

specification. How “rotational alignment” contributes to stackability and proper orientation of cassettes was unexplained and left to speculation.

[99] I agree with Mr. Morelli’s definition of “alignment features”. As already found, nowhere in the 128 Patent is there any mention, let alone any discussion, of rotation; to impose this requirement would be an undue restriction on the scope of the claims. Mr. Bailey relies essentially on the figures to deduce his definition of rotational alignment, looking at the discontinuous features that might require some degree of turning on the part of the user to have the cassettes fit one on top of the other. However, the claims’ silence as to rotation, as well as the disclosure’s emphasis on the stackability issue and the improper orientation issue, provide no such corroborative information that the alignment features seek to claim rotational alignment. While it is permissible to look to the specification as a whole to clarify ambiguous terms in the claims, the specification cannot restrict or expand the claims’ scope (*Whirlpool*, at para 52, cited recently in *Tetra Tech EBA Inc. v Georgetown Rail Equipment Company*, 2019 FCA 203 [*Tetra Tech*] at para 86; *Sanofi* at para 77). As far as has been shown to the Court, not only is the term inexistent in the 128 Patent, but it has not been shown what purpose could be served by the so-called “rotational alignment” when the Patent’s purpose does not require any such feature.

[100] The two purposes of the 128 Patent relate to stackability and proper orientation of cassettes. On a purposive construction, there does not appear to be any reason to consider some new rotational alignment. In *Free World Trust* (*supra*) the Supreme Court plainly found that “(t)he primacy of the claims language was already rooted deeply in our jurisprudence and should, I think, be affirmed again on this appeal” (para 40). In *Whirlpool* (*supra*), the Court

found that on a purposive construction of claims requires that the words of the claim be interpreted with the purpose of the inventor being present: “(i)ntention is manifested in words, whose meaning should be respected, but words themselves occur in a context that generally provides clues to their interpretation and a safeguard against their misinterpretation” (para 49).

[101] While it is permissible to look to the whole of the specification, including the drawings, to understand the meaning of terms in the claims, there must be some terms and it is “not to enlarge or contract the scope of the claim as written and thus understood” (*Whirlpool* at para 52, cited recently in *Tetra Tech* at para 86; *Sanofi* at para 77). To take up Mr. Bailey’s construction of “alignment features” out of some interpretation of a drawing, without even a word to that effect in the rest of the specification, while the construction given by Mr. Morelli is perfectly reasonable and does not rely on words that are not present in the specification, would be to stretch the construction beyond reason. The Court does not accept a construction that is not anchored in the claims and their language.

[102] The Court thus upholds Mr. Morelli’s definition of “alignment features” as those features in the holder of the cassette that fit with the first registration features in the bottom of the cassette to assist allowing for the cassette to be properly installed upright in the holder.

(b) “*mating engagement*” and “*complementary/complimentary shapes*”

[103] The experts disagree as to whether “mating engagement” and “complementary shapes” denote different degrees of fit.

[104] Mr. Morelli does not distinguish between “complementary shapes” and “mating engagement”, as used in the 128 Patent. Mr. Morelli explains that both of these terms denote that the features that “engage” fit in one another, just as a protrusion might be shaped to fit into a recess (Morelli First Report, paras 330, 336; Morelli, TT Vol. 9, 83:12-84:15).

[105] Mr. Bailey defines “complementary shapes” and “matingly engage” as two distinct concepts with different degrees of complementarity. Complementary designates that two features fit compatibly together without fitting in a complete and intimate way; the features do not need to be mirror images of one another or have one-to-one correspondence (Bailey First Report, para 80; Bailey Second Report, paras 30, 46). In contrast, shapes that “matingly engage” do need to be mirror images of one another or otherwise have a one-to-one correspondence, denoting a close and intimate fit (Bailey First Report, para 88(a); Bailey Second Report, para 46). Mr. Bailey testified that mating engagement is more specific than complementary engagement, stating that it implies more intimacy (Bailey, TT Vol. 17, p. 148:1-7).

[106] The Plaintiffs pointed out during closing arguments that the use of these two distinct terms can actually be rendered coherent when looking at the patent disclosure itself, dispelling doubt as to their meaning (Closing arguments, TT Vol. 33, pp. 91:1-92:10). At page 5:9 of the 128 Patent, Figure 13 is described as showing “a bottom surface of the cassette matingly engaged with complementarily-shaped alignment features defined by a seating surface of the receptacle.” The specification thus reveals that registration or alignment features can be complementary in shape such that they matingly engage one another. The two concepts are different, but work together. When examining the detailed description of the preferred embodiment of the present

invention, one finds a significant number of passages where both expressions are used. And often they are used together, not in contradistinction to one another. For instance, at 5:31 we see “The recesses 42 and the raised bumps 44 are complementarily [*sic*] shaped relative to one another so that when cassettes 20 are stacked one-on-top-of-the-other, the raised bumps 44 of one cassette matingly engage the recesses 42 of the successive cassette ...”. The complementarity of the shapes leads to the bumps and recesses to matingly engage. Another telling example is found at 7:12 when we find “The cassette bottom 330 includes an annular recessed portion 352 best seen in Fig 8 that is complementarily [*sic*] shaped to matingly engage the annular ...”. The same correspondence can also be found at 7:28 and 8:9. Indeed, the claims themselves use the language of “complementarily shaped” when discussing the design of the first and second registration features or the first registration features and alignment features, yet use the term “engage” or “matingly engage” when describing the action of these features fitting with one another. A POSITA with a mind willing to understand would look to the patent, in tandem with the specification, to see the words contained therein as internally consistent and imbued with meaning. This Court thus finds that there is no difference in degree or type of fit between those features that are said to matingly engage or be complementarily shaped to engage. They denote a measure of intimacy that will favour the stackability.

(c) “*recess*”

[107] The parties agree that a recess, as defined in the 128 Patent, is a removal of material such that there is a hole or a depression that creates an empty space or cavity into which something else, such as a projection or protuberance, may be inserted (Morelli First Report, para 330;

Bailey First Report, para 84). It is not significantly different from the definition of “recess” discussed in reference to the Angelcare Patents below.

- (d) *Whether the location of the film-dispensing gap in the cover of the patent is an essential element of the 128 Patent*

[108] Mr. Morelli and Mr. Bailey disagreed as to whether the location of the film-dispensing gap on the cover of the cassette disclosed in the 128 Patent was an essential element. Mr. Morelli asserts that it is essential because the location of the gap can have a material effect on shift-resistant stackability (Morelli First Report, para 317). With the gap placed toward the center of the cassette, there is a larger surface area for contact between the registration features on the cover and the bottom of the cassette, according to Mr. Morelli (Morelli Second Report, para 123). Mr. Morelli explains that, all things being equal, placing the registration features toward the exterior of the cover will increase the shift-resistant stackability (Morelli Second Report, para 123). Conversely, Mr. Bailey sees the gap’s location as non-essential because it is not the key determinant of shift-resistant stackability; it only influences where the registrations may be placed on the cover (Bailey first Report, paras 82, 195; Bailey, TT Vol. 16, pp. 115:18-117:6). He explains that if the gap is narrow (i.e. less than a third of the width of the cassette cover), its placement may not even affect the positioning of the second registration features (Baily Reply Report, para 29). Additionally, Mr. Bailey notes that the 128 Patent does not require any particular degree of shift-resistant stackability and that the number, size, and shape of the registration features, can compensate for advantage or disadvantage the placement of the gap might contribute to the stackability (Bailey Reply Report, para 28).

[109] The Court begins with the assumption that an element of a claim is essential, but that it can be found non-essential if the evidence establishes that, on a purposive construction of the words of the claim, it was clearly not intended by the inventor that they are essential or that the POSITA would appreciate that it could be omitted or substituted without affecting the way the invention works (*Free World Trust*, para 55, cited recently in *Betser-Zilevitch v Petrochina Canada Ltd.*, 2021 FC 85 at para 100). This must be considered in tandem with the principle that an unnecessary or troublesome limitation in the claims is “a self inflicted wound” (*Free World Trust*, para 51, cited recently in *Tearlab Corporation v I-MED Pharma Inc.*, 2019 FCA 179 [Tearlab] at para 32 and, in particular on the notion of essential vs. non-essential claims, *Easton Sports Canada Inc. v Bauer Hockey Corp.*, 2011 FCA 83 at para 53). Justice St-Louis, writing at paragraph 84 of *Eli Lilly Canada Inc. v Apotex Inc.*, 2020 FC 814, notes that “the usual rule is that what is not claimed is considered disclaimed”, relying on *Whirlpool* at paragraph 42 and *Monsanto Canada Inc v Schmeiser*, 2004 SCC 34 [*Monsanto*] at paragraphs 122–123 to this effect. A purposive construction will strike a balance between these principles, neither unduly limiting the meaning of the claim, nor extending it beyond what the inventor intended.

[110] I find the placement of the gap in the cover of the cassette in the 128 Patent to be an essential element of Claim 1. It bears noting that, of the more than 120 claims asserted in this action, the Defendants only alleged that one element of one claim was non-essential. As often noted, claims construction cannot become a result-oriented interpretation, “with an eye on the allegedly infringing device in respect of infringement or with an eye to the prior art in respect of validity to avoid its effect” (*Whirlpool*, (*supra*) para 49). The gap is featured in the disclosure of the Patent and all figures show a gap (situated between the tubular wall and the interior

peripheral edge of the cover shown to be attached of the cassette). I have not been convinced that the presence of a gap was done *per incuriam* or that it is somehow some non-essential element. Indeed, Claim 1 refers specifically to the positioning of the second registration features in relation to the gap, as defined, by claiming that the features are “positioned outward from the gap”

[111] Mr. Morelli agreed that the gap’s placement is but one feature that assists with shift-resistant stackability with the size, shape, and number of registration features as other relevant features (Morelli, TT Vol. 30, pp. 59:5-64:6). However, this does not mean that, on a purposive reading, the patent itself does not intend for the gap to be at its most optimal placement for shift-resistant stackability.

[112] Changing the placement of the gap would require additional modification to the rest of the structure of the cassette and would cause a limitation not wanted by the inventor against the patent’s stated purpose of achieving shift-resistant stackability. As discussed above, an element will be found non-essential if it can be substituted *without* having a material effect on the structure or operation of the invention (*Free World Trust*, paras 20, 55). Ron Tsang, an expert retained by counsel for the Defendants, who made on the Court a strong impression by his clarity and the independence of his testimony as an expert witness, supported the importance of the surface area contact. I reproduce paragraphs 74 and 76 from his expert report of November 24, 2020:

74. To improve on the stackability of products, the Skilled Designer would focus on enhancing the surface area contact between the items being stacked. Unsurprisingly, stacked items

resting on a small number of small or narrow surfaces will be more prone to topple over.

76. Once adequate surface area contact has been achieved, the Skilled Designer would likely seek to achieve lateral shift resistant stackability with small projections and recesses in the bottom and cover of the cassettes. These projections and recesses could be much smaller than those discussed above in relation to the incorrect orientation problem because that issue required end users to recognize that the projections were present, which requires larger features. In contrast, as explained above, larger projections would likely disrupt the stackability of the cassettes and increase the amount of shelf space and shipping costs required.

Mr. Tsang testified that all things being equal, registration features placed nearer to the exterior of the cassette would be best for shift-resistant stackability and that more surface area contact between two cassettes stacked on top of one another would assist in solving stackability-related issue (Tsang Report, paras 74-78). Mr. Morelli was of a similar view (Morelli Second Report, para 123). If a location of the gap is part of what contributes to the shift-resistant stackability, even if it is one feature among others, its substitution will have a material effect on either the structure or the invention described in the claims. The surface available on the cover of the cassettes to fit the second registrations is an important element to offer stackability.

[113] As alluded to earlier, Claim 1 states that the second registration features are “positioned radially outward from said gap”, thus convincingly asserting that the gap was intended to be closer to the interior of the cassette than the registration features placed exterior to it.

[114] I note that the two main experts in this case were first time experts testifying for the first time. Neither one was diapering products specialist. That helps explain why the reliability of their testimony was at times subject to reservation. Counsel for the Defendants put considerable

emphasis on the fact that the expert retained by the Plaintiffs had to correct his reports on a few occasions, including on his understanding of “gaps” and “chamfers”. However, the expert retained by the Defendants had his own limitations. His constant reliance on figures, as opposed to the text of the claims, produced a testimony in search of an argument that figure 6 of the 128 Patent may be disclosing a gap on the exterior of the cassette. It does not. Another example includes his attempt at finding a chamfer at Figure 8 of the 128 Patent, an unsuccessful attempt based exclusively on a figure. In the end, the Court had to examine issues on a case-by-case basis, without being able, in spite of the express suggestion of counsel to the Defendants, to favour *a priori* the expert for the Defendants.

[115] With all this said, I find that the location of the film-dispensing gap on the cover of the cassette is an essential feature of Claim 1 of the 128 Patent.

(2) The Angelcare Patents

[116] The Defendants contend that the Angelcare patents are twice divided into further divisional applications, thus being part of the same family, must be interpreted consistently and harmoniously. The Court agrees.

- (a) *“clearance” of the 384 and 421 Patents, “clearance means” of the 159 Patent, and “recessed area” of the 312 and 415 Patents*

[117] The parties agree that the “clearance” of the 384, 159, and 421 Patents is equivalent to the “recessed area” of the 415 Patent (Morelli First Report, para 281; Morelli, TT Vol. 10, pp. 90:27-91:7; Bailey First Report, para 159, 173). They also agree that the “clearance means” of the 159

Patent is the wall that creates the clearance (Morelli First Report, para 218; Bailey First Report, para 142(b)).

[118] Both experts initially agreed that the clearance in the Angelcare Patents refers to an empty space in the bottom of the cassette (Morelli First Report, para 74; Bailey First Report, para 114(b)). However, it looked like Mr. Bailey's position evolved over time. Mr. Bailey specified in his Second Report that the clearance must fit the fixed or movable portion of the closing mechanism of the Angelcare Patents (Bailey Second Report, paras 15, 80, 84(a)). He added that the clearance may also be sized to fit one or two "interfering members", but that this does not in any way negate that the clearance must at least be able to fit the closing mechanism (*Ibid*, para 84(c)). He wrote at paragraph 84(c) of his Second Report:

In my view, the fact that the clearance may fit one or two interfering members does not mean that the clearance fits only the interfering member(s). The presence of an interfering member does not override the rest of the disclosure's description of the clearance and its role in respect of the closing mechanism.

[119] Mr. Bailey took on the more precise construction of the term "clearance" in his Second Report because he opines that the clearance must be understood in light of how it assists with the improper orientation problem, with the clearance working in tandem with the closing mechanism to this effect (*Ibid*, paras 80, 84(a) and (c)). During testimony, Mr. Bailey affirmed this second and more specific construction of the clearance in the Angelcare Patents (Bailey, TT Vol. 16, pp. 162:12-164:5). Mr. Bailey further explained that the term "clearance" is generally used in the design world to denote the distance between two objects moving relative to one another (Bailey, TT Vol. 16, p. 165:26-28; see also Bailey, TT Vol. 17, pp. 130:17-19, 134:10-14). The

Defendants rely on Mr. Bailey's testimony to assert, at paragraph 69 of their written closing arguments, that the clearance is

... a gap allowing the fitting or operation of a closing mechanism and, *optionally*, the fitting of one or more interfering members, with the function of resolving the incorrect cassette orientation (*i.e.*, upside down) problem.

[120] Mr. Morelli disagrees with Mr. Bailey's construction of the term "clearance" as one that must accommodate the operation of a closing mechanism (Morelli, TT, Vol. 9, pp. 157:19-159:7). He states that this empty space helps ensure that the cassette is installed in the diaper pail in the correct orientation (Morelli Second Report, para 79; Morelli, TT Vol. 8, p. 123:1-24). To this end, he explains that the clearance can be used in tandem with a fixed projection and there does not appear to be any reason why the POSITA would necessarily require the clearance to be a space that allowed the movement of a closing mechanism (Morelli, TT, Vol. 9, pp. 157:19-159:7). One does not need for the closing mechanism and the interfering member to work at the same time to have a cassette properly oriented in the holder. No need for belts and suspenders: one is enough. The evidence of Mr. Bailey was unfortunately ambiguous on what a clearance is. He is clear that a clearance must be defined with its function in mind (for the proper orientation of the cassette). What is less clear is whether the clearance must be configured to fit the closing mechanism and the interfering member. To the extent he asserts such construction, which is equivocal, that is not a construction that is sustainable. In their written closing arguments, the Plaintiffs relied on Mr. Morelli's testimony to submit that "[t]he "clearance" is therefore an empty space at the bottom of the cassette that solves the orientation problem by engaging with a fixed or movable part of the pail" (PCA, para 33). There are three ways of solving the orientation problem: using the closing mechanism, with the moving portion engaging the clearance or with

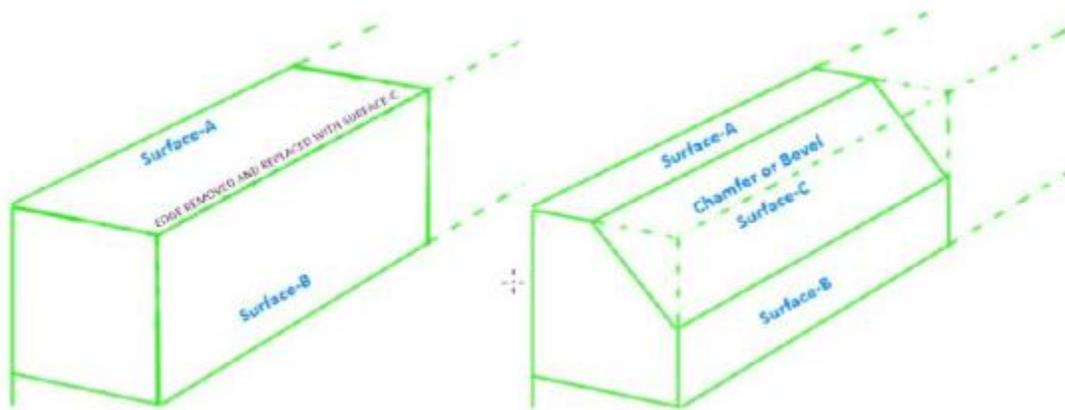
the fixed portion engaging the clearance, and with an interfering member in the holder that forces the cassette to be installed upright in the holder because the clearance allows for the interfering member not to be interfering.

[121] I take the Plaintiffs' definition of the clearance at paragraph 33 of their closing arguments to be the proper construction. The clearance is not alone configured for the fitting or operation of a closing mechanism. It can also be configured to fit interfering members in the diaper pail's holder, as discussed in the Angelcare Patents. Mr. Bailey confirmed this on cross-examination, agreeing that there are embodiments described in the 384 Patent where the clearance did not accommodate the movement of a closing mechanism but could nonetheless solve the improper orientation problem (Bailey, TT Vol. 17, pp. 144:3-148:1). Reference to the claims themselves is also informative. For example, Claim element 1(h) of the 159 Patent discusses a projection in the holder that inserts itself into the cassette's clearance when the cassette is installed in the diaper pail holder. There is no indication that this is necessarily part of the closing mechanism, nor that it is movable, as it is claimed as part of the holder itself. Accordingly, a clearance is an empty space at the bottom of the cassette that solves the orientation problem by engaging with a fixed or movable part of the pail.

(b) *“chamfer” and “shape of chamfer” of the 384, 421, and 159 Patents*

[122] Both experts agree that a chamfer is the surface created when material is removed from the corner where two surfaces meet such that it forms a third surface or 'beveled edge' (Morelli Second Report, para 140; Bailey First Report, para 115). The illustration of a chamfer that Mr. Bailey includes in his First Report, and that Mr. Morelli takes up in his second report, is

displayed below. The key difference that emerged between Mr. Morelli's and Mr. Bailey's construction of "chamfer" is whether it can be combined with other geometric shapes, such that one of its three surfaces is eliminated.



[123] Mr. Morelli does not believe that the chamfer can be combined with other features and remain a chamfer; if combined with another geometric figure, or something else, Mr. Morelli is adamant that it is not a chamfer anymore. A square that does not have sides of equal lengths may be a rectangle, or something else, but it is not a square. What is fundamental for a chamfer to be created is that the two original surfaces remain in order for the third surface to emerge once material is removed from where the two surfaces meet (Morelli, TT Vol. 31, pp. 25:1-29:21). In contrast, Mr. Bailey is of the opinion that a chamfer can be combined with other geometric shapes and remain a chamfer, including when this results in one of the original two surfaces being altered or removed in its entirety, such as in Figure 8 of the 128 Patent (Bailey First Report, paras 205-206; Bailey, TT Vol. 23, pp. 84:1-17, 86:27-87:13).

[124] "Chamfer" must be interpreted to be the surface created when material is removed from the corner where two surfaces meet. The removal of material is the common ground between the

two experts on what will constitute a chamfer. Importantly, and contrary to Mr. Bailey's assertion, the original two surfaces must remain; any combination with other geometric features cannot alter this fundamental characteristic. Altering a fundamental feature, even in a simple way, will alter how we label a geometric shape. Take again the example of a square. As alluded to earlier, this is a shape with four walls of equal length. Someone might modify this square slightly by, say, stretching out two of the walls such that two parallel walls are now longer than the other two. However minor this alteration, this prohibits us from calling this shape a square because it no longer has four walls of equal length. Similarly, eliminating one of the two original surfaces from a chamfer will mean that, whatever shape it has become, it has ceased to be a chamfer.

(c) *“integrally formed” of the 384, 159, and 421 Patents*

[125] Both parties agree that “integrally formed” means that the configuration of one or more elements is intimately linked such that the structure of one element defines the structure of the other or others; for example, that will be the case if they are formed by a single component (Morelli First Report, para 77; Bailey First Report, para 114(c)). There is no reason for the Court to disagree.

(d) *“moveable with relation to” or “moveable relative to” the bottom wall to gather the tube in the 312 and 415 Patents*

[126] The parties disagreed over the type of movement dictated by the phrase “moveable relative to” or “moveable with relation to” the bottom wall of the holder, claim elements found in both the 312 and the 415 Patents (312 Patent, Claim 1(d); 415 Patent, Claim 5). This describes

the movement of the projection or projecting member of the closing mechanism that inserts itself into the clearance at the bottom of the cassette. Claim 1(d) of the 312 Patent reads:

- 1) An apparatus for packaging soiled diapers in an elongated tube of plastic flexible material, the apparatus comprising:
...
 - d) a tube gathering mechanism for sealing the tube when no soiled diaper is being pushed through the entrance, the tube gathering mechanism including:
 - i) a closure member including a projection extending above the bottom wall of the holder, the closure member engaging the tube and being moveable with relation to the bottom wall to gather the tube;
 - ii) the closure member being responsive to pressure by a hand of a user to progressively open and allow insertion of a soiled diaper in the storage area;
 - iii) a stationary wall portion located below the bottom wall for slidingly supporting the closure member during the movement of the closure member with respect to the bottom wall;
 - iv) a device connected to the closure member for driving the closure member to move relative the bottom wall to gather the tube;
- ...

Claim 5 of the 415 Patent reads:

- 5) An apparatus as defined in anyone of claims 1 to 4, wherein the projecting member is moveable relative to the bottom wall to gather the tube material after the insertion of a soiled diaper in the storage area.

[127] The Plaintiffs submit that “movable” indicates any form of movement, including that of a wheel turning about its axis, relying on Mr. Morelli’s testimony to this effect (Morelli First

Report, paras 269, 431; Morelli, TT Vol. 12, pp. 82:16-84:4). Mr. Morelli on cross-examination testified that he understood movement to have multiple meanings, only one of which was movement in space relative to a reference point and that, as a general notion, there is no requirement that the moving element change position in space (Morelli, TT Vol. 14, pp.129:4-132:1).

[128] The Defendants, in contrast, submit that this element requires movement in space or across planes (Bailey Second Report, paras 114-115, 124; Bailey, TT Vol 19, pp.17:12-18:17).

[129] Mr. Bailey's interpretation is more credible. The difficulty with the position held by Mr. Morelli is that the text of the claim itself does not refer to any movement whatever it may be, but rather indicates that the movement of the projecting member or projection of the closing mechanism is relative to the bottom wall. The movement asserted in the two claims is a movement in space relative to a reference point, the bottom wall. If this movement did not change planes or move in space with the bottom wall as its reference point, then this relational claim language would be rendered meaningless. In such a situation, Mr. Morelli's broad and general sense could be taken up. However, with the bottom wall as a reference point, there must be a sense in which the projection or projecting member of the closing member changes position in space while the bottom wall stays put.

(e) *“projection” and “imaginary projection” of the 384, 159 and 421 Patents*

[130] Both parties agree that “projection” and “imaginary projection”, in the context of these patents, refer to an imaginary downward continuation of the cassette's annular or tubular wall

that assists the POSITA in situating the clearance relative to this annular or tubular wall (Morelli First Report, paras 80-84, 113, Bailey First Report, para 114 (d), Schedule E, p. 2, Schedule F, p. 2, Schedule G, p. 2).

- (f) *“projection”, projecting portion” and “projecting member” of the 159, 312, and 415 Patents*

[131] Both parties agree that “projection”, “projecting portion”, and “projecting member” are distinct from the imaginary projections described above. These are tangible elements that rise up from the diaper pail’s holder or above the bottom wall of the holder as part of the closing mechanism (Morelli First Report, paras 138-140, 269-270, 304; Bailey First Report, paras 139, 162 (c), 172 (c)).

- (g) *“Transition wall” of the 159 and 421 Patents and “intermediate wall” of the 159 Patent*

[132] The parties agree that the “transition wall” of the 159 and 421 Patent, also called the “intermediate wall” in the 159 Patent, is the wall that forms the shape of the clearance (Morelli First Report, paras 162, 206; Morelli, TT Vol. 28, p. 140:6-22; Bailey First Report, paras 142(a), 153, Schedule F, p. 17). However, they disagree as to whether it must necessarily be a single wall or if it can be multiple walls. Mr. Bailey asserts that it can, identifying it as being formed of two walls in Figure 8 of the 128 Patent (Bailey First Report, para 229). Mr. Morelli contests this, stating that it is only one wall (Morelli Second Report, para 170(c)).

[133] The transition wall in Claims 159 and 421 must be a singular wall or surface. Mr. Bailey was never able to make a convincing argument that a transition wall may comprise two walls, referring to Figure 8 of the 128 Patent, which is not part of the family of Angelcare patents under consideration in this case. Mr. Bailey relies on the general definition of the transition wall as the wall that forms the clearance and then goes on to portions of figures in an attempt to make a demonstration, without concerning himself with the words of the claims themselves which have primacy. The strength of an expert's evidence resides in the ability to demonstrate, not only to state. The transition wall is defined in the Angelcare patents as the wall that connects the lower edge of the tubular wall to the inner edge of the bottom wall (Claim 12, 421 Patent; Claim 9, 159 Patent; Claim 31, 159 Patent). As such, it connects two discrete edges or points on the cassette. If it only connects two points, this must be a singular surface because this wall extends from one edge to another, with no additional edges or points in between that could define any additional surfaces.

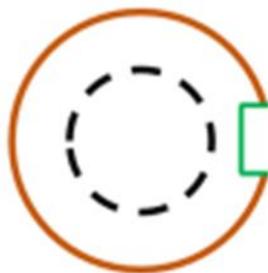
(h) *“Convex edge portion” and “inwardly recessed portion” in the 159 and 421 Patents*

[134] The experts disagree on two issues in relation to these terms. First, whether the POSITA would have been able to construct these claim elements, with Mr. Bailey of the opinion that these terms are fundamentally vague and ambiguous. Mr. Morelli, conversely, sees no such difficulty. The second issue is whether construction is done from a top-down view of the cassette, as asserted by Mr. Morelli, or in a side view, as asserted by Mr. Bailey.

[135] Claim element 1(d) of the 421 Patent and Claims 19 and 38 of the 159 Patent describe the cassette's cover as follows:

1(d) a cover having a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent to the convex edge portion;

[136] Mr. Morelli interpreted this element in the same way across the 159 and 421 Patents (Morelli First Report, paras 177, 245). He understood the cover's periphery to be its outer edge, i.e. the farthest extremity from the center of the cassette (Morelli First Report, para 177). He discussed the cassette from a top-down view (Figure 24), illustrating a figure that shows an outer border of the cassette as the convex edge portion, and a part of this outer edge retreating toward the center of the cassette (the inwardly recessed edge portion) (*Ibid*, para 178). He explained that the recessed edge portion allows users to more easily insert their fingers into the cassette and grab the plastic film stored within (*Ibid*, para 179).



[137] The Plaintiffs argue that Mr. Bailey's testimony to the effect that these claim elements are too ambiguous to be constructed is not credible. They draw attention to his ability to locate the "convex edge portion" and "inwardly recessed portion" on the prior art Captiva cassette when seen from a top-down view for the purpose of his non-infringement and invalidity analyses (PCA, para 22; Bailey Second Report, paras 152-153). They seem to allege that it was

Mr. Bailey's choice to construct the terms from a side-view, rather than a top-down view, that led to his conclusion of ambiguity (PCA, paras 21-23).

[138] Additionally, the Plaintiffs point to Mr. Tsang's testimony that a designer would understand the utility of this element insofar as having a larger gap in the cover of the cassette would allow the user to easily insert their fingers and grab the plastic tubing stored within with greater ease. As a matter of fact, Mr. Tsang asserted that, as a designer who solves problems and does not seek to create them, he would be looking for an inwardly recessed portion to insert the fingers and grab the plastic tubing. (PCA, para 24, Tsang, TT, *in camera*, Vol 26, pp. 30:1-32:11).

[139] For the Defendants, Mr. Bailey testified that he had difficulty interpreting the cover's description as defined in these claims and that the POSITA would be unable to understand the structures being described (Bailey First Report, paras 135, 147, 429). Commenting specifically on the added disclosure that accompanied the 159 Patent and the subsequent divisional applications, he explains that these elements are not mentioned in the 384 Patent and are not visible in its figures 2B and 5B of the Angelcare Patents, making it impossible for the POSITA to infer the cassette's cover's profile therefrom (*Ibid*, 135). He further explains the inwardly recessed and convex edge portions are not clearly situated in relation to other structural features of the cassette's cover, namely, the inner, intermediate, and outer cover portions (*Ibid*). This, in Mr. Bailey's view, makes it impossible to understand their relative locations or the purpose of these features in the context of the invention (*Ibid*, paras 429-432).

[140] Mr. Bailey chooses to make these observations with the understanding that the features are intended to be part of the cover's profile, but seen from a side-view (Bailey Second Report, para 95). He supports this way of assessing the claimed features by referring to how prior art cassette patents would describe covers in side view (*Ibid*). For that purpose, he refers to one corner of a figure that illustrates the 128 Patent (Figure 12). Additionally, the wording of the claim led Mr. Bailey to this conclusion. He believes the patent would have used language such as "inwardly axially" or "toward the centre axis", should the inventor have intended a top-down view and interpretation of these elements and explained that everywhere else in the Patent, the term "curved" is used to describe edges, rather than "convex" (Bailey, TT Vol. 25 *in camera*, pp. 142:20-143:14). In assessing whether the 128 Patent discloses the features claimed in the 421 Patent, Mr. Bailey used the side view of Figure 12 contained in the 128 Patent (Bailey First Report, para 220). He was able to similarly identify these features as forming part of the cassette's profile in Figure 7 of the 128 Patent (*Ibid*, para 221). In my estimation this was rather contrived and less than convincing.

[141] When looking at Figure 2B of the Angelcare Patents and the black spot thereon, located at 12 o'clock, which Mr. Morelli identified as the recessed edge portion (Morelli, TT. Vol. 3, pp. 184:19-186:28), Mr. Bailey testified that this black spot is unclear and could be a misprint (Bailey, TT Vol. 25 *in camera*, pp. 141:19-142:19). The Defendants also point out that there is no film-dispensing gap claimed in the 421 Patent, so a construction that interprets the outer recessed portion to be a widening in the gap for the insertion of user's fingers is not coherent (DCA, para 87).

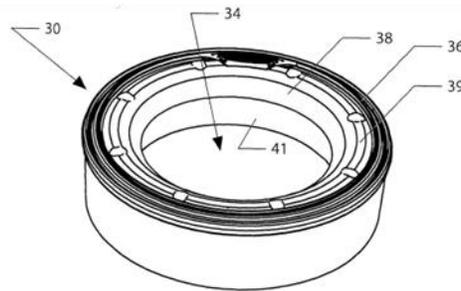


Fig. 2B

[142] Having taken stock of these competing viewpoints, I believe that these claim elements are not so ambiguous that they cannot be construed. Mr. Morelli's use of a top-down view of the cassette permits construction and dispels any ambiguity as to what, and where, the convex edge portion and recessed edge portion may be. The patents must be interpreted with a mind willing to understand, so the view that lends to understanding should be taken up. As such, I understand that the POSITA would resort to these features as shown from a top-down view.

[143] A purposive reading of the patents would confirm Mr. Morelli and Mr. Tsang's testimony that the recessed edge portion is intended to assist the user in inserting their fingers into the cassette and grabbing the plastic film. The Defendants point out the fact that the 421 Patent does not disclose a gap is no impediment to this understanding. The 159 Patent discloses both the features at issue and the film-dispensing gap and the Defendants themselves argue that all of the Angelcare Patents should be interpreted "consistently and harmoniously", with the interpretation of a feature from one bearing on the construction of similar features in another (DCA, para 83). The utility of the recessed edge portion can thus be gleaned from the 159 Patent. The utility would be the same for the two patents as the same figures are used to illustrate the inventions.

[144] Additionally, the figures assist in understanding the location and purpose of these claim elements. Mr. Bailey's speculation that the black spot on Figure 2B of the Angelcare Patents is a misprint is simply not credible. The lines around it are too neat and are too consistent with another figure in the Angelcare Patents, Figure 5B, which reveals the same black spot in the same location on the cassette's cover. A misprint would not be so perfectly and neatly reproduced. As such, the figures showing a top-down view of the cassette assist in dispelling any ambiguity as to the position of these features relative to other features of the cassette's cover, as well as the function it aims to serve.

[145] The POSITA would consequently understand the convex edge portion to be the outer periphery of the cover, seen from a top-down view. They would construct the inwardly recessed edge portion as the removed material or hole adjacent to this outer periphery toward the center of the cassette, such that it provides access to the plastic tubing stored beneath the cover.

(i) *"Lid" of the 312 Patent*

[146] There was some disagreement between the parties as to whether the "lid" in Claim 1 of the 312 Patent covered only the cassette when installed in the holder or both the cassette and access to the diaper pail's storage area (PCA, para 40; Bailey First Report, para 172(f)). I take the view that the lid only covers the cassette when installed in the holder. The claims language makes this evident. Claim element 1(e) of the 312 Patent reads as follows:

a lid hingedly moveable between a closed position and an opened position, in the closed position the lid closing the holder, in the opened position the lid allowing access to the holder to permit installation of a new supply of tube material, the lid having a central funnel-shaped portion defining an aperture generally

aligning with the entrance to the storage area, the aperture permitting insertion of a soiled diaper into the storage area.

[Emphasis added.]

Clearly, this lid is meant to preserve access to the storage area inside the diaper pail.

Additionally, the “holder” discussed above is the cassette holder, further emphasizing that the lid only serves to cover the cassette when installed in the holder and not access to the diaper pail’s storage area.

(j) *“tubular wall” of the 159 and 421 Patents*

[147] Both parties agreed that the tubular wall, sometimes expressly named the “inner tubular wall”, refers to the inner wall surrounding the opening of the cassette (Morelli First Report, para 144; Morelli, TT Vol. 11 p. 43:3-6; Morelli TT Vol. 15 p.103:26-28, Bailey First Report, para 114 (d), Schedule F, p.3, Schedule G, p. 1).

[148] However, the parties disagreed as to the particular shape this wall could take. Mr. Morelli and the Plaintiffs are of the opinion that the tube can vary in circumference from one extremity of the wall to the other and thus does not need to strictly be in the shape of a cylinder (Morelli First Report, para 114; Morelli, TT Vol. 12, pp.107:3-112:12). Accordingly, this term is inclusive of walls that extend outward from the center, growing in radius as the wall descends down toward the bottom of the cassette, like a cone (Morelli, TT Vol. 12, pp.107:3-112:12; Morelli First Report, Ex MM-9.1, pp. 8, 51, 19, 25, 28, 31, 34, Ex MM9-2. Fig 159.4.3).

[149] The Defendants, relying on Mr. Bailey's testimony, disagreed, stating that the tubular wall's radius stays approximately the same as it extends in length (Bailey Second Report, para 166, Schedule D, p. 4; Bailey, TT Vol. 17, pp. 131:10-133:14, 135:7-136:6). Mr. Bailey was explicit that cones and tubes are not the same; they are mutually exclusive shapes (Bailey, TT Vol. 17, pp. 131:10-133:14).

[150] The Plaintiffs point out that Mr. Bailey's testimony was contradictory to this effect. Whether contradictory or not, I do not see his so-called "contradictory" testimony as determinative of the matter. In Schedule G of Mr. Bailey's First Report, he indicated that tubular wall simply meant the inner wall of the receptacle (i.e. the cassette) (Bailey First Report, Schedule G, p. 1). During cross-examination, he clarified that he used the language of tubular and annular when aiming to designate the wall that surrounds the central opening, for lack of better language found in the patents (Bailey, TT Vol. 18, pp. 183:9-190:3). He stated that he did not, in doing so, aim to state that tubular or annular was inclusive of cone-shaped walls or walls that extend radially outward as they lengthen (*Ibid*).

[151] As a matter of fact, Mr. Morelli's own testimony changed on this issue. When asked about the presence of a tubular wall on the Fourth Generation Munchkin cassettes, which is conical in shape and not cylindrical, he stated that there was no tubular wall (Morelli, TT Vol. 29, pp. 25:25-26:20). This is despite his previous testimony on claims construction being to the effect that a tubular wall would be inclusive of a cone-shaped wall.

[152] At any rate, I find Mr. Bailey's construction of "tubular wall" to be what the POSITA would understand in reading the 159 and 421 Patents. The claims language of the 159 Patent and 421 Patent aligns with this construction. Claim element 1(a) of the 421 Patent requires that the central axis be vertical in nature and that the tubular wall extend downwardly along it. Similarly, Claim 21 of the 159 Patent states that the central opening, delimited by the tubular wall, extends "along a generally vertical axis." This seems to imply, as pointed out by Mr. Bailey (Bailey Second Report, para 166), that the tubular wall extends downward without extending outwardly. Additionally, the Angelcare Patents' disclosure and claims use the language of "frusto-conical" to designate a conical structure (159 Patent (Angelcare Patents Disclosure), pp. 4:24, 5:7; 159 Patent, Claims 53 and 54). This would indicate that there is something about a tubular feature that is distinct from conical or frusto-conical shapes. Finally, this construction of tubular aligns with the common sense meaning of the term that is cylindrical in shape. A cone is simply not a tube, or a cylinder. If the meaning to be ascribed to "tubular" was to be so different from the usual meaning of the word, it should be expected that signals to that effect were to be found. Finally, the figures in all of the Angelcare Patents demonstrate tubular walls that are cylindrical in shape. While the figures cannot be used to unduly limit the claims upon their construction, they can nonetheless be of assistance to interpret any ambiguous claim term and should indeed be considered in interpreting the claims purposively (*Whirlpool* at paras 52 and 54; *Tetra Tech* at para 86; *Sanofi* at para 77; see also *Fox on Patents*, #7:10 on drawings being treated as part of the specification). Accordingly, Mr. Bailey's construction of the tubular wall as cylindrical, as opposed to conical, with the requirement that the radius cannot expand as the length of the wall extends downwardly, must be taken up. Every indication in these patents leads to that conclusion.

IV. Infringement

[153] *Fox on Patents* says that “any act that interferes with this full enjoyment of the monopoly granted to the patentee is an infringement, if done without the patentee’s consent” (#13:4).

Section 42 of the *Patent Act* confirms the principle. In the case at bar, it is not disputed that there was no consent given by the Plaintiffs. It follows that the Court must consider the asserted claims and, compare them to the Defendants products.

[154] An infringement analysis consists of comparing the alleged infringing product with the claims as construed (*Monsanto*, para 30), cited recently in *Evolution Technologies Inc. v Human Care Canada Inc.*, 2019 FCA 209 at para 23). In order to infringe, all of the essential elements of the asserted claim must be found in the alleged infringing product (*Free World Trust*, paras 31(f) and 68; see also *Distrimed Inc. v Dispill Inc.*, 2013 FC 1043 at para 216). As established above, all elements of the asserted claims in the present case are essential, including the reference to the “gap” in the 128 Patent.

[155] The burden of proof falls to the Plaintiffs, who must establish infringement on a balance of probabilities. The evidence advanced in support of infringement must accordingly be, as with all civil cases, “sufficiently clear, convincing, and cogent to satisfy the balance of probabilities test” (*F.H. v McDougall*, 2008 SCC 53, [2008] 3 SCR 41, para 46; *Canada (Attorney General) v Fairmont Hotels Inc.*, 2016 SCC 56, [2016] 2 SCR 720, para 36).

[156] The Court will review the six Patents-in-suit for the purpose of establishing if asserted claims have been infringed by the Defendants' products.

A. *The 128 Patent*

[157] The Plaintiffs assert infringement of independent Claim 11 and its dependent Claims 12, 13, 16, 18, 19, 22 and 23 of the 128 Patent. In spite of the Plaintiffs not asserting Claims 1, 2, 20 and 21, the Defendants put them in play at the validity stage of the process by claiming that they are invalid. In order to have a finding of infringement of any of the dependent claims there must first be infringement of the independent claim on which they rely because it follows that if the independent claim is not infringed, the dependent claims cannot in turn be infringing.

[158] The Plaintiffs allege that Munchkin's Generation 1 cassette infringes the asserted claims by its assembly with Munchkin's PAIL and STEP diaper pails and the Diaper Genie Expressions and Mini diaper pails. They allege that Munchkin's Generations 2 and 3 cassettes infringe by assembly with Munchkin's PAIL and STEP diaper pails and the Diaper Genie Essentials, Elite, Complete, Expressions and Mini diaper pails. Finally, they allege that Munchkin's Generation 4 cassettes infringe by assembly with Munchkin's PAIL and STEP pails.

(1) Independent Claim 11

[159] Independent Claim 11 reads as follows:

11. A dispensing assembly comprising:

a cassette comprising a cassette body having a central tubular portion defining an aperture extending therethrough, an outer wall surrounding said central tubular

portion and a cassette bottom extending between and connecting said outer wall and said central tubular portion;

said outer wall, said cassette bottom and said central tubular portion cooperating to define an interior area that surrounds said central tubular portion;

said cassette bottom including first registration features;

a cover coupled to said body and at least partially overlying said interior area;

a receptacle including an opening sized at least to receive said cassette; and

said receptacle defining alignment features formed on an interior surface defined by said receptacle and generally facing said first registration features; and

said first registration features and said alignment features matingly engage one another such that said cassette is positioned upright in said receptacle

[160] The parties do not dispute that most of the essential elements pertaining to the general configuration of the cassettes as described in Claim 11 of the 128 Patent are present in the Defendants' cassettes. The Defendants challenge the presence of a limited number of essential elements. The main tasks in assessing infringement between the Defendants' cassettes and their assembly with the relevant diaper pails is determining the existence of alignment features in the relevant diaper pails' holders and assessing whether these matingly engage with the registration features at the bottom of the cassettes. Additionally, there is the question of whether this mating engagement serves to position the cassette upright (i.e. in the proper orientation) in the diaper pail's receptacle.

[161] The parties agree that the slots on the bottom of all four Munchkin cassette generations (12 slots in the generation 1 to 3 cassettes and the 4 slots in the fourth generation) are registration features (Morelli First Report, paras 452, 466; Bailey Second Report, para 60). They also agree that the chamfer on the bottom of the Munchkin Generations 1 to 3 cassettes are registration features (Morelli First Report, paras 452, 466; DCA, para 107).

(a) *Alignment Features*

[162] The parties agree that the four tabs (also referred to at times as four walls) at the bottom of the cassette holder in Munchkin's PAIL and STEP diaper pails are alignment features (Morelli First Report, para 467(a); Bailey Second Report, para 60).

[163] Where the parties disagree is whether the orange ring in the Munchkin PAIL and STEP pails and the orientation cone snap-on, at the bottom of the cassette's receptacle in the relevant Diaper Genie pails (the Essentials, Elite, Complete, Expressions and Mini) are alignment features. The Plaintiffs assert that they are (Morelli First Report, paras 467(b), 477), while the Defendants deny this, stating that they cannot be so because they do not provide rotational alignment (Bailey Second Report, paras 59, 70-71). The Plaintiffs' submission must prevail, as the above construction of the term "alignment" does not impose any rotational element. As already noted, the words are not even found in Patent 128. Accordingly, the orange ring in the Munchkin's PAIL and STEP diaper pails and the orientation cone in the Diaper Genie pails are alignment features within the meaning of Claim 11 of the 128 Patent.

(b) *Mating engagement between registration features and alignment features*

[164] As discussed above, mating engagement requires that the shapes between two features be complementary such that they fit together harmoniously, in a mating engagement. The Patent speaks repeatedly of registrations that are complementarily shaped to matingly engage. There is no complementary engagement that would be looser than a matingly engagement.

[165] On this construction, all generations of the Munchkin cassettes infringe Claim 11 in an assembly with Munchkin's PAIL and STEP diaper pails. The four tabs in these pails' receptacles are alignment features that fit harmoniously and tightly within the slots on the bottom of all of the cassettes that are the registration features. Even if Munchkin's Generations 1 to 3 cassettes have more slots than there are tabs in the diaper pail, there is nonetheless mating engagement between tabs at the bottom and slots in the cassettes.

[166] As for the Diaper Genie pails, the chamfers on the bottom of the Generations 1 to 3 of the Munchkin cassettes (the registration features) matingly engage the orientation cone of the Diaper Genie Mini diaper pails (the alignment features). Indeed, those cassettes were designed to be compatible with the Diaper Genie diaper pails (see paras 14 and 17 of these reasons for judgment). The chamfer fits harmoniously atop the orientation cone (Morelli First Report, Ex MM-13.1 pp.17-19).

[167] This is similarly the case for Generations 1 to 3 of the Munchkin cassettes when assembled with the Diaper Genie Expressions diaper pails (Morelli First Report, Ex MM-13.1

pp. 13-14). It is unlikely that, in reality, Generation 1 cassettes would be combined extensively with Diaper Genie Expressions diaper pails in great numbers because the Generation 1 cassettes were not on the Canadian market at the same time as this particular diaper pail. The Generation 1 cassettes became available in Canada in August 2013 and were discontinued in September 2016 (ASF, paras 68, 70). The Diaper Genie Expressions pail with the orientation cone was launched in October 2016 at the earliest (ASF, para 111). It is unclear that assemblies between these two products (Generation 1 Munchkin cassettes and Diaper Genie Expressions diaper pails) occurred, although it is not excluded either that Generation 1 Munchkin cassettes left in September 2016 could have been used with the then arriving on the market Diaper Genie Expressions pail. For our purposes, it suffices at this stage to conclude that the combination of Generation 1 Munchkin cassettes with the Diaper Genie Expressions diaper pails was an infringing combination.

[168] Munchkin's Generation 4 cassette does not infringe Claim 11 of the 128 Patent when assembled with any of the Diaper Genie diaper pails. Evidence presented by both sides demonstrated that its registration features are limited to the four slots at the bottom of the cassette and these are not shaped in such a way that they fit harmoniously with the orientation cone (Morelli First Report, para 476, DCA, para 101).

(c) *Contribution to positioning the cassette upright in the receptacle*

[169] I find that the assembly between the registration features on the bottom of the impugned cassettes and the alignment features in the holder of the relevant diaper pails contribute to the upright positioning in all the alleged infringing assemblies.

[170] Mr. Morelli testified that the slots in all generations of the Munchkin cassettes, when paired with the tabs in Munchkin's PAIL and STEP diaper pails, contribute to their upright positioning (Morelli First Report, para 468). The Defendants admit that the tabs assist with this (DCA, para 106). The raised orange ring serves a similar purpose, taking up space in the bottom of the cassette's clearance to ensure proper orientation of the Defendants' cassettes (Morelli First Report, para 468). The Defendants do not dispute this, instead asserting that there is no infringement because the raised orange ring does not provide rotational alignment (Bailey Second Report, Schedule B, pp. 1-2, 7-8). There is no such thing. As explained before, the "rotational alignment" does not exist in the 128 Patent. Accordingly, the assemblies between all generations of Munchkin cassettes and Munchkin's PAIL and STEP diaper pail meet this requirement of Claim 11.

[171] Assemblies between Munchkin's Generations 1 to 3 cassettes and the Diaper Genie diaper pails also contribute to the cassette's upright positioning in the receptacle. The parties appear to be in agreement to this effect. There was significant discussion throughout the trial on how the presence of a chamfer on the bottom of the cassette, paired with the orientation cone in the Diaper Genie diaper pails, contributes to the upright positioning of a cassette in a diaper pail. The Defendants' dispute relates to the same orange cone's non-infringement (Morelli First Report, para 468; Bailey Second Report, Schedule B, pp. 7-8). As a result, the same conclusion applies.

(d) *Claim 11 Infringement Conclusion*

[172] Independent Claim 11, upon which the rest of the asserted claims rely, is infringed by the following assemblies:

- (1) Generations 1 to 4 of the Munchkin cassettes and Munchkin's PAIL and STEP diaper pails;
- (2) Generations 1 to 3 of the Munchkin cassettes and the Diaper Genie diaper pails.

These are the only assemblies that consequently merit assessment on the asserted dependent claims.

(2) Dependent Claims

[173] The main defense the Defendants' raised against infringement of dependent Claims 12, 13, 16, 18, 19, 22, and 23 was that the essential elements of independent Claim 11, upon which these subsequent claims rely, was not infringed. Thus, this general defense failed.

[174] Claim 12 requires that one of the first registration features (located on the cassette) and one of the alignment features (located in the receptacle) has at least one outwardly projecting protuberance. The other first registration feature or alignment feature, as the case may be, must include at least one recess that is complementarily shaped to engage the aforementioned protuberance.

[175] This claim is met for most assemblies that infringe Claim 11. The tabs (or walls) on the Munchkin PAIL and STEP diaper pails are protuberances, rising up above the holder to engage

the recesses that are the slots in the Generations 1 to 4 cassettes (Morelli First Report, para 471). Similarly, the orientation cones of the Diaper Genie pails are protuberances that rise up and complementarily engage the chamfer in the bottom of the Generations 1 to 3 cassettes, which are recesses (Morelli First Report, Ex MM-13.1 p.10 (2nd and 3rd Generation Munchkin Cassettes with the Diaper Genie Elite), p. 14, (2nd and 3rd Generation Munchkin Cassettes with Diaper Genie Expressions), p. 19, (1st, 2nd and 3rd Generation Munchkin Cassettes with the Diaper Genie Mini)).

[176] Claim 13 builds on Claim 12, specifying that there are a plurality of protuberances and recesses. As such, only the assembly between all generations of the Munchkin cassettes and Munchkin's PAIL and STEP diaper pail will infringe because there are four tabs, which qualify as protuberances and at least four slots that qualify as recesses (Morelli First Report, Ex MM-13.1, p. 7). In the assemblies between Munchkin's Generations 1 to 3 cassettes and the Diaper Genie diaper pails, there is only one recess (the chamfer) that engages one protrusion (the orientation cone). That evidently does not constitute a plurality of protuberances.

[177] Claim 16 requires that one of the first registration features and the alignment features include a plurality of outwardly projecting ribs, and the other complementary first registration or alignment feature include a plurality of recesses, with the ribs matingly received in the recesses. Like the analysis on Claims 12 and above, only the assembly between the Munchkin cassettes and the Munchkin PAIL and STEP pail will infringe this claim (Morelli First Report, Ex MM-13.1, p. 7).

[178] Claim 18 requires that the cassette's first registration features minimize misalignment between the cassette and the receptacle. It also specifies that the receptacle includes an opening sized at least large enough to receive the cassette. During claims construction, it was clarified that alignment refers to the correct orientation of the cassette in the receptacle. This claim is met for assemblies between Munchkin's PAIL and STEP diaper pails and all four generations of Munchkin cassettes (Morelli First Report, Ex MM-13.1, p. 7). Both the PAIL and STEP diaper pails include a receptacle that is large enough for all generations of Munchkin cassettes to be inserted (*Ibid*). Additionally, Claim 18 is violated by assemblies between Generations 2 and 3 Munchkin cassettes with the Diaper Genie Essentials, Elite, Complete, Expressions and Mini (Morelli First Report, Ex MM-13.1, p. 11, 15, 21). Assembly between Munchkin Generation 1 cassettes and the Diaper Genie Mini and Expressions also violates this claim (*Ibid*, p. 15, 21).

[179] Claim 19 adds a constraint to Claim 18 and explains that the receptacle has alignment features that matingly engage the first registration features of the cassette. Based on the above analysis of Claim 18 and Claim 11, these claim elements are present in assemblies that infringe Claim 18 (Morelli First Report, Ex MM-13.1, p. 12, 16, 21).

[180] Claim 22 requires that the first registration features be operable to minimize the likelihood of the cassette being improperly installed. The Defendants disagree that the first registration features on the Munchkin's PAIL and STEP diaper pails, the slots, meet this claim, asserting instead that it is the tabs on the diaper pail that assist to ensure the cassette's proper orientation (DCA, para 106; Bailey Second Report, para 63). The Plaintiffs note that these slots

operate in combination with the tabs to help ensure the cassette is proper installed (PCA, para 83; Morelli First Report, para 474).

[181] I agree with the Plaintiff's contention; the slots do assist in minimizing the likelihood of incorrect cassette installation because they are complementary to other features that work to this end. These features operate in tandem, with the first registration features and alignment features designed to be harmonious. The fact that the first registration features must be paired with the compatibly designed alignment features does not undermine that the first registration features are part of the invention's solution to the improper orientation problem. Accordingly, assemblies between the Munchkin PAIL and STEP diaper pails and all generations of Munchkin cassettes infringe Claim 22 insofar as the slots assist in ensuring that the cassette is properly oriented, i.e. installed upright, in the receptacle (Morelli First Report, Ex MM-13.1, p. 8).

[182] Claim 23 requires that flexible tubing be positioned in the interior area of the cassette in the dispensing assembly of Claim 11. It follows that the infringing assemblies of Claim 11 also infringes Claim 23.

B. *The 384 Patent*

[183] The 384 Patent makes 11 claims, all of which relate to the configuration of a cassette. The Plaintiffs assert Claims 1 through 10, with the exception of Claims 2 and 7 when involving Generation 4 cassettes. They allege that Generations 1 to 3 of Munchkin's cassettes infringe these ten claims and that Generation 4 Munchkin cassettes infringe Claims 1, 4, 5, 6, 9, and 10.

(1) Independent Claims 1 and 6

[184] Claims 1 and 6 are the only independent claims of the 384 Patent. These claims are largely similar and neither party, nor their expert witnesses, noted any differences that would be relevant for the purpose of the infringement analysis. Indeed, both experts testified to the claims' similarity (Morelli, TT Vol. 11, pp. 8:8; Bailey, TT Vol. 16, pp.168:4-169:14). Accordingly, these claims will be analyzed in tandem for infringement.

[185] Claim 1 reads as follows:

A cassette for packing at least one disposable object into an elongated tube of flexible material, comprising an annular receptacle to accommodate a length of the elongated tube in an accumulated condition, the annular receptacle including an annular wall delimiting a central opening of the annular receptacle, a volume receiving the elongated tube of flexible material radially outward of the annular wall, and an annular opening at an upper end of the cassette for dispensing the elongated tube such that the elongated tube extends through the central opening of the annular receptacle to receive disposable objects in an end of the elongated tube, the annular receptacle having a clearance in a bottom portion of the central opening, the clearance extending from and being formed integrally with the annular wall, the clearance being radially outward of a downward projection of the annular wall, the clearance delimiting a portion of the volume of reduced width relative to a portion of the volume above the clearance.

[186] Claim 6, the second independent claim, reads as follows:

A cassette for packing at least one disposable object into an elongated tube of flexible material, comprising an annular receptacle to accommodate a length of the elongated tube in an accumulated condition, the annular receptacle including an annular wall delimiting a central opening of the annular receptacle, a volume receiving the elongated tube of flexible material radially outward of the annular wall and an annular opening at an upper end of the annular receptacle for dispensing the tubing such that

the elongated tube extends through the central opening of the annular receptacle to receive disposable objects in an end of the elongated tube, the annular receptacle having a clearance at a bottom of the central opening, the clearance being located radially outward of a downward projection of the annular wall relative to the central opening, and opening into the central opening, at least a portion of the volume of the annular receptacle being located radially outward of and side by side with at least a portion of the clearance such that at least a portion of the elongated tube of flexible material is disposed in the accumulated condition in said portion of the annular receptacle, said clearance causing a reduced width of said portion of the volume relative to the volume above the clearance.

[187] The Plaintiffs allege infringement of these independent claims by all four generations of the Munchkin cassettes. The Plaintiffs argue that Generations 1 to 3 of the Munchkin cassettes have a singular, continuous clearance along the bottom of the cassette that infringes Claims 1 and 6 of the 384 Patent (Morelli First Report, para 371(a)). They also claim that the four slots in the Generation 4 of the Munchkin cassettes are clearances (*Ibid*, para 371(b)(2); PCA, para 88). The Defendants, relying on Mr. Bailey, concede that Munchkin's Generations 1 to 3 cassettes infringe all relevant claim elements of the 384 Patent (Bailey Second Report, para 145). Disagreement concerns whether Munchkin's Generation 4 cassettes disclosed a clearance as claimed in Claims 1 and 6.

[188] It will be remembered that the inner wall of the Generations 1 to 3 Munchkin cassettes has been replaced in the Generation 4 cassettes with an oblique wall without the chamfer of the previous three Generations. As a matter of fact, the Plaintiffs withdrew their allegation that the Generation 4 cassettes have the shape of a chamfer (letter to the Court of April 29, 2021). The Plaintiffs assert that the four slots on the Generation 4 Munchkin cassettes are the clearances that the Plaintiffs seek to use to fulfill the essential claim elements of Claims 1 and 6. They argue that

these slots are empty spaces, meeting the definition of a clearance, and that they are located radially inward of a downward projection of the annular wall (PCA, para 89; Morelli First Report, para 373 (b)). They submit that these slots are integrally formed with the annular wall (Morelli First Report, para 372). Additionally, they explain that the sidewalls of the four slots enter into the internal volume of the cassette, reducing its internal volume (PCA, para 93). They allege that Mr. Bailey agrees with them on this notion (*Ibid*, citing Bailey, TT Vol. 18, pp. 176:23-181:13).

[189] The Defendants deny that the slots of the Fourth Generation Munchkin cassettes are clearances within the definition of Claims 1 and 6 of the 384 Patent. They state that these slots are not an empty space, but rather a feature of the cassette's oblique inner wall (DCA, para 115; Bailey Second Report, paras 129, 131). Accordingly, they are on the wall itself, and not radially outward of a downward projection of this wall (DCA, para 117; Bailey Second Report, para 131(g)). They also state that these slots do not have a back wall and as such do not have an internal volume, nor are they formed integrally with the cassette's annular wall (DCA, para 115; Bailey Second Report, para 135). Moreover, the Defendants submit that the slots cannot delimit a portion of the volume of reduced width or cause a reduced width of the internal volume of the cassette without a back wall (DCA, para 117; Bailey Second Report, paras 131(e), 134-135). Additionally, they argue that the slots would not allow for the movement of a closing mechanism, nor fit a fixed portion thereof, because they are too small (DCA, para 115; Bailey Second Report, para 131(a)). They also point out that the term "clearance" is used in the singular throughout the patent, while these slots are multiple (DCA, para 116; Bailey Second Report, para 131(d)).

[190] I agree with the Defendants that the slots of Generation 4 cassettes are not clearances, although not for all the reasons the Defendants raise.

[191] As discussed during claims construction, the clearance of the Angelcare Patents does not require only that it fit the movement of a closing mechanism or a fixed portion thereof. These slots are located, as the Plaintiffs contend, radially outward of a downward projection of the annular wall, taking from the starting point the top of this wall and simply following its trajectory downward. Furthermore, there is also no requirement that the clearance as claimed be limited to a singular feature on the cassette. Letters patent are regulations under section 2 of the *Interpretation Act*, RSC 1985, c I-21 and this Act makes clear that words used in the singular also include the plural under subsection 33(2):

33 (2) Words in the singular include the plural, and words in the plural include the singular.

33 (2) Le pluriel ou le singulier s'appliquent, le cas échéant, à l'unité et à la pluralité.

[192] However, the lack of a back wall on the slots prevents me from concluding that they meet the definition of a clearance as described in Claims 1 and 6 of the 384 Patent. Claim 1 requires that the clearance be “formed integrally with the annular wall”. As both parties’ experts advanced that Claims 1 and 6 are effectively the same, the requirement that the clearance be formed integrally with the annular wall must be present for this essential element to be satisfied for infringement to occur. Both parties agree that “formed integrally” means that the configuration of the shapes are intimately linked such that the shape of one defines the shape of the other, (Morelli First Report, para 77) i.e. that they are formed of a single component (Bailey First Report, para 114(c)). The lack of a back wall means that the annular wall and the slots are

not a whole. Material is missing that would make these two structures integrally formed, such that the slots could be considered fundamentally tied to the structure of the annular wall.

[193] In light of the above, Generation 4 Munchkin cassettes do not possess a clearance as defined in Claims 1 or 6 of the 384 Patents. As a result, it is missing an essential element of these claims and therefore does not infringe them.

(2) Dependent Claims 2-10

[194] As discussed above, the Defendants concede that Generations 1 to 3 of the Munchkin cassettes violate all essential elements of the 384 Patent (Bailey Second Report, para 145).

[195] Conversely, Generation 4 Munchkin cassettes not only do not have the shape of a chamfer, but they do not infringe the two independent claims and, as such, cannot infringe any of the dependent claims.

C. *The 159 Patent*

[196] The 159 Patent has 61 claims, all of which are asserted by the Plaintiffs (with the exception of Claims 14 and 26 concerning Generation 4 cassettes). These claims mainly discuss the configuration of a cassette, although some claims also relate to the configuration of a diaper pail and the assembly between these two products.

[197] The Plaintiffs allege that Generations 2 and 3 of the Munchkin cassettes infringe Claims 1 to 50 and 52 to 61. Generation 4 Munchkin cassettes infringe Claims 1 to 13, 16 to 25, 28 to 50, 52 to 55 and 58 to 61. Considering assemblies between Generations 2 to 4 of the Munchkin cassettes with the PAIL and STEP diaper pails, as well as with the Diaper Genie Expressions and Mini pails, they infringe Claim 51. The Generation 1 Munchkin cassettes are not alleged to infringe any part of the 159 Patent.

(1) Independent Claims 1, 21, 40, 51, and 52

[198] Of the 159 Patent's 61 claims, five are independent: Claims 1, 21, 40, 51, and 52. The rest of the claims are dependent, relying upon at least one other claim. Claims 1, 21, 40, and 52 all relate to the configuration of a cassette that is compatible with a projection or a projecting portion in a diaper pail holder.

[199] Claim 40 also describes the configuration of a diaper pail. Claim 51 is about the assembly between a cassette and a diaper pail. The five independent claims are reproduced for ease of reference.

[200] Claim 1 reads as follows:

- 1) A cassette for packaging soiled diapers into an elongated tube of flexible material, the cassette comprising:
 - a) a receptacle including a wall delimiting a central opening, the central opening extending along a generally vertical central axis;
 - b) the receptacle defining a storage area circumscribing the central opening and receiving the elongated tube of flexible material outwardly of the wall;

- c) the cassette including an outer boundary spaced outwardly of the wall;
- d) a cover at a top portion of the storage area, the cover engaging the wall and extending outwardly therefrom toward the outer boundary of the cassette;
- e) the cassette dispensing the elongated tube of flexible material from the top portion of the storage area;
- f) the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outwardly of an imaginary projection of the wall extending downwardly along the central axis;
- g) a first portion of the outwardly of the clearance storage area that is located outwardly of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance;
- h) the cassette configured for installation in a soiled diaper disposal device, the soiled diaper disposal device including a holder for receiving the cassette, the holder having a projection, the clearance being configured for receiving the projection when the cassette is seated in the holder.

[201] Claim 21 is the second independent claim of the 159 Patent. It reads:

- 1) A cassette for packing soiled diapers into an elongated tube of flexible material, the cassette comprising:
 - a) a receptacle including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis;
 - b) the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall;
 - c) the cassette including an outer boundary spaced outward of the tubular wall;
 - d) a cover at a top portion of the storage area, the cassette being configured to dispense the tube of flexible material

from the storage area through the central opening while the tube overlies the cover;

- e) the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outward an imaginary projection of the tubular wall extending downwardly along the central axis;
- f) a first portion of the storage area that is located outward of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance;
- g) the cassette configured for installation in a soiled diaper disposal device, the soiled diaper disposal device including a holder for receiving the cassette, the holder having a projection, the clearance being configured for receiving the projection when the cassette is seated in the holder.

[202] Claim 40 is another independent claim that describes a cassette. It reads as follows:

- 1) A cassette for use in a diaper pail, the diaper pail comprising:
 - a) a storage area for holding soiled diapers;
 - b) an opening for introducing soiled diapers in the storage area;
 - c) a holder for the cassette proximal the opening, including
 - i) a bottom wall;
 - ii) a projecting portion extending above the bottom wall, the projecting portion being located radially inward from the bottom wall with relation to an axis of the opening;
 - d) the cassette configured for dispensing an elongated tube of flexible material, including:
 - i) a receptacle including:
 - (1) a tubular wall delimiting a central opening;

- (2) a bottom located outwardly of the tubular wall, the tubular wall connecting with the bottom;
 - (3) a cover at a top portion of the receptacle, the cover engaging the tubular wall and extending outwardly therefrom toward an outer boundary of the cassette;
- ii) the receptacle defining a storage space in which the elongated tube of flexible material is stored outwardly of the tubular wall;
 - iii) the bottom of the receptacle configured to sit on the bottom wall of the holder when the cassette is loaded in the holder;
 - iv) the receptacle defining a clearance located inwardly of the bottom, the clearance configured to receive the projecting portion when the bottom of the receptacle sits on the bottom wall of the holder.

[203] Claim 51 is another independent claim of the 159 Patent. It describes the assembly between a diaper pail and a cassette. It reads as follows:

- 1) An assembly of a diaper pail and cassette comprising:
 - a) a storage area for holding soiled diapers;
 - b) an opening for introducing soiled diapers in the storage area;
 - c) a holder for the cassette proximate the opening including
 - i) a bottom wall;
 - ii) a projecting portion extending above the bottom wall, the projecting portion being located radially inward from the bottom wall with relation to an axis of the opening;
 - d) the cassette configured for dispensing an elongated tube of flexible material, including:
 - i) a receptacle including:

- (1) a tubular wall delimiting a central opening;
 - (2) a bottom located outwardly of the tubular wall, the tubular wall connecting with the bottom;
 - (3) a cover at a top portion of the storage area, the cover engaging the tubular wall and extending outwardly therefrom toward an outer boundary of the cassette;
- ii) the receptacle defining a storage space in which the elongated tube of flexible material is stored outwardly of the tubular wall;
 - iii) the bottom of the receptacle being supported by the bottom wall of the holder when the cassette is loaded in the holder;
 - iv) the receptacle defining a clearance located inwardly of the bottom, the clearance receiving the projecting portion when the bottom of the receptacle sits on the bottom wall of the holder.

[204] The final independent claim, Claim 52, claims only a cassette:

- 1) A cassette for dispensing pleated film tubing, configured for one-way insertion in a waste storage container, the cassette comprising:
 - a) a receptacle including:
 - i) an inner tubular wall delimiting a central opening;
 - ii) an outer tubular wall spaced outwardly from the inner tubular wall, the inner tubular wall and the outer tubular wall defining there between a storage compartment circumscribing the central opening;
 - b) the pleated film tubing being received in the storage compartment;
 - c) a cover at a top portion of the storage area, the cover engaging the inner tubular wall and extending outwardly therefrom toward the outer tubular wall, the cover including an outer edge portion defining with the outer tubular wall a film tubing dispensing gap;

- d) the cover and the inner tubular wall defining a structure configured to support and guide the film tubing as the film tubing is dispensed from the dispensing gap through the central opening;
- e) clearance means in a bottom portion of the receptacle for inter-fitting engagement with a projection in a cassette holder of the waste storage container, the clearance means operating to establish a use position of the cassette in the waste storage container in which the film tubing is dispensed through the central opening.

[205] All five independent claims share the following essential elements: (i) a cassette that has a clearance; and (ii) that clearance is compatible with a projection or projecting portion in the holder of a compatible diaper pail. If these common essential elements are not to be found in the Munchkin cassettes and in the assembly between these cassettes with either the Munchkin pails or Diaper Genie pails, there will not be any infringement of the 159 Patent. Thus, the analysis begins by determining whether the Munchkin cassettes, as well as their assembly with both the Munchkin and Diaper Genie diaper pails, practice the common essential elements.

(a) *Cassette with a clearance*

[206] As part of this analysis, we must first determine whether the alleged infringing cassettes have a clearance. As discussed in relation to the 384 Patent, Munchkin's Generations 2 and 3 cassettes both have a clearance: it is the chamfer at the bottom of the cassette. The Plaintiffs also appear to submit that the slots at the bottom of these cassettes are clearances within the meaning of the 159 Patent, but rest on their arguments in relation to the 384 Patent to do so (PCA, 121). These arguments were already addressed in relation to the 384 Patent and, as no new ones specific to the 159 Patent have been presented, the slots on the bottom of these cassettes are not

clearances for the 159 Patent either. Only the chamfer at the bottom of Munchkin's Generations 2 and 3 cassettes are considered clearances within the meaning of the 159 Patent.

[207] Moreover, neither the slots nor the inner angled wall of the Generation 4 cassettes are a clearance within the meaning of the 159 Patent. The Plaintiffs relied on their arguments in relation to the 384 Patent to assert that the slots in the Munchkin Generation 4 cassettes were a clearance within the meaning of Claims 1, 21, and 51 of the 159 Patent (PCA, paras 97, 121). The Plaintiffs advanced no arguments as to whether they were a clearance in relation to Claims 40 or 52. Consequently, the determination made during the infringement analysis of the 384 Patent that the slots of the Generation 4 cassettes are not a clearance within the meaning of the Angelcare Patents must stand. As for the inner angled wall of the Generation 4 cassettes, the Plaintiffs submit that it is a clearance in relation to Claim 40 of the 159 Patent, but argue only that it is a clearance "without regard to the limitations of any claims of any patent" and that it is located "inwardly of the bottom" of the cassette (PCA, para 111). This is not sufficient to resuscitate the inner angled wall as a clearance. As such, the Generation 4 Munchkin cassette does not have a clearance and, missing this essential element found in all five independent claims of the 159 Patent, does not infringe any claim of the 159 Patent.

[208] With Generation 1 not asserted in relation to the 159 Patent and Generation 4 ruled out because it lacks a clearance (an essential element in all five independent claims), only Generations 2 and 3 of Munchkin's cassettes and their assembly with the relevant Diaper Genie and Munchkin diaper pails need to be analyzed for infringement of the 159 Patent. The main question is thus whether the clearances in the Generations 2 and 3 Munchkin cassettes

compatibly fit with or receive the projections or projecting portion in the holder of the diaper pails in dispute.

- (b) *The clearance's compatibility with a projection or projecting member in the holder of a diaper pail*

[209] Generations 2 and 3 of the Munchkin cassettes do not infringe Claims 1, 21, 40, 51, and 52 when assembled with Munchkin's PAIL and STEP diaper pails. The parties agree that the four white tabs in the holder of these diaper pails are projections or projecting members (PCA, para 115; DCA, para 135). As discussed above, the slots in the Generations 2 and 3 Munchkin cassettes are not clearances. As such, the engagement between the four white tabs in the holder of the Munchkin diaper pails and the slots in the bottom of both Generations 2 and 3 Munchkin cassettes does not disclose an engagement between a projection or projecting member and a clearance, since the slots are not clearances.

[210] The Plaintiffs submit that the raised orange ring in the PAIL and STEP diaper pails is a projection or projecting member that engages the agreed upon chamfer-shaped clearance at the bottom of the Generations 2 and 3 Munchkin cassettes (PCA, para 115; Morelli First Report, para 180). However, as advanced by the Defendants, this cannot be the case, as this raised orange ring is not part of holder but is rather part of the closing mechanism (DCA, para 133; Bailey Second Report, para 180; PCA, para 146; Morelli First Report, para 430). The Court examined the physical exhibits, installing Munchkin's Generations 2 and 3 cassettes in the PAIL and STEP diaper pails. In observing how these products function together, it is difficult to see how the raised orange ring can be part of the holder, as it does not hold or even touch the cassettes when

installed. That is in fact required as the orange ring rotates freely in order to be part of the closing mechanism of the Munchkin diaper pails. Instead, these cassettes rest upon the four white tabs to allow for the rotation to take place and seal the bag. This is also the case for the Generation 4 cassettes. Consequently, the raised orange ring is not a projection or projecting portion in the holder within the meaning of the 159 Patent, but is rather part of the closing mechanism.

[211] Munchkin's Generations 2 and 3 cassettes thus do not infringe independent Claims 1, 21, 40, or 52, nor do they infringe independent Claim 51 when they are assembled with the PAIL and STEP diaper pails.

[212] However, Munchkin cassettes infringe when assembled with some Diaper Genie pails. Munchkin's Generations 2 and 3 cassettes do infringe these claims because they practice all of the essential elements when viewed in relation to the Diaper Genie Mini and Expressions pails (these are the pails asserted by the Plaintiffs). As discussed in relation to the 384 Patent, these cassettes have a clearance on the bottom portion. These clearances fit compatibly with the orientation cones that are moulded directly into the holder of the Diaper Genie Mini and Expressions pails. Both parties agree that the orientation cone is a projection or projecting portion on the holder of the pails that is compatible with the clearance on these cassettes (PCA, para 117; Morelli First Report, para 411; DCA, para 135; Bailey Second Report, para 184). The Defendants submit that the Generations 2 and 3 Munchkin cassettes nonetheless cannot be considered clearances since, when assembled with the Diaper Genie pails, they preclude the fitting of a closing mechanism (DCA, para 135; Bailey Second Report, para 184). However, as discussed in claims construction, this is not a necessary element of "clearance" in the Angelcare

Patents. The clearance is defined as an empty space at the bottom of the cassette that solves the orientation problem by engaging with a fixed or moveable part of the pail. It can be configured with a fixed portion of the closing mechanism, a moveable portion of the closing mechanism, as well as with an interfering member in the holder. As such, the Defendants' proposition that Munchkin's Generations 2 and 3 cassettes cannot infringe the 159 Patent when they are seated in the holder of the Diaper Genie pails because they cannot fit a closing mechanism cannot stand.

[213] Mr. Morelli provided photographic evidence and expert testimony in his report that demonstrate that Munchkin's Generations 2 and 3 cassettes practice all of the essential elements of Claims 1, 21, 40 and 52 (Morelli First Report, Ex MM-9.1, pp. 1-3, 8-10, 14-16, 19-21, Ex MM-9.2). Mr. Morelli did the same for Claim 51, the assembly claim, finding that Generations 2 and 3, assembled with the Diaper Genie Mini and Expressions pails, practiced all the essential elements of this claim (Morelli First Report, Ex MM-9.1, pp. 30-36). In contrast, Mr. Bailey's evidence of the non-infringement of Generations 2 and 3 is limited to a discussion of the clearance and the projection in the holder; he does not provide any other evidence that would contradict Mr. Morelli's evidence that every essential element of the five independent claims of the 159 Patent are infringed by Munchkin's Generations 2 and 3 cassettes (Bailey Second Report, paras 178-185, 211, Schedule E, pp. 1-8, 17-19, 22-26) The Defendants do not make any arguments that go beyond an analysis of the common essential elements of the five independent claims in relation to the Munchkin's Generations 2 and 3 cassettes either (DCA, paras 132-135). The Plaintiffs have thus met their burden of proof that Munchkin's Generations 2 and 3 cassettes infringe Claims 1, 21, 40, and 52, as well as Claim 51 when assembled with the Diaper Genie Mini and Expressions pails.

(2) Dependent Claims

[214] The Plaintiffs submitted photographic evidence that all dependent claims of the 159 Patent were infringed by Generations 2 and 3 Munchkin cassettes (Morelli First Report, Ex MM-9.1, Ex MM-9.2). Mr. Bailey's only testimony regarding the non-infringement of these claims was that the independent claims upon which they rely were not infringed (Bailey Second Report, Schedule E). Moreover, the Defendants made no arguments regarding the non-infringement of the dependent claims of the 159 Patent by Generations 2 and 3 cassettes in their closing arguments. As such, the Plaintiffs have met their burden of proof and all remaining claims of the 159 Patent are infringed by the Defendants' Generations 2 and 3 cassettes, as well as their assembly with the Diaper Genie Expressions and Mini pails.

[215] In conclusion, Munchkin's Generations 2 and 3 cassettes infringe Claims 1-50 and 52-61 of the 159 Patent. These cassettes also infringe Claim 51 when assembled with the Diaper Genie Expressions and Mini pails, meaning that all 61 claims of the 159 Patent are infringed by these cassettes.

D. *The 421 Patent*

[216] The 421 Patent makes 19 claims, all of which the Plaintiffs assert (with the exception of claims with respect to Munchkin's Generation 4 cassettes which do not have the shape of a chamfer). They allege infringement of Claims 1-19 by Munchkin's Generations 2 and 3 cassettes and of Claims 1-4, 7-12, and 15-19 by Munchkin's Generation 4 cassettes. They do not allege infringement by Munchkin's Generation 1 cassettes.

(1) Independent Claim 1

[217] Of the 421 Patent's 19 claims, only Claim 1 is independent. The rest are dependent on one or more other claims.

[218] Claim 1 reads as follows:

- 1) A cassette for packing soiled diapers into an elongated tube of flexible material, the cassette comprising:
 - (a) a receptacle including a tubular wall delimiting a central opening, the central opening extending along a vertical central axis;
 - (b) the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall;
 - (c) the cassette including an outer boundary spaced outward of the tubular wall;
 - (d) a cover at a top portion of the storage area, the cover having a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent to the convex edge portion;
 - (e) the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outward of an imaginary projection of the tubular wall extending downwardly along the central axis;
 - (f) a first portion of the storage area that is located outward of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

[219] All the essential elements defined in Claim 1 must be present in the Defendants' products for there to be infringement. That is evidently the Plaintiffs' contention that there is

infringement. The Defendants deny infringement of Claim element 1(d) by their cassettes, stating that the Captiva cassette discloses the exact same cover (DCA, para 126; Bailey Second Report, Schedule D, pp. 2-3). They also deny that there is a clearance as described in Claim element 1(e) for the Generation 4 Munchkin cassettes, because neither the slots nor the cassette's inner wall are clearances (DCA, paras 123-124; Bailey Second Report, Schedule D, pp. 3-4). The Plaintiffs submitted arguments about the shape of the cover, as defined in Claim element 1(d), as it relates to Generations 2 to 4 of Munchkin's cassettes, as well as the clearance as defined in Claim element 1(e) in the Generation 4 Munchkin cassette. The Court will examine whether these two essential elements are practiced by the Defendants' Generations 2 to 4 cassettes. If any of these cassettes are missing either of these essential elements, then they will not be found to infringe the 421 Patent.

[220] Generations 2 to 4 Munchkin cassettes, as per the construction of the "convex edge portion" and the "inwardly recessed edge portion" taken up by the Court, disclose a cover that meets these elements. The cover, when viewed from the top, has material removed starting near the exterior edge of the cassette going toward its interior. The convex outer edge portion is simply the exterior edge of the cassette. It should also be noted that any argument the Defendants advance regarding prior art ought to be dealt with during the anticipation analysis. At this stage, we are concerned with the essential element being found in the Munchkin cassette of Generations 2 to 4. As such, whether the Captiva cassette discloses Claim element 1(d) of the Munchkin's Generations 2 to 4 cassettes is irrelevant to finding that these cassettes contain these claim elements upon an infringement analysis. Here, the covers of these cassettes have a periphery that includes a convex edge portion and an inwardly recessed edge portion, adjacent to

the convex edge portion (Morelli First Report, Ex. MM-10.1, p. 2, fig. 421.23.2 (1d)).

Consequently, Munchkin's Generations 2 to 4 cassettes practice Claim element 1(d) of the 421 Patent.

[221] As for the presence of a clearance, as required by paragraph 1(e) of Claim 421, the 384 Patent infringement analysis confirms the Defendants' position that the Generation 4 cassette does not have a clearance. Indeed, the Plaintiffs relied on the same arguments as those submitted for the 384 Patent, as well as the 159 Patent (which itself relied on the arguments presented in relation to the 384 Patent), to assert that the slots of the Generation 4 Munchkin cassettes are clearances (PCA, para 129). The analysis cannot change for the 421 Patent. That said, Generations 2 and 3 of the Munchkin cassettes do have a clearance according to the 384 Patent infringement analysis above. Their clearance is even in the form of a chamfer.

[222] The other essential elements of claim one have not been contested. In light of the foregoing, Generations 2 and 3 of the Munchkin cassettes infringe Claim 1 of the 421 Patent because they have all of the essential elements (Morelli First Report, Ex MM-10.1, fig. 421.23.3). Generation 4 of the Munchkin cassettes does not infringe because it lacks a clearance as defined at Claim 1(e).

(2) Dependent Claims

[223] Generation 4 Munchkin cassettes cannot infringe any dependent claims of the 421 Patent, as they rely upon the infringement of Claim 1. The Court must thus proceed only with an analysis of the dependent claims in relation to Generations 2 and 3 of the Munchkin's cassettes.

[224] The Plaintiffs submitted proof of infringement of all dependent claims of the 421 Patent by Generations 2 and 3 of the Munchkin's cassettes (Morelli First Report, Ex MM-10.1, Ex MM-10.2). The Defendants' main defense against the allegation of infringement of the dependent claims was the non-infringement of independent Claim 1 (Bailey Second Report, Schedule D).

[225] In addition to the argument based on non-infringement of Claim 1, the Defendants also advanced arguments regarding Claim 6. They submit that Claim 6, which requires that the clearance extend along the full periphery of the central opening, was not infringed by Munchkin's Generations 2 and 3 cassettes because the slots on the bottom of the cassette interrupt the clearance (DCA, para 128; Bailey Second Report, paras 157-158). The Plaintiffs are more convincing on this point. They submit that Mr. Bailey erroneously considered whether the clearance wall (i.e. the chamfered wall or the transition wall) extends along the full periphery of the central opening rather than whether the clearance itself, being the empty space, fulfills this requirement (PCA, para 130). The clearance exists at every point along the periphery of the central opening, regardless of the presence of the slots (Morelli First Report, paras 92, 170, 245). This is especially the case if the slots are merely a feature of the wall, as Mr. Bailey contends (Bailey Second Report, para 129). Consequently, Claim 6 is infringed by Munchkin's Generations 2 and 3 cassettes.

[226] The Defendants do not expressly mention Claim 13, but a footnote in their closing written case leads to Mr. Bailey's Second Report, where he denies that Munchkin's Generations 2 and 3 cassettes infringe Claim 13 (DCA, para 128, citing Bailey Second Report, paras 157-158). This claim requires that the transition wall (i.e. the wall that shapes the clearance, as per

the Court's construction of the term) extend along the full periphery of the central opening. Mr. Bailey explains that the transition wall of Munchkin's Generations 2 and 3 cassettes does not extend along the full periphery of the central opening, as the slots in the bottom of the cassettes prevent it from doing so (Bailey Second Report, paras 157-158).

[227] The argument above is similar to that advanced in relation to Claim 6 for the clearance, except in relation to the transition wall. However, in this case I find the Defendants more convincing. While the clearance may exist at every point along the periphery of the central opening regardless of the presence of the slots, the same cannot be said of Claim 13. This transition wall is indeed interrupted by 12 slots, meaning that it does not extend along the full periphery of the central opening. Consequently, Munchkin's Generations 2 and 3 cassettes do not infringe Claim 13.

[228] The Plaintiffs have thus proven infringement of the dependent Claims of 2-12 and 14-19 by Munchkin's Generation 2 and 3 cassettes. They have not proven infringement of Claim 13. Consequently, 18 of the 19 claims of the 421 Patent are infringed by these products.

E. *The 312 Patent*

[229] The 312 Patent defines 8 claims, all of which the Plaintiffs assert were infringed. The majority relate to diaper pails and their closing mechanism, with only Claim 8 discussing an assembly between a diaper pail and a cassette.

[230] The Plaintiffs assert that Claims 1 to 7 are infringed by Munchkin's PAIL and STEP diaper pails. It is alleged that Claim 8 is infringed by an assembly between the Munchkin's PAIL and STEP diaper pails and Munchkin's four generations of cassettes.

[231] Claim 1 is the only independent claim of this patent. It reads as follows:

- 1) An apparatus for packaging soiled diapers in an elongated tube of plastic flexible material, the apparatus comprising:
 - a) a storage area for receiving soiled diapers;
 - b) an entrance for introducing soiled diapers in the storage area;
 - c) a holder configured for releasably receiving a supply of the tube material such that the supply of the tube material extends through the entrance, the holder being proximal the entrance and including:
 - i) a recess including an upwardly extending side wall;
 - ii) a bottom generally horizontally extending wall, the bottom wall being generally circular and surrounding the entrance;
 - d) a tube gathering mechanism for sealing the tube when no soiled diaper is being pushed through the entrance, the tube gathering mechanism including:
 - i) a closure member including a projection extending above the bottom wall of the holder, the closure member engaging the tube and being moveable with relation to the bottom wall to gather the tube;
 - ii) the closure member being responsive to pressure by a hand of a user to progressively open and allow insertion of a soiled diaper in the storage area;
 - iii) a stationary wall portion located below the bottom wall for slidingly supporting the closure member during the movement of the closure member with respect to the bottom wall;

- iv) a device connected to the closure member for driving the closure member to move relative the bottom wall to gather the tube;
- e) a lid hingedly moveable between a closed position and an opened position, in the closed position the lid closing the holder, in the opened position the lid allowing access to the holder to permit installation of a new supply of tube material, the lid having a central funnel-shaped portion defining an aperture generally aligning with the entrance to the storage area, the aperture permitting insertion of a soiled diaper into the storage area.

[232] The parties dispute the presence of a tube gathering mechanism and its components at Claim element 1(d) in Munchkin's PAIL and STEP diaper pails.

[233] The Plaintiffs submit that the raised orange ring in the Munchkin's PAIL and STEP pails is a closure member because it is a movable portion that engages and closes the tube of plastic film through its star-shaped slots, twisting it closed when it rotates (PCA, paras 133-134). They argue that the tube gathering mechanism and closure member are not limited to the mechanism that is illustrated in the figures of the 312 Patent and that the orange piece nonetheless serves the function of gathering the tube and closing it so that odours do not escape (PCA, para 135). The parties agree that the raised orange ring includes a projection that extends above the bottom wall of the holder (PCA, para 133; Bailey Second Report, para 234).

[234] The Defendants argue that the raised orange ring cannot be the closure member described in Claim 1 of the 312 Patent because it is not movable with relation to the bottom wall. While it may gather the tube, its movement is around its own axis; it does not change position in space relative the bottom wall of the holder (DCA, para 150).

[235] I agree with the Defendants on this point. The raised orange ring does not meet all the essential elements of this claim because it is not movable with relation to the bottom wall to gather the tube. In line with the construction of this term, the closure member must change position in space relative to the bottom wall in order to meet this claim element. The closure member is not moveable with relation to anything, and more particularly the bottom wall, if both the bottom wall and the orange ring are static elements in space. The raised orange ring rotates around its axis, not changing position in space relative the bottom wall of the holder. Accordingly, this element is missing from Claim 1 of the 312 Patent.

[236] The Defendants submit that the tube gathering mechanism of the 312 Patent is limited to one in which there are two biased closing members that alternate between open and closed positions and operate in a linear fashion by pinching the plastic film shut (DCA, para 147; Bailey Second Report, paras 218-219). As such, they say that the rotating raised orange ring that is connected to several parts cannot meet the essential requirements of the 312 Patent (DCA, para 148; Bailey Second Report, para 218).

[237] I do not take the Defendants' view that the tube gathering mechanism is as limited as they make it to be. However, I do agree that the tube gathering mechanism of the PAIL and STEP diaper pail is at odds with Claim 1(d). That is all that is needed to deal with Claim 1 of Patent 312. I add nevertheless that Claim 1(d) discloses four subparagraphs that relate to the closure member and its particular limitations. It is a projection that extends above the bottom wall and that is movable with relation to the bottom wall of the holder to gather the tube, as per Claim 1(d)(i). It is responsive to the pressure of a user's hand to open progressively so that a soiled

diaper can be inserted into the storage area, as per Claim 1(d)(ii). The closure member is slidingly supported by a stationary wall while the closure member moves with respect to the bottom wall of the holder, as per Claim (d)(iii). Finally, a device is connected to the closure member that drives it to move relative the bottom wall of the holder and gather the tube, as per Claim 1(d)(iv). Upon the Plaintiffs' reading of the claims, each element of the tube gathering mechanism is isolated, with no indication of how they may work together to perform the intended function of sealing the plastic tubing.

[238] The Defendants submit numerous arguments regarding how the raised orange ring of the PAIL and STEP pails do not practice Claim elements 1(d)(i) to (iv) and how it is an entirely different type of closing mechanism than that defined in the 312 Patent. They note that the raised orange ring does not move between an open and closed position (DCA, para 149; Bailey Second Report, para 219) and that it is not responsive to the pressure of a hand to open progressively (DCA, para 151). As the Defendants submit, the raised orange ring is more or less in the same state of openness, with flexible plastic petals that the user can push through easily (DCA, para 151). A user inserting a soiled diaper into the PAIL and STEP pails untwists the plastic film in doing so, causing the plastic film to open. However, once the user removes their hand, the raised orange ring is in the same position as it was before the plastic film was untwisted. It is not the removal of the user's hand that causes the closure member to twist up the tube and seal it in the Munchkin pails, but rather the lid. The user must shut the lid of the PAIL and STEP pail for the plastic film to twist shut. The closing (i.e. twisting shut) of the plastic film is thus completely separate from the pressure of the user's hand. The features of these pails that the Plaintiffs allege correspond to Claim elements 1(d)(i) to (iv) function in isolation. The operation of the PAIL and

STEP diaper pails thus does not align with a reading of the Patent whereby the claim would describe how these elements interact and cause the intended processes.

[239] There is much to be said for the Defendants' arguments. If I had to, I would agree with the Defendants. However, it is not necessary to reach these other arguments as the Court concluded that, the fact that the raised orange ring of the Munchkin PAIL and STEP pails is not "movable with relation to" the bottom wall of the cassette holder is enough to determine that these products do not infringe Claim 1 of the 312 Patent. This is an essential element, defined at Claim 1(d)(i), that is missing from these diaper pails.

[240] Without infringing Claim 1 of the 312 Patent, the Munchkin PAIL and STEP diaper pails cannot infringe any of the dependent claims of this patent, as they all fundamentally rely on Claim 1. This is also true for any assembly between these diaper pails with any of the generations of Munchkin's cassettes.

F. *The 415 Patent*

[241] The 415 Patent comprises six claims, all of which the Plaintiffs assert are infringed. The Plaintiffs allege that Munchkin's PAIL and STEP diaper pails infringe Claims 1 to 5 and that the assembly between Munchkin's four generations of diaper pails with its PAIL and STEP diaper pails infringe Claim 6.

[242] Claim 1 is the only independent claim in the 415 Patent. It reads as follows:

- 1) An apparatus for packaging soiled diapers within an elongated tube of flexible plastic material, comprising:
 - a) a storage area for receiving soiled diapers;
 - b) an entrance for introducing soiled diapers in the storage area;
 - c) a holder configured for releasably receiving a cassette for dispensing the tube material, the cassette having a central opening, the cassette dispensing the tube material from a top thereof through the central opening, the cassette lower portion thereof, entrance and including:
 - i) an upwardly extending wall;
 - ii) a bottom wall;
 - iii) a projecting member upwardly extending above the bottom wall, the projecting member configured to engage the recessed area of the cassette when the cassette is received in the holder, wherein the projecting member is movable relative to the bottom wall.

[243] The disputed element of this claim is whether the PAIL and STEP diaper pails have a projecting member in the holder that engages the cassette's recessed area, as described in Claim element 1(c)(iii). This projecting member must be movable relative to the bottom wall. The Plaintiffs submit that the PAIL and STEP diaper pail infringe because the raised orange ring projects above the bottom wall of the holder, engages the cassette's recessed area, and is movable relative to the holder's bottom wall.

[244] The Defendants deny any infringement on two grounds. One is that they assert that the raised orange ring cannot be the projecting member as defined in Claim 1 of the 415 Patent because it is not part of the holder (DCA, para 144). The only projections in the holder of these

diaper pails, they assert, are the four white tabs (*Ibid*). The second is that the raised orange ring is not movable relative to the holder's bottom wall because it does not change position in space; it rotates around its own axis and as such cannot move relative to the bottom wall (DCA, para 145).

[245] I agree with the Defendants on both of these points. It is true that the raised orange ring is not movable relative to the bottom wall of the holder. As discussed in relation to the 312 Patent, the orange ring only rotates about its axis, when the diaper pail lid is closed after a diaper has been disposed of, thus creating a closing mechanism for the film that is coming out of the cassette (which is itself not moving, being anchored in the holder by four tabs in the holder and slots at the bottom of the cassette), without any movement in space relative to the holder's bottom wall. The only movement is that of the orange ring rotating, without going anywhere relative to the bottom wall of the holder.

[246] As already pointed out, upon the Court's careful examination, a Munchkin cassette installed in a Munchkin pail does not sit upon or even touch the raised orange ring, but only the four white tabs. That is needed in order for the ring to be able to rotate. A cassette sitting on the orange ring would prevent the rotation of the orange ring from doing its part in the closing mechanism. It is artificial to say that the raised orange ring is part of the holder simply because of its close proximity. On the other hand, it seems clear that it is part of the closing mechanism of the Munchkin pail when one sees the mechanism in action.

[247] At any rate, it suffices for our purposes to conclude that the essential element of Claim 1(c)(iii) is not present in the Munchkin pails: there is no projecting member that is movable relative to the bottom wall.

[248] Consequently, the raised orange ring does not correspond to the projecting member described at Claim 1(c)(iii) of the 415 Patent.

[249] Without meeting this claim element, the PAIL and STEP diaper pails cannot infringe Claim 1 of the 415 Patent. This also means that they cannot infringe any of the dependent claims that rely on Claim 1, including the assembly Claim 6.

G. *Inducement*

[250] The Plaintiffs allege in their written case that Munchkin is liable for inducing end-users into infringing some of its patents. The so-called “indirect infringement” by Munchkin is alleged to be with respect of the following assembly claims in Patent 128:

- Munchkin’s Generations 1-4 cassettes if assembled with the Munchkin’s PAIL or STEP diaper pails; this is alleged to infringe by inducement Claims 11, 12, 13, 16, 18, 19, 22 and 23;
- Munchkin’s Generation 1 cassettes if assembled with the Diaper Genie diaper pails Expressions and Mini; this is alleged to infringe by inducement Claims 11, 12, 18, 19 and 23;
- Munchkin’s Generations 2 and 3 cassettes if assembled with Diaper Genie diaper pails Essentials, Elite, Complete, Expressions and Mini; this is alleged to infringe by inducement Claims 11, 12, 18, 19 and 23.

[251] The Plaintiffs also allege infringement by inducement of Claim 51 of the 159 Patent when Munchkin's Generations 2 to 4 cassettes are assembled with the PAIL and STEP diaper pails and with the Diaper Genie Expressions and Mini diaper pails (PCA, para 172 (b)).

[252] Finally, the Plaintiffs allege Claim 8 of the 312 Patent and Claim 6 of the 415 Patent are infringed by inducement in the assembly between Munchkin's Generations 1 to 4 cassettes with Munchkin's PAIL and STEP diaper pails (PCA, para 172 (c)).

(1) Legal Test

[253] *Fox on Patents* describes "inducing infringement" as "a person who induces or procures another to infringe a patent is himself, herself or itself responsible for infringement of the patent" (# 13.15). To put it simply, if Munchkin induced others to infringe the Plaintiffs' patents, it is itself infringing the patents. Here, the Plaintiffs' have limited their allegations to combination claims from four patents: Patents 128, 159 as well as Patents 312 and 415.

[254] In order to have infringement by inducement where end users are encouraged to use a product in such a way that infringes a patent, the case law has developed a three-part test. In *Corlac Inc v Weatherford Canada Inc*, 2011 FCA 228 [*Corlac*],, the Federal Court of Appeal laid out the test in the following words at paragraph 162:

[...] First, the act of infringement must have been completed by the direct infringer. Second, the completion of the acts of infringement must be influenced by the acts of the alleged inducer to the point that, without the influence, direct infringement would not take place. Third, the influence must knowingly be exercised by the inducer, that is, the inducer knows that this influence will result in

the completion of the act of infringement: [citations omitted]. The test is a difficult one to meet.

No one disputes the application of the test in this case.

[255] The Plaintiffs contend that they satisfy the test. The first element is that the person said to be induced, the direct infringer, must have performed an act of infringement. Without an act of infringement, there cannot be infringement by inducement. The direct infringer must have assembled cassettes and diaper pails in such a way that the combination infringed on the combination claimed in the four patents considered here. In the case before the Court, the direct infringer is a purchaser of diaper pail cassettes who assembles them with various pails, both Munchkin's pails and Diaper Genie's pails.

[256] It has already been found that the following assemblies constitute infringement of some patents:

- Generations 1 to 4 of Munchkin's cassettes assembled with Munchkin's PAIL or STEP diaper pails infringe Claims 11, 12, 13, 16, 18, 19, 22, and 23 of the 128 Patent.
- Generation 1 of Munchkin's cassettes assembled with the Diaper Genie Mini and Expressions diaper pails infringe Claims 11, 12, 18, 19 and 23 of the 128 Patent.
- Generations 2 and 3 of Munchkin's cassettes assembled with the Diaper Genie Essentials, Elite, Complete, Mini and Expressions diaper pails infringe Claims 11, 12, 18, 19, and 23 of the 128 Patent.
- Generations 2 and 3 of Munchkin's cassettes assembled with the Diaper Genie Expressions and Mini diaper pails infringe Claim 51 of the 159 Patent.

On the other hand, it has also been found that the 312 and 415 Patents have not been infringed. It follows that only these combinations will be considered further for indirect infringement.

In essence, if the Plaintiffs can satisfy the Court that (1) these acts of contravention by purchasers of Munchkin cassettes were influenced by the alleged inducer, Munchkin, to the point that, if it were not for the influence, direct infringement would not occur; and (2) the influence was knowingly exercised, in that the inducer knows that the influence would result in an act of infringement, then indirect inducement will have been demonstrated.

[257] It is often said that the second element of the test for inducing infringement is a “but for” proposition. But for the influence of the inducer, there would not have been infringement. It follows that passivity by a “would be” inducer will not result in the test being satisfied.

(2) Application

[258] The binding decision of the Federal Court of Appeal in *MacLennan v Produits Gilbert Inc*, 2008 FCA 35, 67 CPR (4th) 161 [*MacLennan*], distinguished the state of the law in the United States and the United Kingdom to that in Canada. The Court found at paragraph 33 that “(I)n Canada, the courts have consistently held that selling a component intended to be incorporated in a patented combination (or process) without anything further, does not constitute an inducement to infringement, even where this component cannot be used for any other purpose;”. The mere characteristics of the article sold will not suffice. More will be needed.

[259] The Plaintiffs offer a variety of pieces of evidence in support of their contention that the inducer, Munchkin, did more than put on sale infringing cassettes that were assembled in violation of the patented combination: “something active”, in the words of the Plaintiffs, took place.

[260] First, between 2006 and 2011, the Diaper Genie pails are said to have been alone compatible with Playtex cassettes (generally flat bottom). It is only in January 2012 that the Defendants started developing what became their first Generation cassettes. Munchkin Baby Canada, Ltd made available in Canada in or around August and September 2013 its Generation 1 cassette under a “value brand” and a private label for an important retailer. Witnesses for Munchkin testified that the Generation 1 cassettes were designed to be only compatible with Playtex’s Diaper Genie pails.

[261] Munchkin’s Generation 2 cassettes emerged from development in March 2014, to be made available in Canada in November 2015. At the time, Generation 2 cassettes were only compatible with the Diaper Genie pails (Essentials, Elite, Complete, Mini and Expressions) (Amended Agreed Statement of Facts, para 75). The Generation 3 cassette is structurally identical to Generation 2, the only difference being a throw-away blister plastic cap; the cassette became available in Canada around August 2017. They were compatible with the Munchkin pails and the Plaintiffs’ Diaper Genie pails already listed as compatible with Generation 2 cassettes.

[262] The development of the Generation 4 cassette started around February 2019 and the cassettes became available on the Canadian market around February 2020. They are only compatible with the Munchkin pails and the Diaper Genie pails.

[263] Munchkin’s diaper pails became available only around March 2016. Thus, during the period Generation 1 cassettes were marketed in Canada, these were only compatible with Diaper

Genie pails (Amended Agreed Statement of Facts, para 69). Before the launch of Munchkin diaper pails, the Generation 2 cassette was available in Canada with the only compatibility being with the Diaper Genie pails. If the two early generations of Munchkin cassettes were only compatible with Diaper Genie pails (until Munchkin diaper pails came onto the market), the Munchkin cassettes were made to fit Diaper Genie pails, and only Diaper Genie pails. In order to sell Munchkin cassettes, the only outlet appears to have been the Diaper Genie pails. Indeed, it may have been a business decision to make its product compatible with the pails that had been in existence for many years and have a significant share of the market.

[264] Second, the Plaintiffs argue Munchkin cassettes being sold in close proximity of the Diaper Genie cassettes was part of Munchkin's strategy. An internal exchange of e-mails in evidence suggests that they "continue to pound on the doors of everyone who takes Diaper Genie" (Exhibit 220). In cross-examination, a senior official at Munchkin agreed that Munchkin cassettes were sold in the same vicinity as the Diaper Genie cassettes. The theory is that location in a store is an important consideration in order to drive sales. However, this argument, in and of itself, does not demonstrate influence of Munchkin on the end users of its cassettes. There is no evidence that Munchkin obtained a preferential treatment from retailers at the request of Munchkin. It may be true that retailers would tend to put like products with products of the same ilk. But then, it would be simply to take advantage of location, not that the location in the store is Munchkin's doing with a view to influencing customers.

[265] Third, the Plaintiffs claim that Munchkin's cassettes were sold at a discount compared to the Diaper Genie cassettes. If cassettes are compatible with Diaper Genie diaper pails, that would

surely attract customers, especially if the cassettes are in the same vicinity and are less expensive.

[266] Fourth, the most important element is the label affixed on the Munchkin cassettes: it unambiguously states that the Munchkin's cassette fits Diaper Genie diaper pails. In the cassettes of Generation 1, the reference is only to Diaper Genie diaper pails. In the third and fourth generation cassettes, the label refers to Munchkin and Diaper Genie pails.

[267] The need to quickly and clearly convey the compatibility with the Diaper Genie pails was confirmed by one Munchkin officials. The evidence in this case convinces the Court, on a balance of probabilities, that the very business model adopted by Munchkin was to use the Diaper Genie diaper pails in order to sell its cassettes: they were built to fit only the Diaper Genie pails, until Munchkin produced its own pail and made it available in Canada in 2016, and then only to fit the Munchkin's and Diaper Genie's diaper pails. Munchkin sold its cassettes at a discount. It is likely that Munchkin was able to take advantage of the proximity of its ware to the Diaper Genie products. However, although proximity should appear to be advantageous, the evidence did not confirm that Munchkin could control the location of its cassettes in a given store. What it had control over was the label on the cassettes which, unmistakably, directed the end-user to the Diaper Genie diaper pails. That notification, which has been on the Munchkin's cassettes since its first Generation, suggests that Munchkin had success in using the label on compatibility with the Diaper Genie pails to sell cassettes.

[268] In *MacLennan*, the Court of Appeal decided the issue as if at trial (para 24) and the Court came to its own conclusion as to a finding of infringement by inducement. The gist of the analysis is found at paragraphs 38 to 40:

[38] As stated above, British law was followed in Canada beginning in 1906 (see *Copeland-Chatterson, supra*). Thus, in Canada, where the Patent Act has remained unchanged, the sale of a constituent part of a patented combination, even if this part cannot be used for anything other than infringing the invention, is not sufficient to establish the element of inducement. Apart from the existence of direct infringement, the evidence must establish that the influence of the alleged inducer constitutes a *sine qua non* of the direct infringement, and this influence must be exercised knowingly, i.e., in circumstances where the alleged inducer knew that his or her influence would result in the act of infringement (*AB Hassle, supra*, at par. 17).

[39] In the case before us, the evidence indicates that the Gilbert teeth have no other use other than working the patented invention, which is not sufficient in itself to establish infringement by inducement. However, there is also evidence that Produits Gilbert gave its clients a price list that identified by number the Quadco teeth that corresponded to the Gilbert teeth and that were intended to be replaced by the Gilbert teeth.

[40] While, for the reasons given above, it is true that the sale of a component of a patented combination, even if the component has no use other than working the patented combination, is not sufficient to establish infringement by inducement, this state of affairs becomes inculpatory when the seller indicates to its clients the use that should be made of the component. We are no longer talking here about the mere fact that the seller knows or ought to know, by the type of article sold, that it will be used to infringe a patented combination (see *Innes, supra, Townsend, supra* and *Dunlop, supra*). The seller is making its clients aware of the fact that its product is intended to work the patented invention, which is the only reason they are buying it.

[Emphasis added.]

[269] The Court of Appeal was satisfied that Produits Gilbert, giving its clients a price list that identified which Quadco products could be replaced by Produits Gilbert products, helped

demonstrate infringement by inducement. Here, the evidence is even clearer that the label must have had influence on the consumers as they were directly referred to the Diaper Genie diaper pails to use the Munchkin cassettes in Diaper Genie pails. The cassettes are said to “fit” the Diaper Genie diaper pails.

[270] Similarly, in *Proctor & Gamble Co v Bristol-Myers Canada Ltd* (1978), 39 CPR (2nd) 145 [*Proctor & Gamble*], our Court relied on instructions on packages as well as TV advertising to conclude that the public was induced to infringe a method claim. In the world of pharmaceutical patents, there are many cases where inducements were based on statements in the product monographs on the label. In fact, Munchkin conceded that much in their closing submissions (TT, Vol. 35, p 147.4 to 147.8). I note in passing that the Court of Appeal in *MacLennan* referred, at paragraph 43, to *Proctor & Gamble* in agreement with the proposition that there is no necessity for the Defendants to have had direct contact with, or to know the identity of, the end-users of the combination. One reads at page 167:

Where the defendant has induced or procured an infringement, I do not feel that it is at all necessary in such cases for the supplier to have had any personal contact with the infringing consumer, to even know his or her identity or to have sold the article directly to that person. It is sufficient in such cases, if it is also established, that the article in fact has been sold by the defendant for the purpose of putting it on the market for sale to the ultimate infringer, regardless of whether the final sale is made by an agent of the defendant or by independent distributors or retailers.

[271] The third prong of the test requires that the influence must be knowingly exercised by the inducer, the Defendants (*Hospira*).

[272] That appears to be quite obvious. Munchkin marketed cassettes that fit the Diaper Genie pails (at a time early on when there were no other outlets for Munchkin's cassettes but the DG pails) and announced the compatibility with Diaper Genie pails on its stickers affixed on the cassettes. There is no doubt that Munchkin knew of the label it affixed on its cassettes. One senior official testified that they had to make sure that the packaging is working as hard as it possibly can, in order to convey quickly and clearly the features and benefits of the product on its packaging (TT, Vol. 20, in camera, pp 30:18 to 31:18). Evidently, the compatibility of cassettes and the Diaper Genie diaper pails was one of the benefits; indeed, it was essential to Munchkin in the early days of its involvement in the diaper cassettes' business because Generations 1 and 2 were only compatible with Diaper Genie diaper pails. The evidence shows that the Diaper Genie diaper pails were the only channels to sell the Munchkin cassettes. There is no doubt that Munchkin knew it was influencing. Indeed, the evidence shows that it was its purpose. It has continued its advertisement of the compatibility of its four generations of cassettes to this day because having the DG pails that can receive Munchkin cassettes provides access to a broader market. The influence was deliberate.

[273] It is easily inferred from the evidence that the influence resulted in the completion of the act of infringement. There was never any doubt that the decision to launch Generation 1 was accompanied by Munchkin's intention to have its cassette fit Diaper Genie's pails (Dunn, TT, Vol. 22, pp 48:13 to 49:18) which were very dominant. The evidence shows that the development of Generation 1 cassettes was aimed at Generation 1 fitting the Diaper Genie diaper pails (Johnson, TT, Vol. 21, pp 17:20 to 17:23; 25:20 to 26:18) where the lead designer for Munchkin was provided with pails and cassettes with a view that Munchkin cassettes be

compatible. As a matter of fact, Generation 2 cassettes were developed in reaction to changes made by the Plaintiffs to the configuration of its pails (Johnson, TT, Vol. 21, p 31:9 to 31:23). Again, the purpose for Munchkin was for its products to adjust to a new configuration (snap ring in the holder), with the lead designer being provided with samples of Diaper Genie products (Johnson, TT, Vol. 21, pp 31:27 to 37:9).

[274] As already noted, the compatibility of the Munchkin cassettes with Diaper Genie diaper pails continued even after Munchkin launched its own diaper pails, the PAIL and the STEP, in March 2016. The messaging on the label of Munchkin cassettes remained the same: compatibility with the Diaper Genie diaper pails. According to the testimony of a senior official for Munchkin, the Munchkin diaper pails have little distribution in Canada, which suggests that the sole realistic outlet for the Munchkin cassettes remains the Diaper Genie diaper pails (Carvalho, TT, Vol. 20, pp 101:9 to 103:18). The importance of connecting the Munchkin cassettes with the Diaper Genie diaper pails is unabated.

[275] The Defendants contended that the Plaintiffs failed to prove the first prong of the test. They alleged that direct infringers, the Canadian consumers, could not have infringed the combinations involving their cassettes as the combination did not infringe the Plaintiffs' patents. If there is no infringement, there will not be any inducement to infringe. However, the Court found infringement of some of the patented combinations (the 312 Patent and 415 Patent have been found not to be infringing due to an essential element not being present in the alleged infringing products). Consequently, the first prong of the test is satisfied and the general

argument of Munchkin that none of the claims have been infringed does not provide protection against liability.

[276] The other defense raised by the Defendants was that of an implied licence obtained from a patentee when the product has been lawfully obtained. That implied licence is such that “the sale of a patented article is presumed to give the purchaser the right ‘to use or sell or deal with the goods as the purchaser pleases’ ”: see *Badische Anilin und Soda Fabrik v Isler*, [1906] 1 Ch 605, at p 610. Unless otherwise stipulated in the licence to sell the patented article, “the licensee is thus able to pass to purchasers the right to use or resell the article without fear of infringing the patent” (*Eli Lilly & Co v Novopharm Ltd*, [1988] 2 SCR 129, at para 100). The Court goes on to say that limitations imposed must be clearly and unambiguously expressed.

[277] The Defendants contend that the Diaper Genie diaper pails are sold to customers without limitations. They can use the pail however they wish. Furthermore, consumers were not advised about the prohibition to use its pails with cassettes sold by Munchkin, including on the packaging of the pails.

[278] The Plaintiffs rely on *MacLennan* for their argument and they consider that it is dispositive in this case. They argue that the facts in *MacLennan* and this case are similar. The invention is used in circular saws for feller heads; it covers two pieces, a repositionable saw tooth and a detachable tooth holder. That combination claim speaks in terms of a saw tooth and tooth holder combination. Les Produits Gilbert Inc sold replacement teeth for teeth that would be damaged, instead of consumers relying on the Quadco replacement teeth. Les Produits Gilbert

Inc, with their replica of the Quadco teeth, was found to infringe by inducement as it distributed “a price list indicating the series number of the original Quadco tooth that its teeth are designed to replace” (para 7).

[279] As indicated earlier, the Court of Appeal chose to examine the case as if acting as a trial court to avoid sending the matter back (para 25). The Court notes that the case is concerned by combination claims which are protected. The focus ought to be on the claim that is the protected combination. That is also the case here. It is the liability of Munchkin that is discussed, liability for inducing customers to infringe a patented combination. As discussed at paragraph 40 of *MacLennan*, the sale of a component of a patented combination, even if it cannot have any other use than working a patented combination, does not suffice to establish infringement by inducement. What changes, however, is when the seller, Munchkin, indicates to its clients the use that should be made of the component in the combination. The Court of Appeal in *MacLennan* speaks of “this state of affairs becomes inculpatory”. The paradigm has shifted: we are dealing with a combination claim involving in our case two components, which has received the protection of a patent; it is the action of Munchkin that is scrutinized to decide if Munchkin has induced infringement, making it liable. The result in this case for all intents and purposes is dictated by a binding decision of the Court of Appeal on facts very similar.

[280] Given the facts of this case and the lack of articulation of an argument that would distinguish the case of *MacLennan*, this Court must apply *MacLennan* to the facts of this case. As a result, the three-prong test is met and the Plaintiffs have been able to prove indirect

infringement (or inducing infringement of some patented combination of Munchkin cassettes and diaper pails).

H. *Liability of Defendants Munchkin, Inc., the American Parent Company*

[281] The Defendants submit that even if the Court finds the products at issue to infringe the Plaintiffs' patents, Munchkin, Inc., the American parent corporation of the Canadian subsidiary, is not liable (DCA, para 156). They allege that the Plaintiffs have not established its liability as a corporate entity based in California without any offices or employees in Canada and that has no role in the manufacture, use or sale of the Munchkin cassettes or diaper pails in Canada.

[282] The Plaintiffs do not address this issue directly in their closing arguments. However, the evidentiary record they mounted contained information about design decisions that came directly from Munchkin, Inc. in California, which resulted in the infringing products sold in Canada. The Court heard testimony from Mr. Johnson and Mr. Dunn, two Munchkin Inc. Officials, about how Munchkin's cassettes were designed to be compatible with Diaper Genie's diaper pails. Mr. Johnson testified that, to his knowledge, there have never been designers at Munchkin Canada (Johnson, TT Vol. 21, p. 2:17-21). Mr. Carvelho testified that all of the Munchkin products distributed in Canada are designed at Munchkin, Inc.'s Los Angeles headquarters (Carvelho, TT Vol. 19, p.183:10-16). He also explained that there are only seven Munchkin Canada employees and that their roles are limited to sales, marketing, and warehousing (Carvelho, TT Vol, 19, p.183:22-28). Moreover, Munchkin Canada's products are merely a subset of what is offered in the United States; there are no unique items in Canada (Carvelho, TT Vol. 19, p.184:18-25). The Court also heard testimony from Mr. Carvelho about Munchkin's strategy to advertise that their

cassettes are compatible with Diaper Genie pails, with labelling designed to this effect. There was no distinction made between the decisions undertaken for the American market and the Canadian market to this effect. As such, the Plaintiffs advanced evidence that the American parent company made design and marketing decisions that had a direct impact on the resulting infringing activities in Canada. As such, Munchkin, Inc. is liable for any proven infringing activities in Canada.

V. Invalidity

A. *Anticipation*

[283] The first ground of invalidity raised by the Defendants is that of anticipation, or lack of novelty. Munchkin claims that the Captiva/Diaper Genie II cassette anticipates four claims of the 128 Patent. I note that these four claims, Claims 1, 2, 20 and 21, are not asserted by the Plaintiffs. Nevertheless, the Defendants challenge their validity because, in their view, they are anticipated by the Captiva/Diaper Genie II cassette (the so-called “flat-bottomed cassette”). Furthermore, the 128 Patent is said to anticipate a number of claims of the five Patents designated collectively as the “Angelcare Patents” (patents 384, 159, 421, 312 and 415). Lastly, it is alleged that the inventor, Mr. Morand, disclosed his invention in a way that did not preserve confidentiality such that the invention was communicated to the public.

(1) Legal Principles

[284] The *Patent Act* requires for an invention to be new. It is a foundation of patent law that if a monopoly is to be conferred to an inventor for an “invention”, it must be for “any new and

useful art, process, machine, manufacture or composition of matter, on any new and useful improvement in any act, process, machine, manufacture or composition of matter” (s 2). Without novelty, a monopoly would be granted with nothing in return, that is the subject-matter of the grant must be new (*SmithKline Beecham Pharma Inc v Apotex Inc* (2002), 21 CPR (4th) 129 (FCA)). If there is prior disclosure of a patent’s claimed subject-matter, there is no novelty. Accordingly, an “inventor” will not be rewarded with a monopoly because it has not been earned due to the disclosure of the invention. It is section 28.2 of the *Patent Act* that governs novelty. It provides a specific statutory test. I reproduce subsection (1) which is relevant:

28.2 (1) The subject-matter defined by a claim in an application for a patent in Canada (the “pending application”) must not have been disclosed

(a) more than one year before the filing date by the applicant, or by a person who obtained knowledge, directly or indirectly, from the applicant, in such a manner that the subject-matter became available to the public in Canada or elsewhere;

(b) before the claim date by a person not mentioned in paragraph (a) in such a manner that the subject-matter became available to the public in Canada or elsewhere;

(c) in an application for a patent that is filed in Canada by a person other than the applicant, and has a filing date that is before the claim date; or

28.2 (1) L’objet que définit la revendication d’une demande de brevet ne doit pas :

a) plus d’un an avant la date de dépôt de celle-ci, avoir fait, de la part du demandeur ou d’un tiers ayant obtenu de lui l’information à cet égard de façon directe ou autrement, l’objet d’une communication qui l’a rendu accessible au public au Canada ou ailleurs;

b) avant la date de la revendication, avoir fait, de la part d’une autre personne, l’objet d’une communication qui l’a rendu accessible au public au Canada ou ailleurs;

c) avoir été divulgué dans une demande de brevet qui a été déposée au Canada par une personne autre que le demandeur et dont la date de dépôt est antérieure à la date de la revendication de la

- demande visée à l'alinéa (1)a);
- (d)** in an application (the “co-pending application”) for a patent that is filed in Canada by a person other than the applicant and has a filing date that is on or after the claim date if
- (i)** the co-pending application is filed by
- (A)** a person who has, or whose agent, legal representative or predecessor in title has, previously regularly filed in or for Canada an application for a patent disclosing the subject-matter defined by the claim, or
- (B)** a person who is entitled to protection under the terms of any treaty or convention relating to patents to which Canada is a party and who has, or whose agent, legal representative or predecessor in title has, previously regularly filed in or for any other country that by treaty, convention or law affords similar protection to citizens of Canada an application for a patent disclosing the subject-matter defined by the claim,
- (ii)** the filing date of the previously regularly filed application is before the claim
- (d)** avoir été divulgué dans une demande de brevet qui a été déposée au Canada par une personne autre que le demandeur et dont la date de dépôt correspond ou est postérieure à la date de la revendication de la demande visée à l'alinéa (1)a) si :
- (i)** cette personne, son agent, son représentant légal ou son prédécesseur en droit, selon le cas :
- (A)** a antérieurement déposé de façon régulière, au Canada ou pour le Canada, une demande de brevet divulguant l'objet que définit la revendication de la demande visée à l'alinéa (1)a)
- (B)** a antérieurement déposé de façon régulière, dans un autre pays ou pour un autre pays, une demande de brevet divulguant l'objet que définit la revendication de la demande visée à l'alinéa (1)a), dans le cas où ce pays protège les droits de cette personne par traité ou convention, relatif aux brevets, auquel le Canada est partie, et accorde par traité, convention ou loi une protection similaire aux citoyens du Canada,
- (ii)** la date de dépôt de la demande déposée antérieurement est antérieure à la date de la revendication

date of the pending application,	de la demande visée à l'alinéa a),
(iii) the filing date of the co-pending application is within twelve months after the filing date of the previously regularly filed application, and	(iii) à la date de dépôt de la demande, il s'est écoulé, depuis la date de dépôt de la demande déposée antérieurement, au plus douze mois,
(iv) the applicant has, in respect of the co-pending application, made a request for priority on the basis of the previously regularly filed application.	(iv) cette personne a présenté, à l'égard de sa demande, une demande de priorité fondée sur la demande déposée antérieurement.

[285] Prior disclosure to the public can take different forms, including prior publication, prior use, and even, as dictated under paragraph 28.2(1)(d), in a “co-pending patent application” filed by a person other than the applicant. Subsection 28.2(1) prohibits the invention from having been made available to the public before the claim date or, in the case of paragraph 28.2(1)(a), before the one year grace period prior to the filing date.

[286] Notably, an invention communicated to a single member of the public who is free to use it as they please will make the invention available to the public for the purpose of anticipation under paragraph 28.2(1)(a) of the *Patent Act* (*Baker Petrolite Corp. v Canwell Enviro-Industries Ltd.*, 2002 FCA 158, [2003] 1 FC 49 [*Baker Petrolite*] at para 42, cited recently in *Enercorp Sand Solutions Inc. v Specialized Desanders Inc.*, 2018 FCA 215 [*Enercorp*] at para 40).

[287] Given the presumption that Canadian patents are valid, the burden is on the party who claims invalidity, including a lack of novelty, to prove its allegation on the standard of the balance of probabilities.

[288] As has been said repeatedly in the jurisprudence, the test to satisfy anticipation is a difficult one to meet. There cannot be any mosaic of prior art references. The test is much more restrictive. This passage from *Beloit*, from the Federal Court of Appeal, has often been quoted, including in *Free World Trust*, at paragraph 26:

One must, in effect, be able to look at a prior, single publication and find in it all the information which, for practical purposes, is needed to produce the claimed invention without the exercise of any inventive skill. The prior publication must contain so clear a direction that a skilled person reading and following it would in every case and without possibility of error be led to the claimed invention.

(p 297)

The Federal Court of Appeal recently referred again to the jurisprudence of *Free World Trust* and *Beloit* as controlling. In *Western Oilfield Equipment Rentals Ltd v M-I LLC*, 2021 FCA 24 [*Western Oilfield*], requirements for anticipation are nicely encapsulated, including the need for disclosure and enablement as well as the need for a single prior art reference:

[81] The appellants argue that several patent publications and activities constitute prior art that anticipates the claims in issue. The appellants observe correctly that assessing anticipation (also known as lack of novelty) is a two-step process; **the party attacking a claim must establish both disclosure and enablement of the invention**. The appellants argue that disclosure is based on whether performing the subject matter of the prior art would result in infringement. With regard to enablement, the appellants argue that the test is whether the skilled person “would have been able to perform the prior art without undue burden.” A comment is necessary on both of these arguments.

[82] On disclosure, the appellants fail to acknowledge two important requirements. Firstly, **the disclosure “must contain so clear a direction that a skilled person reading and following it would in every case and without possibility of error be led to the claimed invention”** (emphasis added): *Free World Trust* at para. 26, citing *Beloit Canada Ltd. v. Valmet OY* (1986), 8 C.P.R. (3d) 289, 64 N.R. 287 (F.C.A.) at 297 (*Beloit*). “A signpost, however clear, upon the road to the patentee's invention will not suffice”; “[t]he prior inventor must be clearly shown to have

planted their flag at the precise destination before the patentee”: *Free World Trust* at para. 26 citing *Beloit; General Tire & Rubber Co. v. Firestone Tyre & Rubber Co.*, [1972] R.P.C. 457 (Eng. C.A.) at 486 (*General Tire & Rubber*).

[83] The second important disclosure requirement that the appellants fail to acknowledge is that there is **no room for trial and error or experimentation by the skilled person at this stage**; that person is simply reading the prior reference for the purposes of understanding it: *Apotex Inc. v. Sanofi-Synthelabo Canada Inc.*, 2008 SCC 61, [2008] 3 S.C.R. 265 at para. 25 (*Sanofi-Synthelabo*). **Non-inventive experimentation is a consideration in assessing enablement, but not disclosure.**

[84] On enablement, it is important to bear in mind that the question is whether the skilled person would be enabled to perform the claimed invention without undue burden, not the prior art: *Sanofi-Synthelabo* at para. 27. The appellants’ argument quoted near the end of paragraph 81 above focusses on enablement of the prior art.

[85] Another important requirement for anticipation is **that all of the essential elements of the claim in issue must be disclosed and enabled in a single prior art reference**: *Free World Trust* at para. 26; *General Tire & Rubber* at 486. This means that a separate anticipation analysis must be done for each of the prior art references in issue.

[86] The appellants argue that anticipation (and obviousness) must be viewed from the perspective of a skilled person taking into account the common general knowledge of which that person would have been aware. Certainly, the teachings of the prior art are to be read as a skilled person would understand them. It is also true that, by definition, that skilled person is aware of the common general knowledge. But it does not follow that a party attacking a patent claim is necessarily entitled to fill in gaps in a prior art reference with such common general knowledge. As stated above, the skilled person must find in the prior art reference sufficient information that he or she could not possibly fail to arrive at the claimed invention. That may or may not be so in a case where the skilled person is required to fill in gaps with the common general knowledge.

[Emphasis added.]

[289] In effect, the essential elements of claims have to be disclosed and enabled; and these are disclosed and enabled in one prior art reference chosen by the Defendants.

[290] In disclosure, the Court must be satisfied that clear directions are present in the piece of prior art selected by the Defendants show lack of novelty. As for enablement, it is to be considered separately as a requirement for anticipation (*Sanofi*, para 24): is the person skilled in the art able to perform the invention, having regard to the particular piece of prior art as a whole? The question is not what the skilled person would consider the prior art to mean, which is the issue on disclosure, but rather whether the POSITA would be able to, equipped with the common general knowledge, “make the invention of the second patent without undue burden” (*Sanofi*, para 33). What must be enabled are the essential elements claimed in the asserted claims said to be anticipated. The Supreme Court in *Sanofi* provides four factors to help guide courts in determining whether the prior disclosure is enabling:

[37] Drawing from this jurisprudence, I am of the opinion that the following factors should normally be considered. The list is not exhaustive. The factors will apply in accordance with the evidence in each case.

1. Enablement is to be assessed having regard to the prior patent as a whole including the specification and the claims. There is no reason to limit what the skilled person may consider in the prior patent in order to discover how to perform or make the invention of the subsequent patent. The entire prior patent constitutes prior art.
2. The skilled person may use his or her common general knowledge to supplement information contained in the prior patent. Common general knowledge means knowledge generally known by persons skilled in the relevant art at the relevant time.
3. The prior patent must provide enough information to allow the subsequently claimed invention to be performed without undue burden. When considering whether there is

undue burden, the nature of the invention must be taken into account. For example, if the invention takes place in a field of technology in which trials and experiments are generally carried out, the threshold for undue burden will tend to be higher than in circumstances in which less effort is normal. If inventive steps are required, the prior art will not be considered as enabling. However, routine trials are acceptable and would not be considered undue burden. But experiments or trials and errors are not to be prolonged even in fields of technology in which trials and experiments are generally carried out. No time limits on exercises of energy can be laid down; however, prolonged or arduous trial and error would not be considered routine.

4. Obvious errors or omissions in the prior patent will not prevent enablement if reasonable skill and knowledge in the art could readily correct the error or find what was omitted.

[291] As such, the disclosure must contain enough information that, paired with the POSITA's common general knowledge, would allow the POSITA to practice the invention without undue burden. If the POSITA would not understand what was contained in the disclosure or would otherwise be unable to use that information to create an invention that would infringe the allegedly anticipated patent, then the enablement stage of the anticipation test will not be met.

(2) The Captiva/Diaper Genie II Cassette and the 128 Patent

[292] The Defendants submit that Playtex's Captiva cassette, structurally identical to and also branded as the Diaper Genie II cassette, anticipates Claims 1, 2, 20, and 21 of the 128 Patent (DCA, para 158; ASF, para 103). The priority date for the 128 Patent is May 4, 2007 (ASF, para 57). As per paragraph 28.2(1)(a), any disclosure prior to this date will invalidate these 128 Patent's claims for anticipation.

[293] The Captiva cassette was launched in December 2005 (ASF, para 103). Mr. Powell testified that by September 30, 2007 at the latest, over 900,000 Diaper Genie II cassettes had been sold in Canada (Powell, TT Vol. 7, pp. 9:17-13:22; Ex 94). As such, there is no doubt that these cassettes were widely available prior to the claim date of the 128 Patent. The question is whether these prior art objects actually disclose the subject-matter of the above-mentioned claims.

[294] Claims 2, 20 and 21 of the 128 Patent are dependent on Claim 1 of the 128 Patent. The independent claim reads:

1. A cassette for dispensing flexible tubing, said cassette comprising:

a cassette body having a central tubular portion defining an aperture extending therethrough, an outer wall surrounding said central tubular portion and a cassette bottom extending between and connecting said outer wall and said central tubular portion;

said outer wall, said cassette bottom and said central tubular portion cooperating to define an interior area that surrounds said central tubular portion;

said cassette bottom including first registration features, said first registration features are operable to establish an upright position of said cassette;

a cover coupled to said body and at least partially overlying said interior area, said cover defining an interior peripheral edge which is spaced away from said central tubular portion thereby defining a gap therebetween, said cover defining second registration features positioned radially outward from said gap;

said first and second registration features having complementary shapes and being operable to provide one-on-top-of-the-other shift resistant stackability of at least two of the cassettes.

The 128 Patent, and Claim 1 in particular, addresses issues of stackability of cassettes and their improper installation in a receptacle meant to receive them. Dependent Claim 2 limits Claim 1 in that the registration features are said to be at least a protuberance and at least one recess complementarily shaped to engage the protuberance. Dependent Claim 20 limits further by requiring that first registration features be operable to minimize the likelihood of the cassette being improperly installed, while dependent Claim 21 speaks of a length of flexible tubing being positioned in the interior area of the cassette.

[295] As I understand it, Munchkin asserts that the Captiva/Diaper Genie II cassettes disclosed that they have registration features that are operable to establish an upright position; that they have registration features that are complementarily shaped and made operable to establish an upright position for the cassette in the receptacle; that complementary shaped registrations that are operable to provide shift resistant stackability. Munchkin alleges that these features of the Captiva/Diaper Genie cassettes disclose the invention in these claims.

[296] To be clear, the more significant problem encountered by Munchkin is rather that Claim 1 requires a cover to the cassette which is positioned in a precise location. Given that what is claimed is a cassette for dispensing flexible tubing, Claim 1 provides for a gap which must be between the central tubular portion and the inside edge of the cover. In other words, what is required is an inside gap, as opposed to the gap being situated between the exterior edge of the cover and the exterior wall of the cassette, which would define an exterior gap. The experts agree that the 128 Patent locates this gap closer to the tubular wall that surrounds the central opening

of the cassette than to its outer periphery (Morelli First Report, para 323; Bailey First Report, para 82). Claim 1 is unambiguous.

[297] The only defense against that requirement of Claim 1 offered by the Defendants is that the gap location is not an essential element. That is only one factor to contribute to shift-resistant stackability. Nonetheless, this is an element that is clearly claimed by the 128 Patent. As already explained, by having an interior gap, the cassette's cover is allowed to extend all the way to the periphery of the cassette that favours a better positioning of registration features: Claim 1 specifically asserts "thereby defining a gap therebetween, said cover defining second registration features positioned radially outward from said gap". To put it simply, the inventor meant for the gap to be inside for reasons that are readily apparent; the maximization of the surface on which second registration features can be placed, as well as these features being positioned as closely as possible to the exterior edge of the cassette.

[298] The Captiva/Diaper Genie II cassette does not disclose Claim 1 of the 128 Patent because the film-dispensing gap in this prior art reference is in a different location than that defined in the 128 Patent. In the Captiva and Diaper Genie II cassettes, the gap is located closer to the outer periphery of the cassette. Claim 1 of the 128 Patent locates the gap closer to the tubular wall at the centre of the cassette. Consequently, this essential claim element is not disclosed by the Captiva/Diaper Genie II for the purpose of anticipation.

[299] Claims 2, 20, and 21 depend on Claim 1 and as such cannot be anticipated by the Captiva/Diaper Genie II cassette if it fails to disclose an essential element of Claim 1. There is accordingly no need to proceed to the enablement phase as disclosure has not been established.

[300] As for the claims asserted by Angelcare to be infringed (Claims 11, 12, 13, 16, 18, 19, 19, 22 and 23 of the 128 Patent), it was confirmed at trial that Munchkin does not allege that the dispensing assembly (independent Claim 11 and depending claims) was anticipated.

(3) The 128 Patent and the Angelcare Patents

(a) *The 384 Patent*

[301] According to the Defendants, the 128 Patent discloses the subject-matter in all claims of the 384 Patent. That is because, according to Mr. Bailey, the expert retained by the Defendants, the recesses at the bottom of the 128 cassettes are the clearance claimed in the Angelcare cassette patents. It will be remembered that the 128 Patent was geared towards addressing issues of stackability of cassettes and their proper orientation in the holder (upside down). Patent 384 seeks also to remedy the issue of improperly oriented cassettes, but does not consider the advantage of the stackability of cassettes. Rather, the disclosure of the 384 Patent speaks of other disadvantages that the Patent seeks to remedy: parts of prior art cassettes prone to breakage; not user-friendly and operations difficult to understand; costly to fabricate and excessive utilization of film; and not effective in containing the odours of the disposed material.

[302] Mr. Morelli, the expert retained by the Plaintiffs, agreed that the 128 Patent discloses the essential elements of Claim 1 of the 384 Patent (Morelli, TT, Vol. 30, p 173:6), including, of course, the clearance (said to be “asymmetrical”) claimed at the end of Claim 1 and for that matter, at the end of Claim 6, the other independent claim of the 384 Patent. The Plaintiffs readily accept that the 128 Patent includes a clearance on the bottom of the cassette, which could be considered a first registration feature within the language of the 128 Patent (PCA, para 229). The experts also agree that the clearance causes a reduced width of the cassette’s internal volume relative to the volume above the clearance, as specified in Claim 6 (Bailey First Report, paras 210, 219; Morelli Second Report, para 157). Notably, neither Claim 1 nor Claim 6 of the 384 Patent require that the film-dispensing gap be either toward the interior or exterior of the cassette’s cover. As such, the 128 Patent’s requirement that it be close to the tubular wall (i.e. inner wall) of the cassette does not interfere with a finding of anticipation for these claims.

[303] In paragraph 138 of his Second Report, Mr. Morelli contends that the other expert, Mr. Bailey, did not discuss all of the essential elements of Claim 1. This is turned into an argument that Munchkin did not discharge its burden of establishing anticipation. However, when asked by the Court what essential elements were not discussed and proven, the answer given by the Plaintiffs was inadequate. More importantly, Mr. Morelli conceded during a skillful cross-examination (TT, Vol. 30, pp 168:19 to P 173:6) that Figures 7 and 8 of the 128 Patent comprise all of the elements of Claim 1 of the 384 Patent. That is evidence leading the Court, on a balance of probabilities, to conclude that Claims 1 and 6 of the 384 Patent are anticipated by the 128 Patent.

[304] Claims 2 and 7 of the 384 Patent, however, are not anticipated by the 128 Patent; they define a clearance in the shape of a chamfer which is not disclosed by the 128 Patent. The Defendants, through the testimony of Mr. Bailey, spent much time trying to demonstrate the presence of a chamfer in Figure 8 of the 128 Patent. However, this testimony is unconvincing and ultimately does not display an image of a chamfer as constructed. This is regardless of some inference drawn from read-ins of John Rousso, inventor of the 128 Patent, who declined to testify, who implied during pre-trial examination that Figure 8 of the 128 Patent contains a chamfer with a pocket on the bottom left-hand side and a chamfer on the right-hand side (DCA, para 174). It is very much unclear what Mr. Rousso meant by “angled surface” and it was even less clear what he actually referred to as a chamfer with a pocket. A proper examination could have elucidated issues. Mr. Rousso, as indicated earlier, did not testify. The lack of clarity as to Mr. Rousso’s description of Figure 8 of the 128 Patent renders the piece of information useless in my estimation and it can only be discounted. A chamfer, as recalled from the claims construction analysis and as determined by this Court from the expert testimony of Mr. Morelli at trial, is a beveled edge that forms from the removal of material where two surfaces meet at a corner. Mr. Morelli accepted the definition of chamfer offered by Mr. Bailey (Bailey First Report, para 115 and figure reproduced at paragraph 122 of the reasons for judgment). The two original surfaces must remain in order for a particular shape to be a chamfer. Mr. Morelli was adamant that a chamfer will have the shape found at paragraph 115 and he was not shaken on cross-examination. In fact, he reproduces the figure at paragraph 140 of his Second Report which brings precision to his First Report, at paragraph 90. When read in context, I have not found any contradiction between paragraph 90 of Mr. Morelli’s First Report and his paragraphs 140 to 142 of his Second Report, just more precision. In my view, Mr. Morelli’s testimony, including his

cross-examination, was more convincing in view of the definition of “chamfer”. On the other hand, Figure 8 of the 128 Patent, on which relies Mr. Bailey, is at best unclear. In fact, Mr. Bailey repeated many times that Figure 8 is a chamfer plus additional removal of material. He also said that it adds material back. To top it off, he had to concede, after notable hesitation, that the word “chamfer” is not to be found in the 128 Patent. I am not satisfied that the chamfer, defined by Mr. Bailey before dealing with validity, is disclosed in Figure 8 of the 128 Patent. Figure 8 of the 128 Patent reveals a beveled edge alone, with one of the original two surfaces no longer present. As such, Claims 2 and 7 of the 384 Patent cannot be anticipated by the 384 Patent. Figure 8 “does not show a single delimiting surface resulting from the removal of a single edge” said counsel for the Plaintiffs. I agree. Instead, Figure 8 shows two walls delimiting the surface, delimiting the clearance (TT, Vol. 34, p 76:25 to 28).

[305] Claim 3 depends on any one of Claims 1 and 2 and indicates that the clearance extends along the full periphery of the central opening. Claim 8 requires the same, depending on any one of Claims 6 and 7. This is also anticipated by the 128 Patent, which designates element 352 as a clearance that extends along the entire bottom portion of the cassettes in Figure 8. The experts are somewhat in agreement to this effect, Mr. Morelli being more equivocal than Mr. Bailey (Bailey First Report, para 206; Morelli Second Report, para 143; Morelli, TT Vol. 30, pp. 184:25-185:13). I agree that the 128 Patent discloses Claims 3 and 8 of the 384 Patent when dependent on Claim 1.

[306] Claim 4, dependent on any of Claims 1 to 3, defines a cassette with an outer periphery that tapers downwardly. Claim 9 similarly defines a cassette with an outer periphery that tapers

downwardly, relying on any of Claims 6 to 8. In my view, this is not disclosed by the 128 Patent. The Defendants advance Figures 2 and 13 of the 128 Patent as proof of a downward taper in the cassette. They suggest that a skilled person would understand “that the cassettes disclosed could have a taper or a clearance (i.e. feature 42)” (DCA, para 178). We do not know why there could be such understanding in view of what feature 42 is said to be in the 128 Patent. In looking at Figure 1, which shows this same cassette in isometric view, it is apparent that these alleged tapers, seen in cross-section in Figures 2 and 13, are actually small recesses that receive the protuberances (44) on the cover around the perimeter of the bottom of the cassette. The 128 Patent thus does not disclose Claims 4 or 9 of the 384 Patent.

[307] Moreover, Mr. Bailey’s First Report spoke at paragraph 117 of “The Skilled Person would readily understand Claim 4 to claim a cassette with an outer wall that tapers from top to bottom”. That is not a recess (42). Neither in the figures nor in the rest of the specification of the 128 Patent do we find any reference, let alone a claim element, referring to a taper. As he has done frequently during the trial, Mr. Bailey found elements in figures. The Court has not been persuaded that Figures 2 and 13 of the 128 Patent are, or could be, a taper:

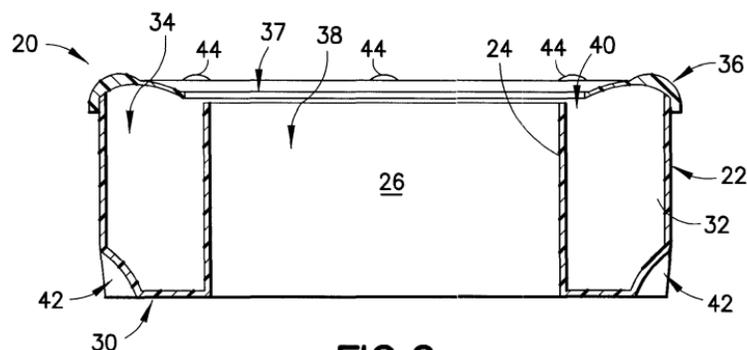
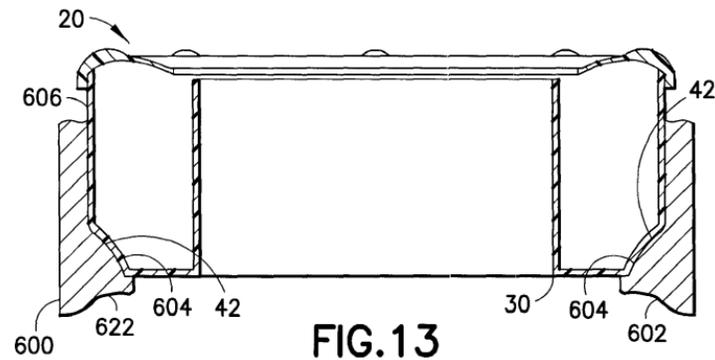


FIG.2



The contention seems to be that the taper is feature 42, a feature expressly identified in the 128 Patent as a recess that serves a very particular purpose. Together with a complementarily shaped bump or protuberance (44), they assist in stackability of cassettes when put on top of one another. That does not constitute a taper.

[308] The Plaintiffs did not discuss in the written case the Defendants' allegation that Claims 5 and 10 are anticipated by the 128 Patent. Claims 5 and 10 refer the inner annular wall and the outer annular wall being integrally formed. The claims are disclosed by the 128 Patent. The experts agree that the 128 Patent discloses a cassette where the inner annular wall and the outer annular wall are integrally formed, i.e., are formed of the same piece (Morelli First Report, para 145; Bailey First Report, para 208). But Claim 5 relies on Claim 4. As just seen, the cassette of Claim 4 requires that the cassette tapers shown inwardly, which is not present in the 128 Patent cassette. It follows that the 128 Patent cannot anticipate Claim 5 of the 384 Patent. The same reasoning applies to Claim 10, which relies on Claim 9 and its downward tapering.

[309] As a result, Claims 2, 4, 5, 7, 9 and 10 were not disclosed by the 128 Patent. These claims are not anticipated. As for Claim 11, it is not asserted anymore.

(b) *The 421 Patent*

[310] The Defendants allege that the 128 Patent discloses all of the claims of the 421 Patent. They obviously rely on the construction given to essential elements in the 384 Patent. They also raise others. Nevertheless, if an essential element of the independent claim is not disclosed, the directly or indirectly dependant claim will not have been disclosed either.

[311] The 421 Patent has one independent claim and 18 dependent claims. One of the essential elements of Claim 1, the independent claim, is found at item (d):

- 1) A cassette for packing soiled diapers into an elongated tube of flexible material, the cassette comprising:
 - (d) a cover at a top portion of the storage area, the cover having a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent to the convex edge portion;

In my view, Claim element 1(d) was not disclosed by the 128 Patent. As a result, the dependent claims cannot have been anticipated either in view of that missing disclosure.

[312] Claim 1, the sole independent claim of the 421 Patent, contains many of the same claim elements as found in independent Claims 1 and 6 of the 384 Patent. Mr. Bailey testified that all of the essential elements of Claim 1 of the 421 Patent were disclosed by the 128 Patent (Bailey First Report, paras 218-221). Mr. Morelli agreed, save on the issue of Claim element 1(d) (Morelli Second Report, paras 157-162). Claim element 1(d) describes the cassette's cover, which has a periphery including a "convex edge portion" and an "inwardly recessed edge portion" that is adjacent to the convex edge portion. This is what is unique to the claim and the

object of the parties' arguments; for the reasons that follow, Patent 421 is not disclosed by the 128 Patent because the essential element 1(d) is not present.

[313] Although it would seem obvious that an examination of the cover of a cassette would be conducted using figures based on a top view of the cassette, the Defendants and their expert sought to rely on the left-hand side corner of Figure 12 of the 128 Patent:

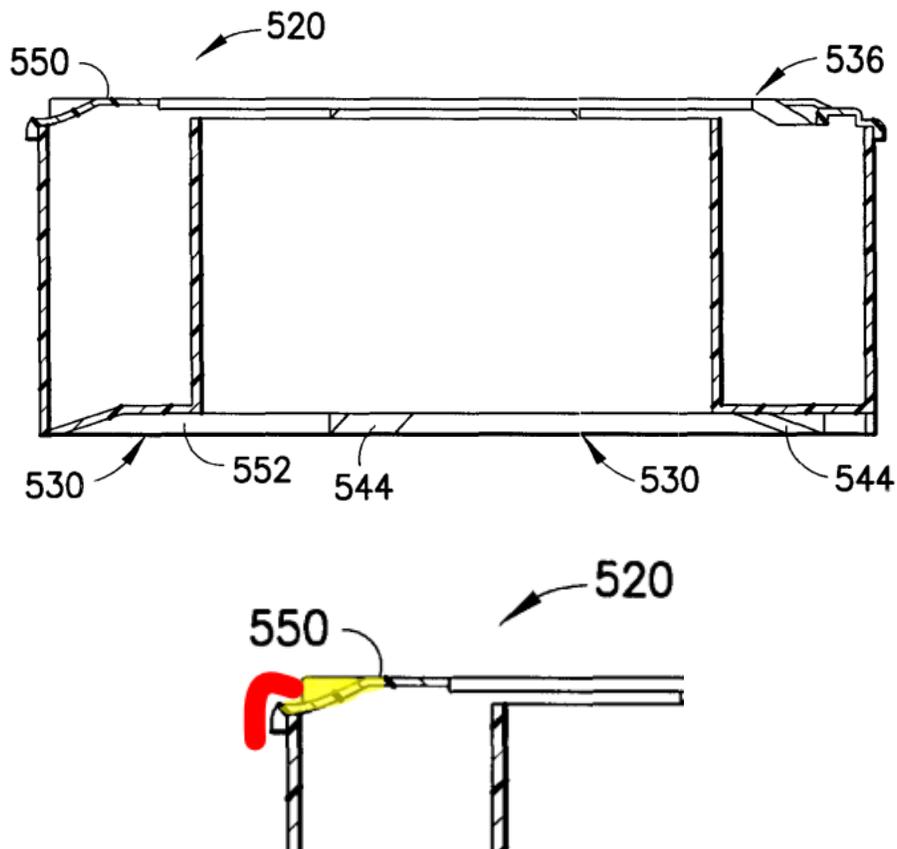


FIG.12

I fail to see how that corner of Figure 12 can assist in disclosing “a cover at a top portion of the storage area, the cover having a periphery including a convex edge portion, adjacent to the convex edge portion”. Using this figure, there is no cover, no periphery. Mr. Bailey points to the

red portion, at the extreme left, as disclosing a cassette cover with a convex edge portion. He then posits that, adjacent to the convex edge portion, is the “inwardly recessed portion which he coloured in yellow” (Bailey First Report, para 220).

[314] This does not describe accurately element 1(d) of the 128 Patent. First, the word “edge” in “inwardly recessed edge portion” was dropped by the expert from the actual text of the claim. Thus, it is the periphery which includes an edge portion that is inwardly recessed; that means towards the inside of the cover. What Figure 12 shows is rather a depression. Furthermore, the figures of the 128 Patent all show an inner dispensing gap. Indeed, Claim 1 defines a gap situated between the cover and the central tubular wall. There is no indication in the claims of the 128 Patent or its disclosure that there exists the element 1(d) of the 421 Patent: there is no cover having a periphery that has a convex edge with, adjacent to it, an inwardly recessed edge.

[315] There is no room for guesswork in anticipation. Speculation must be disregarded as it does not establish anything on a balance of probabilities. Basically, Mr. Bailey invites the Court to speculate with him, an invitation that the Court must decline. In *Bell Helicopter*, the Court of Appeal stated that “(s)ince the illustration in these documents are not inclusive, and since the accompanying text is unhelpful as to the configuration of the landing gears they disclose, Bell Helicopter’s anticipation submissions are largely based on speculation. Consequently, these submissions clearly fail to meet the test for anticipation discussed above” (para 115).

[316] During the claims construction analysis, the Court determined that this description of the cover ought to be made based on a top-down perspective of the cassette, with the convex edge

portion referring to the outer periphery of the cassette's cover viewed from this angle. However, the Defendants argued their anticipation allegation by relying on an interpretation of this claim element from a cross-section view and it is thus necessarily unconvincing.

[317] The Defendants' anticipation analysis based on a top-down view must fail as well. The Court determined during its purposive construction of element 1(d) that the inwardly recessed edge portion of the 421 Patent is removed material adjacent to this outer periphery toward the center of the cassette. Once again, the Defendants submit a figure, Figure 11 of the 128 Patent, which they argue reveals an inwardly recessed edge portion adjacent to the outer periphery of the cassette's cover, when viewed from a top-down angle. Figure 11 is:

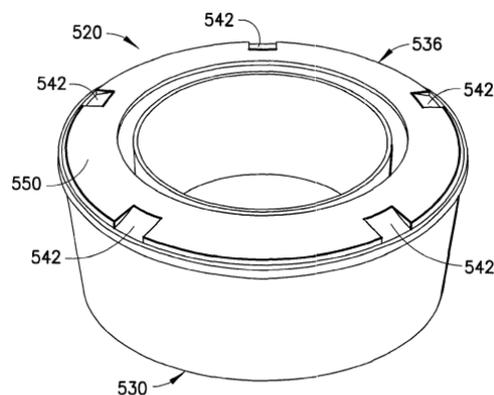


FIG. 11

Figure 11 of Patent 128 does not present an inwardly recessed edge portion of the cover. That is because, simply put, it does not portray a recessed portion. It merely shows slots (no. 542) that are depressed areas on the cover, that are complementarily shaped for a purpose. They are registration features which receive first registration features that are complementarily shaped. Figure 11 does not portray a recessed edge portion; it portrays depressions in the direction of the bottom of the cassette. The first and second registration features assist with the stackability of

cassettes. The Plaintiffs argue that it is through this purposive reading of the 421 Patent that this term should be interpreted and applied (PCA, 253). I agree and have done so during the claims construction analysis. The Defendants' arguments based on Figure 11 of the 128 Patent thus cannot succeed.

[318] In light of the above, the 128 Patent does not disclose this essential element of Claim 1 of the 421 Patent. Moreover, if Claim 1, the only independent claim of the 421 Patent, is not anticipated by the 128 Patent, then it necessarily follows that none of the dependent claims of the 421 Patent are anticipated.

(c) *The 159 Patent*

[319] The Defendants allege that the 128 Patent anticipates all cassette claims of the 159 Patent. There are five independent claims in the 159 Patent: Claims 1, 21, 40, 51 and 52. Only Claim 51 does not have a dependent claim, directly or indirectly. All other claims depend on independent claims.

[320] Munchkin argues that the essential elements of the 159 Patent are all disclosed by the 128 Patent. The Defendants simply assert that in view of their contention concerning the essential elements of Claims 384 and 421, what is disclosed by the 128 Patent suffices. It also offers an observation concerning a holder having a projection, which is found in independent Claims 1, 21 and 52 of the 159 Patent. I note that it is unclear why independent Claim 40 is not included given that Claim 40) c) refers directly to "c) a holder ... including ii) a projecting portion extending above the bottom wall ...". At any rate, there is a fundamental issue that is not disclosed by

Patent 128 that is present in all of the independent claims of the 159 Patent. As we shall see that should dispose of the anticipation issue.

[321] Comments are offered concerning some dependent claims. Thus, the Defendants refer more particularly to Claim 58, where the cassette “includes a lip which projects outwardly, when the film tubing is dispensed through the dispensing gap, the lip slidingly engaging the film tubing”. This is a dependent claim from independent Claim 52. The 128 Patent also has a lip. But it is a different lip as, in the words of Claim 7 of the 128 Patent, it is “a lip extending along a peripheral surface defined by said cover so that an outer periphery defined by said cassette bottom is slidably engageable with said lip when one cassette is positioned on top of another cassette”. The lip of Patent 128 does not disclose the lip of 159: one deals with stackability, the other the film dispensing gap to facilitate the extraction of the film from the cassette. The only observation offered by the Defendants is that the POSITA would know about lips which are part of the common general knowledge and they could be added to any embodiment. How that could satisfy the test for anticipation is not explained by the Defendants and no authority was offered in support of such an observation meeting the test for anticipation.

[322] The Defendants comment on the stand alone independent Claim 51, the one claim that speaks to the assembly of a diaper pail and cassette (Claim 40 and its dependent claims speak of a cassette for use in a diaper pail; the other independent claims are about a cassette for packaging soiled diapers and a cassette for dispensing pleated film). As I understand it, the Defendants state, rather than demonstrate, that the assembly is disclosed in the 128 Patent. They then assert that the so-called description of the prior art Diaper Genie pail would somehow have disclosed

the other elements found in the Claim. I fail to see how: both the seven lines referring to the Diaper Genie system at page one of the 128 Patent (lines 18 to 25) and the Bailey First Report (paras 249-250) refer to generalities whereas Claim 51 is very precise. The 128 Patent does not disclose Claim 51. Ultimately, the Defendants rely again on a POSITA's awareness of the configuration of the Diaper Genie pails. This evidence is insufficient to suggest that the Claim is in any way anticipated by the 128 Patent. I add that no authorities were offered by the Defendants in support of such a proposition.

[323] Having referred to the Defendants' observations, the matter of the anticipation of the 159 Patent by the 128 Patent can be disposed of very directly. The five independent claims of the 159 Patent have a feature that was not disclosed by the 128 Patent. These independent claims provide specifically for a cover of the cassette that extends from the tubular wall toward the outer boundary of the cassette. The cover engages the tubular wall (claims 1d), 40d(3), 51(d)(i)(3), and 52c)) or, as in Claim 21d), the tube is dispensed from an outside gap as the tube overlies the cover. Thus the 159 Patent does not have an interior gap. Either the cover engages the tubular wall, which excludes one interior gap to dispense the tube, or it has a gap located on the exterior of the cassette such that the tube overlies the cover. That is possible only if the tube comes from the outside, overlying the cover to reach the central opening of the cassette where soiled diapers and other objects will be dropped into the pail.

[324] In my view, whether the independent claims speak of the cover engaging the interior or tubular wall and extending outwardly toward the outer boundary of the cassette, or speak of the tube that overlies the cover, these features are not disclosed by the 128 Patent. The cover of the

128 Patent engages the outside wall of the cassette, not the tubular wall as clearly defined in its Claim 1: "... said cover defining an interior peripheral edge which is spaced away from tubular portion thereby defining a gap there between ...". The Defendants have the burden of showing, on a balance of probabilities, that the 128 Patent disclosed the 159 Patent such that it anticipates Patent 159. That burden was not discharged. It follows that all dependent claims are equally not anticipated in view of the absence of disclosure of elements of the independent claims.

(d) *The 312 and 415 Patents*

[325] Counsel for Munchkin stated on the record during oral argument that the Defendants do not assert anymore that the 312 and 415 Patents are anticipated by Patent 128. At any rate the Court concluded that the allegations of infringement of these two patents could not be sustained.

[326] Based on the above analysis, the following claims were disclosed by the 128 Patent:

- Claims 1, 3, 6, and 8 of the 384 Patent.

(e) *Is the Disclosure by the 128 Patent enabling?*

[327] It is, of course, not sufficient that there be disclosure, i.e. that the prior patent discloses the subject-matter. The Supreme Court in *Sanofi* accepts, quoting at paragraph 25 Lord Hoffman in *Synthon BV v Smithkline Beecham*, [2005] UKHL 59, 1 All ER 685 at para 32, that "the skilled person is taken to be trying to understand what the author of the description [in the prior patent] meant". At this early stage, there is no room for trial and error or experimentation by the skilled person. He is simply reading the prior patent for the purpose of understanding it. There

must also be proven that the skilled person would have been able to perform the invention without the exercise of any inventive skill. As put by the Supreme Court in *Sanofi*, “[f]or purposes of enablement, the question is no longer what the skilled person would think the disclosure of the prior patent meant, but whether he or she would be able to work the invention” (para 27). Is there an enabling disclosure? It remains that the POSITA has to be able to perform the invention without undue burden, but allowing for an amount of trial and error at this stage.

[328] In this case, there were many debates, but whether or not the skilled person would be able to make the invention was not one of them. The enablement is with respect to the essential elements of the invention in the claims that are asserted to be anticipated. The Defendants dedicated three paragraphs in their written material. The Plaintiffs did not even address the issue in spite of Mr. Morelli offering some such comments (Morelli Second Report, paras 153 to 156). Mr. Morelli offers two comments. Patent 128 does not disclose all of the elements claimed in the 384 Patent. The only element he refers to is the chamfer claimed in the 384 Patent. It is true that the 128 Patent does not disclose a chamfer. But the Court already found that that claim has not been disclosed by the 128 Patent. To the extent an essential element in a dependent claim is not disclosed, that claim will not be anticipated (the chamfer is claimed only in dependent Claim 2).

[329] Second, Mr. Morelli argues that extensive experimentation would be required of the POSITA at the enablement stage. I do not find Mr. Morelli’s assertion that practicing these claim elements would require in-depth and elaborate experimentation or that the POSITA would need to rely excessively on third party subcontractors for help in testing the invention to be convincing (Morelli First Report, para 156). Having prototypes made by third parties is not an undue burden

on the POSITA, as this is part and parcel of the regular design process (Bailey First Report, para 49; Morelli Second Report, para 52(d); Tsang Report, para 26(c); see also, e.g. Morand, TT, Vol. 2, pp. 38:11-23, 207:8-11). The POSITA's ability to practice the 128 Patent, as well as their ability to use both prototypes and CAD 3D modelling software to visualize and test the invention, appear entirely sufficient to enable the POSITA to practice Claims 1, 3, 5, 6, 8, and 10 of the 384 Patent. These seem to be precisely the acceptable "routine trials" that Justice Rothstein discusses at paragraph 37 of *Sanofi* that will not interfere with a finding of enablement.

[330] Neither one of these comments from the Plaintiffs' expert can carry much weight. They lack precision and are more impressionistic than anything else. As importantly, the Plaintiffs did not argue the issue. As a result, the enablement has been established through the evidence of Mr. Bailey (Bailey First Report, paras 216-217).

(4) Alleged Confidential Disclosure of Angelcare Cassettes by Mr. Morand

[331] The Defendants allege that the claims related to cassettes defined in the Angelcare Patents are anticipated pursuant to paragraph 28.2(1)(a) of the *Patent Act* because Mr. Morand disclosed a CAD file of an Angelcare cassette to companies Initial and Plasti-Lax more than one year before the filing date of October 3, 2008. The Plaintiffs deny there was any public disclosure, alleging that these CAD files were protected under obligations of confidentiality.

[332] On January 9, 2007, Mr. Morand or an employee at his firm, Enta Design, emailed Initial, a prototype manufacturing company located in France, seeking a quotation for a prototype of a cassette (DCA, para 205; Morand, TT, Vol. 3, pp. 173:1-176:7; FC 33/Ex 26). Attached to this

email was a CAD file entitled “angel-care-b cassette_v2” (*Ibid*, see also Morand, TT, Vol. 2, 205:21-207:16). It shows how the prototype of the cassette with a chamfer ought to look in three-dimensional space. From this file, Initial made a cassette prototype (DCA, para 207; Morand, TT Vol. 2, 205:21-208:5). A PDF representation of the contents of the file was presented in the Defendants’ written case and is reproduced herein for illustrative purposes as CAD files. It is the capture of an image of the design disclosed in the CAD file.



Initial quoted a price and was retained by Enta Design; it produced the prototype of the body of a cassette.

[333] Mr. Morand, or an employee at Enta Design, sent this same CAD file to Plasti-Lax, the engineering division of a company called IML Containers, to create technical drawings for mould-making (DCA, para 208; Morand, Vol. 2, 212:11-25; Angelcare Read-Ins at Tab 2H). Plasti-Lax subsequently produced technical drawings based on the information contained in the CAD file, such as the one dated February 15, 2007, which were approved by Mr. Morand on July 9, 2007 (DCA, para 208; Morand, TT Vol. 2 at 212:3-213:14; 215:3-16; FC 25/Ex 27).

[334] The Court heard that two other potential disclosures were made. One was made around December 12, 2006 to Usinage JGT Ltée: they were to manufacture three metal rings. The Court

was advised that the three rings were ordered for the purpose of assessing how much film would be lost in cassettes if a chamfer were to be created in a cassette. No information was conveyed to Usinage JGT Ltée to explain the purpose of the metal rings: they were to be manufactured and delivered to Angelcare's cassette manufacturer (IML Containers). The second potential disclosure is with respect of IML Containers which were asked to insert the metal rings in Captiva cassettes, which had a flat bottom at the time, and to fill the cassettes with plastic film. IML Containers had been in a business relationship with Mr. Morand for a few years already. They were referred to as "business partners".

[335] The Defendants pursued their allegations of disclosure concerning what they called the design of the chamfered cassette to Initial and Plasti-Lax in their written case. However, they did not pursue their allegations with respect to the other two occurrences. At any rate, the disclosure to Usinage JGT Ltée about metal rings being manufactured can hardly be anything of a nature of an enabling disclosure and that to IML Containers, the manufacturer of Angelcare's cassettes, is of a nature that would be deemed confidential between "business partners".

[336] It is uncontroversial that an invention communicated to a single member of the public who is free to use it as they please will make the invention available to the public for the purposes of anticipation under paragraph 28.2(1)(a) of the *Patent Act* (*Baker Petrolite* at paragraph 42, cited recently in *Enercorp* at para 40; see also *Bombardier Recreational Products Inc. v Arctic Cat Inc.*, 2017 FC 207 at paragraph 485). It is the communication of the invention that will constitute the disclosure. Here the Plaintiffs rely on the obligation of confidentiality. Thus, the real matter at hand, at this stage, is whether the Plaintiffs can rely on a relationship of

confidentiality between Mr. Morand or Enta Design in their dealings with Initial and Plasti-Lax. Whether the disclosure is enabling is a subsequent matter to consider. Otherwise put, when Mr. Morand or an employee at Enta Design sent the CAD file to Initial and to Plasti-Lax, was this a communication to the public, or was it protected under confidentiality in the context of these relationships?

[337] In *Corlac* the Federal Court of Appeal applied to the issue of anticipation by prior disclosure in a patent case the test developed by the Supreme Court in *Lac Minerals Ltd v International Corona Resources Ltd*, [1989] 2 SCR 574 [*Lac Minerals*]. As the Court of Appeal puts it, “the judge turned to *Lac Minerals* for guidance as to whether confidentiality existed”.

The Court of Appeal, following in the footsteps of the Supreme Court, wrote at paragraph 48:

[48] *LAC Minerals* involved divided opinions in the Supreme Court. Despite disagreement among the five-member panel of the Court regarding the existence of a fiduciary duty, the Court unanimously approved and implicitly adopted the English ‘reasonable man test’ described in *Coco v. A.N. (Engineers) Ltd.*, [1969] R.P.C. 41 (Ch.) (*Coco*), for ascertaining whether an obligation of confidence exists in a given situation: *LAC Minerals*, paras. 10-11, 161-162. Information will be considered to have been exchanged in a confidential relationship where “any reasonable man standing in the shoes of the recipient of the information would have realised that upon reasonable grounds the information was being given to him in confidence”: *Coco*, pp. 47, 48. The following passage from *Coco* (p. 51) was also referred to by Sopinka J. in *LAC Minerals* and cited by the judge in this case:

In particular, where information of commercial or industrial value is given on a business-like basis and with some avowed common object in mind, such as a joint venture or the manufacture of articles by one party for the other, I would regard the recipient as carrying a heavy burden if he seeks to repel a contention that he was bound by an obligation of confidence.

[Emphasis added.]

[338] The Court of Appeal was satisfied that the judge in *Corlac* turned to *Lac Minerals* “to extract general principles in relation to confidential communications, including the factors to be considered in ascertaining whether confidentiality exists” (para 49). Thus, the Court of Appeal concludes that there is no principled reason why there should not be reliance on *Lac Minerals* for the purpose of seeking guidance on whether confidentiality exists. Both parties submit that the determination of whether there was an obligation of confidentiality toward the CAD files should rely on the test as quoted in *Corlac*: “the reasonable man standing in the shoes of the recipient of the information would have realised that upon reasonable grounds the information was being given to him in confidence”.

[339] In effect, the test asks “whether the information was imparted in circumstances in which an obligation of confidence arises” (*Lac Minerals*, p 612). Having reasonable grounds that the information was shared in confidence will suffice. The *Lac Minerals* test thus puts the nature of the relationship between the parties at the centre of the determination to be made. But the nature of the information is also of great significance: information of industrial value given on a business-like basis, such as the manufacture of articles by one party for another, brings significant weight. *Coco* states that the recipient carries a heavy burden if what is sought is “to repel a contention that he was bound by an obligation of confidence” (*Coco*, p 51). The *Corlac* Court found, it bears repeating, that the “(i)nformation will be considered to have been exchanged in a confidential relationship where “any reasonable man standing in the shoes of the recipient of the information would have realised that upon reasonable grounds the information was being given to him in confidence ...” The manufacture of articles by a party for another would fall *prima facie* in that category carrying an obligation of confidentiality.

[340] The Defendants raise that these CAD files cannot reasonably be expected to have been confidential because they were sent by Mr. Morand or an employee at Enta Design to Initial as one of the first interactions in this business relationship; they were thus not in a longstanding relationship of trust and cooperation where expectations of confidentiality had arisen (DCA, para 214). While Mr. Morand testified that he had previously worked with Initial (Morand, TT, Vol. 2 207:14-16; Morand, TT, Vol. 3 178:9-179:20, PCA, para 310), the Defendants note that Mr. Morand had given an answer to an undertaking to the effect that it was actually one of their first dealings (DCA, para 214; Angelcare Read-Ins, Tab 5A). Moreover, when asked about this during cross-examination, Mr. Morand stated that “I don’t really recall” (DCA, para 214; Morand, TT, Vol. 3 179:9-200). The Defendants also submit that testimony from Mr. Bailey and Mr. Tsang indicates that non-disclosure agreements (“NDA”) are standard practices in the field of industrial design in 2007 (DCA, para 217), and that Mr. Morand’s own NDA between himself and Mr. Pinsonnault, the owner of Angelcare, further weighs in favour of such a determination (DCA, para 215).

[341] The Defendants argue that Mr. Morelli’s testimony to the effect that there is an implied standard of confidentiality in industrial design is not enough to establish that NDAs were not standard practice when dealing with potentially patentable information (DCA, para 216). They allege that Mr. Morand’s testimony that it would be “bad for their business” should companies such as Initial and Plasti-Lax disclose such information is insufficient to establish that this imposes a legal obligation upon Initial and Plasti-Lax to keep Mr. Morand and Enta’s disclosures confidential (DCA, para 218).

[342] Thus, the Defendants highlight that there were no non-disclosure agreements that covered the communication of this file to Initial or Plasti-Lax and its affiliated companies, Le Groupe Lacroix or IML Containers (DCA, para 213). Looking at an agreement signed between Angelcare and IML Containers in 2007, in oral closing arguments the Defendants noted that Section 2 allows for this agreement to be extended to its affiliates with an “engagement letter” (FC 324/Ex 110). They raised that there is no evidence of an engagement letter signed by Plasti-Lax as an affiliate of IML Containers (Closing, TT Vol. 35, 212:12-213:15). Accordingly, they submit that, despite the existence of a confidentiality provision at Section 7 that binds IML Containers and Angelcare, there is no basis to conclude that it applies to Plasti-Lax, nor that Mr. Morand is even aware of this agreement (Closing, TT Vol. 35, 214:18-215:16).

[343] The Plaintiffs, for their part, deny that Mr. Morand or Enta Design’s communication of the CAD file constitutes disclosure because it was protected by confidentiality according to the reasonable man test in *Lac Minerals*. As such, they submit that a written or oral agreement such as an NDA is not required for a confidential relationship to be found (PCA, para 298). They also rely on *Wenzel Downhole Tools Ltd. v National-Oilwell Canada Ltd.*, 2011 FC 1323 [*Wenzel FC*] at paragraphs 136-137, to explain that prototypes or tentative solutions to a problem are the types of communications more likely to attract a duty of confidentiality between parties (PCA, para 299). The Plaintiffs submit that *Packers Plus Energy Services Inc. v Essential Energy Services Ltd.*, 2017 FC 1111 [*Packers*] and *Corlac* both support the notion that disclosure in the context of experimenting or testing a product with the assistance of another company is protected under confidentiality obligations (Closing, TT Vol. 35, 294:4-295:10). The Plaintiffs submit that the nature of Initial’s business as one that manufactures prototypes necessitates confidentiality of

their client's information. It is inherently part of the relationship. This accordingly fostered an understanding between Mr. Morand and Initial that the CAD file would be kept confidential (PCA, paras 309-310).

[344] Additionally, the Plaintiffs argue that Mr. Morand had previously worked with Initial, establishing a relationship in which confidentiality was expected (PCA, para 310). They point to the agreement concluded between IML Containers and Angelcare in 2007 that includes a confidentiality provision to protect any information Angelcare may disclose to IML Containers as part of their business relationship (FC 324/Ex 110; PCA, para 307). Moreover, the Plaintiffs submit that Mr. Morand's disclosure to Plasti-Lax would have nonetheless been understood to be confidential. Plasti-Lax is an engineering division of the company IML Containers, with whom Mr. Morand had an ongoing business relationship beginning in 2002, as they were also responsible for manufacturing Angelcare's cassettes (PCA, para 306). The Plaintiffs submit that the context of this business relationship makes it reasonable to assume that the disclosures made to Plasti-Lax would be kept confidential (PCA, para 312).

[345] Finally, during oral submissions on closing arguments, the Plaintiffs raised the applicability of art. 1434 of the *Civil Code of Quebec* ("CCQ") to the contractual relationship between Mr. Morand and Initial. This article dictates that a contract formed in Quebec will contain not only what is specifically mentioned, but also what is incidental to it according to its nature, usage, equity and law. The Plaintiffs raise that confidentiality obligations would thus apply to the contractual relationship between Mr. Morand and Initial because art. 1434 CCQ would make this an implicit contractual term:

<p>Art. 1434. <i>Binding force</i> A contract validly formed binds the parties who have entered into it not only as to what they have expressed in it but also as to what is incident to it according to its nature and in conformity with usage, equity or law.</p>	<p>Art. 1434: <i>Force obligatoire</i> Le contrat valablement formé oblige ceux qui l'ont conclu non seulement pour ce qu'ils y ont exprimé, mais aussi pour tout ce qui en découle d'après sa nature et suivant les usages, l'équité ou la loi.</p>
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[346] Starting with the Plaintiffs' reliance on article 1434 of the CCQ, it is not clear the extent to which this provision further assists the Plaintiffs' case beyond what *Lac Minerals* provides.

Indeed the argument was less than fully articulated and came at the very last minute.

Nonetheless, it does not hurt. The jurisprudence advanced by counsel in oral argument, notably

Wrebbit Inc. c. Benoit, [1998] RJQ 3219 (QC CS) [*Wrebbit*], ultimately relies on the *Lac*

Minerals reasonable man test to assess whether nature, usage, equity or law would demand that

such an obligation of confidentiality ought to be implicit within a given contractual relationship

(see *Wrebbit* at paras 264; 281ff). The Plaintiffs also relied on *Positron inc. c. Desroches*, [1988]

RJQ 1636 (QC CS) [*Positron*], which is fundamentally about the implicit obligation of

confidentiality that binds employees in their employment relationship. The Court in *Positron*

discussed art. 1024 CcBC (the old art. 1434 CCQ) and applied an English common law case,

Faccenda Chicken Ltd. c. Fowler (1986) 1 All. E.R. 617, in finding that information can be

reasonably expected to be confidential when it is obvious from its character (*Positron*, paras 116-

117). This is similar to the test stated in *Lac Minerals*. The established reasonable man test in

Lac Minerals thus seems entirely compatible with the jurisprudence advanced by the Plaintiffs

on the finding of an obligation of confidentiality that might be incidental to a contractual

relationship, as per article 1434 CCQ. The Plaintiffs' own oral argument notes that the

jurisprudence in Quebec establishes the same test as that applicable in *Lac Minerals* (TT,

Vol. 35, 291:25-14, 293:11-18). The legal test set out in *Lac Minerals*, which is consistent with art. 1434 CCQ and the jurisprudence that Quebec's courts have developed on it, should continue to guide the Court.

[347] The Defendants and Plaintiffs presented conflicting evidence as to the length of time that Mr. Morand had worked with Initial. I find the Defendants' assertion that this was one of Mr. Morand's first dealings with Initial more credible, given Mr. Morand's inability to give a clear answer upon cross-examination and his answer to the undertaking given during discovery. The Court has received little information about the relationship between Initial and IML Containers, beyond that Initial was recommended by IML Containers. The Defendants' rightly point out that we heard no evidence as to the existence of "engagement letters" that would extend the 2007 confidentiality agreement between Angelcare and IML Containers to Mr. Morand and his dealings with Initial. While Mr. Morand may have been operating out of a belief in his trusting relationship with IML Containers when disclosing information to Initial to have a price quoted about manufacturing a prototype, the type of trust that may reasonably arise between Mr. Morand and IML Containers to the relationship between Mr. Morand and Initial does not benefit from the same longstanding relationship.

[348] Nevertheless, Initial was in the business of making prototypes, which inherently suggests that an obligation of confidentiality is present. At paragraph 53 of the *Corlac* decision, Justice Layden-Stevenson notes that the prototype at issue was protected by confidentiality, and notes the relationship between the disclosing party and the recipient of the confidential information:

[53] There is no doubt that the judge considered the absence of an oral or written communication concerning confidentiality to be

significant, but not dispositive. Equally, in my view, there is no doubt that the prototype had a quality of confidence about it. It was the result of the work and development of Grenke in early 1991; it was not available to the public; no such device was on the market. The crux of the matter is whether GrenCo sold the prototypes to Amoco in circumstances in which an obligation of confidence arose. The judge's various findings on this issue are summarized above. For present purposes, it suffices to reiterate his finding that both Amoco and Pan Canadian shared a "common cause" with Grenke and had a relationship of trust and co-operation that led to an expectation of confidence: reasons, paras. 294, 298. The appellants do not seriously dispute the existence of a common cause – everyone in the industry was concerned about the stuffing box problem. Rather, it is the finding of a relationship of trust and confidence that the appellants contend was palpably wrong because it was not supported by the evidence.

[Emphasis added.]

[349] I readily accept that the manufacture of prototypes suggests the existence of a particular type of relationship. The nature of the business in which the entity to which some disclosure is made is in my view a critical factor to consider. The reasonable person at Initial, receiving information in order to quote a price for creating prototypes, has ample grounds to realise that the information imparted to produce prototypes is given in confidence. As Mr. Morand, the inventor, said, disclosing information, the purpose of which is the creation of prototypes is certainly understood as not being good for business. Confidentiality is part of the business model. The whole circumstances must be considered to see if the heavy burden of one who seeks to repel "the contention that there exists an obligation of confidence" (see para 48 of *Corlac*) has been met. The Defendants claim for all intents and purposes that the absence of NDAs suffices. As the Court of Appeal finds in *Corlac*, that is not dispositive. The Plaintiffs suggest that prototypes themselves are more likely to be considered confidential (PCA, para 299). The fact that information concerns a prototype is an important factor. It may lead, together with the

circumstances of the case, to a finding that the relationship could only be confidential. Has a relationship of trust and cooperation been established such that it would be reasonable to consider it a confidential communication under the *Lac Minerals* reasonable man test? Clearly Mr. Morand expected confidentiality in disclosing the CAD file to Initial.

[350] It is always prudent to have NDAs: that avoids evidently the kind of debate the Court witnessed in this case. But the existence of an NDA is not dispositive of the issue: it is another factor to consider. Absent an NDA, Mr. Morand testified that he nonetheless expected confidentiality from Initial, given that they are in the business of making prototypes (Morand, TT Vol. 3, 178:12-179:4). There is nothing that prevents the trust to be re-enforced by a written NDA. Expert evidence by Mr. Bailey and Mr. Tsang suggests that NDAs are common practice in the industrial design field (Bailey, TT Vol. 25 *in camera*, 126:20-129:24; Tsang, TT Vol. 26, 18:19-22; 29:9-30:7; Tsang Report at para 19; Bailey Reply Report, paras 22-25). Mr. Tsang specifically was clear that he always concludes NDAs with prototype manufacturers (Tsang, TT Vol. 26, 29:9-30:7; PCA, para 375; Closing, TT, Vol. 34, p. 45:2-13). But *Lac Minerals*, where there was no NDA, confirms that it is not essential, a *sine qua non*, for an obligation of confidentiality to be created.

[351] The relationship between Mr. Morand and Initial, as discussed above, and the fact that the issue is relative to prototypes lead me to believe that one could reasonably have expected the CAD file to have been a confidential disclosure. Initial appears to have been relatively new in terms of a relationship with Mr. Morand, but there was already some relationship. On the other hand, it had been recommended by IML Containers which was said to be a “business partner” as

it manufactured Angelcare's cassettes. The *Coco* test endorsed in *Corlac*, according to which "any reasonable man standing in the shoes of the recipient of the information would have realized that upon reasonable grounds the information was being given to him in confidence" is met. The nature of the information, about prototypes, the business in which Initial operates and the recommendation of IML Containers militate in favour of the confidentiality obligation thus created. In my estimation, the context was such that a confidentiality obligation had arisen. Information of industrial value was shared for the purpose of manufacturing articles for one party by the other, with the articles being prototypes. The fact that there appeared to have existed a prior relationship, although not of long standing, is also favourable to the presence of a confidentiality obligation. Article 1434 CCQ helps confirm the existence of obligation.

[352] As it relates to Mr. Morand's disclosure to Plasti-Lax, Mr. Morand expected his disclosures to Plasti-Lax to be kept confidential. Indeed, there existed already a longstanding business relationship of trust and cooperation with IML Containers. The *Lac Minerals* and *Corlac* test is met in my view.

[353] Plasti-Lax is the engineering division of IML Containers and Mr. Morand was in a relationship of trust and cooperation with the latter. Mr. Morand had been in business with IML Containers since 2002 and IML Containers was the company that manufactured Angelcare's cassettes (Morand, TT Vol. 2, 76:26-78:11, 123:5-124:26 148:24-149:5 Morand, TT Vol. 3, 18:26-19:27;187:2-20). They were "business partners". By February 2007, when Mr. Morand sent a copy of the CAD file to Plasti-Lax, Mr. Morand had been in business with IML Containers for about five years. IML Container's manufacturing of Angelcare's cassettes places it squarely

within the *Lac Minerals* threshold of trust and cooperation that flows from “the manufacture of articles by one party for the other” (*Lac Minerals*, p. 612, citing *Coco* at p. 48). This was similarly the case in *Wrebbit*, where a manufacturer/distributor and seller/buyer relationship was found to give rise to the obligation of confidentiality (*Wrebbit*, para 360). The disclosure of the new cassette design was thus within a relationship between Angelcare, for whom Mr. Morand was developing this new cassette design, and IML Containers. It was not only good business for Plasti-Lax to keep the information confidential, it was that the reasonable man standing in the shoes of someone in a division of IML Containers, manufacturer of the cassettes, would have realised that upon reasonable grounds the information was being given in confidence. There are certainly ample reasonable grounds for the recipient of the information to have realised the information was to be received in confidence. Conversely, as the engineering division of IML Containers, it is not unreasonable for Mr. Morand to have expected these confidentiality obligations, whether rooted in the written agreement or in the longstanding business relationship of trust and cooperation more broadly, to carry over to his dealings with Plasti-Lax.

[354] The kind of relationship between Mr. Morand and Initial, because of its newness, is not as tight as that between Plasti-Lax and Mr. Morand in view of the strong business alliance between IML Containers and Angelcare in the manufacture of cassettes. In the case of Initial, another issue is whether this could constitute an enabling disclosure. The Defendants, whose burden it is to satisfy that the disclosure is enabling, have failed to make the demonstration that the very limited disclosure to Initial would have enabled a POSITA to practice the invention. In fact, the Defendants concentrated their efforts, almost exclusively, on arguing for the need to NDAs. The Plaintiffs’ expert noted in his second report (para 230) that he could not comment on

an enabling disclosure since the Defendants' expert had not provided any justification as to how the claims of the invention would have been realized by a POSITA with what had been disclosed. That is accurate. The Defendants simply asserted in their written case that "(u)nder the circumstances, there can be no doubt that these detailed disclosures were enabling disclosures to the public" (para 209). That submission cannot be accepted.

[355] The CAD file shows only the bottom half of a cassette, with no cover or plastic film inside of it. On the basis of the very limited information and the evidence adduced, together with the absence of a demonstration of enablement, the burden of showing that a POSITA would be in a position to ascertain what this is or what is the invention to be practised has not been discharged.

[356] The Defendants have failed to show that the POSITA would have understood the purpose of the clearance at the bottom of the cassette, as claimed in independent Claims 1 and 6 of the 384 Patent, as well as independent Claims 1, 21, 40, 51, and 52 of the 159 Patent. There was no cover to consider. They submit that the POSITA would have been able to conduct a quick search to discover what "Angelcare" was and what the "cassette" was for. While they may have discovered that this was a diaper pail cassette based on such a search, it has not been shown how this could have led the POSITA to understand and practice the invention as claimed in the cassette-related Angelcare Patents. The Defendants did not present evidence, or even an argument, that this constitutes an enabling disclosure, merely stating at paragraph 209 of their written case that "there can be no doubt that these detailed disclosures were enabling disclosure to the public". Mr. Morelli, in his Second Report of October 2, 2020, noted the complete lack of

evidence on the part of Mr. Bailey as to how these two disclosures could be enabling, which makes commenting on the disclosure requirement of being enabling impossible (Monelli Second Report, paras 229 to 231).

[357] Even Mr. Johnson, the head designer at Munchkin Inc., had testified that he did not know the purpose of the chamfer of the cassette as it relates to the improper orientation problem (Johnson, TT Vol. 21 17:24-18:14). This was someone who has significantly more work experience with diaper cassettes than the POSITA. He is a person who worked specifically in the diaper pail industry, and who had direct access to the Diaper Genie products, including their cassettes. It is simply not credible that a POSITA with a substantially less specialized profile would have been able to understand the subject-matter of the claims of the Angelcare Patents, notably how the cassette's clearance would solve the improper orientation problem, from this CAD file. In light of this, the CAD file, would not have enabled the POSITA to practice the subject-matter of the claims without undue burden or without the possibility of error (*Sanofi*, para 33; *Free World Trust*, para 25). The Defendants had the burden of establishing enablement. The statement, in argument, that there is no doubt that the CAD disclosures were enabling disclosure simply cannot do. They have failed to discharge their burden.

[358] In summary, Mr. Morand reasonably expected his communication of the CAD file to Plasti-Lax to be protected by confidentiality and thus was not disclosed for the purposes of anticipation under subsection 28.2(1) of the *Patent Act*. More importantly, the recipients of the information would have realised the information was given in confidence, especially in view of the fact in the case of Plasti-Lax that IML Containers had been for many years the manufacturer.

As for Initial, the matter can also be disposed of on the basis that the evidence does not convince that the essential elements of the cassette claims were disclosed and enabled.

B. *Obviousness*

(1) Legal Principles

[359] Section 28.3 of the *Patent Act* is the statutory instantiation of the requirement that inventions be, as the term implies, inventive. This section prohibits an invention from being obvious on the claim date. It reads as follows:

28.3 The subject-matter defined by a claim in an application for a patent in Canada must be subject-matter that would not have been obvious on the claim date to a person skilled in the art or science to which it pertains, having regard to

(a) information disclosed before the one-year period immediately preceding the filing date or, if the claim date is before that period, before the claim date by the applicant, or by a person who obtained knowledge, directly or indirectly, from the applicant in such a manner that the information became available to the public in Canada or elsewhere; and

(b) information disclosed before the claim date by a person not mentioned in paragraph (a) in such a manner that the information became available to the

28.3 L'objet que définit la revendication d'une demande de brevet ne doit pas, à la date de la revendication, être évident pour une personne versée dans l'art ou la science dont relève l'objet, eu égard à toute communication :

a) qui a été faite, soit plus d'un an avant la date de dépôt de la demande, soit, si la date de la revendication est antérieure au début de cet an, avant la date de la revendication, par le demandeur ou un tiers ayant obtenu de lui l'information à cet égard de façon directe ou autrement, de manière telle qu'elle est devenue accessible au public au Canada ou ailleurs;

b) qui a été faite par toute autre personne avant la date de la revendication de manière telle qu'elle est

public in Canada or
elsewhere.

devenue accessible au public
au Canada ou ailleurs.

[360] Anticipation, or lack of novelty, and obviousness are not one and the same. The test for each is different. Anticipation is established where the claimed subject matter was disclosed by a single enabling disclosure. Obviousness, on the other hand, occurs when the claimed subject-matter is obvious in light of the state of the art. While anticipation must be found in a single document, that is, it must not result from a mosaic of extracts, not so for obviousness: the prior art can be reviewed and its cumulative effect considered. In *Beloit*, Hugessen JA, in his colourful way provided this oft-quoted observation about the difference between anticipation and obviousness:

While at times the trial judge appears to be conscious of the need to keep the issues of obviousness and anticipation well distinct, there are a number of places, of which the phrase quoted in the preceding paragraph is an example, in which he seems to confound them. They are, of course, quite different: obviousness is an attack on a patent based on its lack of inventiveness. The attacker, says, in effect, “Any fool could have done that.” Anticipation, or lack of novelty, on the other hand, in effect assumes that there has been an invention but asserts that it has been disclosed to the public prior to the application for the patent. The charge is: “Your invention, though clever, was already known.”

(p. 293)

[Emphasis added.]

The Court of Appeal, one page later, inserted that the person of skill is not, for the purpose of obviousness specifically, an inventive person:

The test for obviousness is not to ask what competent inventors did or would have done to solve the problem. Inventors are by definition inventive. The classical touchstone for obviousness is the technician skilled in the art but having no scintilla of inventiveness or imagination; a paragon of deduction and dexterity, wholly devoid of intuition; a triumph of the left hemisphere over the right. The question to be asked is whether this

mythical creature (the man in the Clapham omnibus of patent law) would, in the light of the state of the art and of common general knowledge as at the claimed date of invention, have come directly and without difficulty to the solution taught by the patent. It is a very difficult test to satisfy.

(p. 294)

[Emphasis added.]

[361] Obviousness is assessed from the perspective of the POSITA. I note that in *Sanofi*, the Court found too rigid that the POSITA would “have come directly and without difficulty to the solution taught by the patent”. It is permissible to consider “obvious to try” as one factor, depending on the nature of the invention. The Supreme Court in *Sanofi* took up a four-step test from the English case *Windsurfing International Inc. v Tabur Marine (Great Britain) Ltd.*, [1985] RPC 59 (C.A.) [*Windsurfing*], later refined in *Pozzoli SPA v BDMO SA*, [2007] FSR 37 (p. 872), [2007] EWCA Civ 588, that lends structure to the obviousness analysis. Justice Rothstein, at paragraph 67 of *Sanofi*, laid down the test as follows:

- (1) (a) Identify the notional “person skilled in the art”;
- (b) Identify the relevant common general knowledge of that person;
- (2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;
- (3) Identify what, if any, differences exist between the matter cited as forming part of the “state of the art” and the inventive concept of the claim or the claim as construed;
- (4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

[362] In effect, this test asks whether the POSITA at the relevant claim date could have bridged the distance between the state of the art and the inventive concept using only their common

general knowledge (*Bristol-Myers Squibb Canada Co. v Teva Canada Limited*, 2017 FCA 76 [Bristol-Myers] (Pelletier JA) at para 65). The common general knowledge is, as discussed above, what the POSITA “may reasonably be expected to know and to be able to find out” (*Novopharm Limited v Janssen-Ortho Inc.*, 2007 FCA 217 [Novopharm] at para 25, cited recently in *Tetra Tech* at para 28). If the POSITA can “bridge the gap”, then the invention is obvious and consequently invalid.

[363] The legal principles that define the POSITA are discussed above in the claims construction section. It is nonetheless important to restate that, although the POSITA lacks inventiveness, the POSITA can make some non-inventive adaptations to the prior art to solve the problem at hand (*Wenzel FC* at para 198, *aff’d Wenzel FCA*). Indeed, a “mosaic” of prior art may be used by the POSITA to bridge the gap between the prior art and the inventive concept (*Ciba Specialty Chemicals Water Treatments Limited v SNF Inc.*, 2017 FCA 225 [Ciba], para 60, citing *Wenzel FCA* at para 87; *Aux Sable Liquid Products LP v JL Energy Transportation Inc.*, 2019 FC 581, para 157).

[364] The Federal Court of Appeal summarized the requirements for obviousness, making the distinctions with anticipation, in *Tearlab*, at paragraph 81:

First, the appellant appears to conflate the tests for obviousness and anticipation when it claims that the judge should have addressed each piece of prior art separately and identified the differences between each piece of prior art and the claims as construed. Every element of an obvious claim need not be found in single prior art reference; that is the test for anticipation. The test is rather whether a POSITA can bridge the gap between the state of the art at the relevant time and the claim as construed, without inventive ingenuity. Prior art will be used in the application of both anticipation and obviousness, but in a different manner;

anticipation will be established if a single document can be found which gives a POSITA all the information which is needed to produce the claimed invention without the exercise of any inventive skill, whereas for obviousness it is the cumulative effect of the prior art that must be considered to determine whether the skilled but unimaginative technician would have come to the solution taught by the patent directly and without difficulty. As stated by Harold G. Fox in his seminal book titled *Canadian Patent Law and Practice*, 4th ed. (Toronto, Ontario: Carswell, 1969), at p. 137:

...Prior specifications are generally used to show anticipation if they disclose exactly and fully what the patentee has claimed. If such disclosure is not made by the prior specification and it cannot be used as an anticipation, it may be used as indicating the state of the art at the time that the patentee made his alleged invention and as showing that what the patentee did was so slight a contribution to existing knowledge as to lack the essential element of invention and to be merely obvious...

[365] Moreover, a mere aggregation of known elements, all of which perform independent functions, is not an invention under the *Patent Act* if these parts do not combine to produce a new and common result (*Crila Plastic Industries Ltd. v Ninety-Eight Plastic Trim Ltd* [1987] FCJ No. 1030 (FCA) para 20, citing *Domtar Ltd. v MacMillan Bloedel Packaging Ltd. et al* (1977), 33 CPR (2d) 182. at p. 189-191).

[366] That said, the Court must be mindful in ensuring that the POSITA's choice in selecting and combining multiple elements into a "mosaic" was itself uninventive. The party asserting obviousness must show that the POSITA would have been led by their common general knowledge to link these prior art references together (*Camso Inc v Soucy International Inc*, 2019 FC 255 [*Camso*], at para 125, aff'd 2020 FCA 183, citing *Eli Lilly & Co. v Apotex Inc.*, 2009 FC 991, paras 416-417, aff'd 2010 FCA 240. Indeed, Justice Sharlow in *Bridgeview Manufacturing*

Inc. v 931409 Alberta Ltd. (Central Alberta Hay Centre), 2010 FCA 188 [*Bridgeview Manufacturing*]) warns against invalidating combination patents based on their constituent parts being well-known. She writes at paragraph 51:

[...] It is not fair to a person claiming to have invented a combination invention to break the combination down into its parts and find that, because each part is well known, the combination is necessarily obvious. [...]

As such, it is possible that the selection of different well-known elements into a new and useful combination may require inventiveness. It merits repeating that the Court must avoid using the benefit of hindsight to declare an invention obvious (*Bridgeview Manufacturing*, para 50 and *Novopharm*, para 24, both citing Justice Hugessen in *Beloit* at p. 295; see also *Janssen Inc.* at para 137).

[367] Ultimately, the framework presented in *Sanofi*, the four-step approach, requires that the inventive concept of each claim be identified in order to determine the differences with the state of the art (step 3). What constitutes “inventive concept”? Justice Pelletier of the Federal Court of Appeal grappled with the “inventive concept” in *Ciba*, at paragraphs 72 to 77, stating that “the search for it has brought considerable confusion into the law of obviousness”, suggesting it be avoided until a definition of inventive concept has been made workable (para 77).

[368] Recently, Justice Rennie of the Federal Court of Appeal attempted to dispel some of this confusion in *Apotex Inc. v Shire LLC*, 2021 FCA 52 [*Shire*]. At paragraphs 67 to 69, he summarizes the relevant jurisprudence and sets down guiding principles which aim to shed some light on the inventive concept and how to discern it:

[67] First, on occasion, the inventive concept may be “readily apparent” where there is agreement on it. If not, the inventive

concept needs to be construed. To do that, the judge is to first determine whether it can be identified from the previously completed claims construction exercise (*Ciba* at paras. 76-77). Second, where it is not possible to fully grasp the nature of the inventive concept solely from those claims, the judge may have regard to the patent specification to determine if it provides any insight or clarification into the inventive concept of the claim(s) in issue (*Sanofi* at para. 77; *AstraZeneca Canada Inc.* at para. 31). If this step is necessary, “it is not permissible to read the specification in order to construe the [inventive concept of the] claims more narrowly or widely than the text will allow” (*Sanofi* at para. 77).

[68] Second, insight from *Sanofi* shows that while an inventive concept is an attribute of the claims, it differs from claims construction (Joshua Sealy-Harrington, “The Inventive Concept in Patent Law: Not so Obvious”, (2015) 27 I.P.J. 385). As such, though the process for the identification of an inventive concept bears a striking resemblance to that of claims construction, as seen in longstanding Supreme Court of Canada rulings (see, e.g., *Free World* at paras. 33-50; *Whirlpool Corp. v. Camco Inc.*, 2000 SCC 67, [2000] 2 S.C.R. 1067 at paras. 43, 49), it is nonetheless a distinct, separate exercise.

[69] Third, the caution expressed in *Unilever PLC. v. Chefaro Proprietaries Ltd.*, [1994] R.P.C. 567 (Eng. C.A.) at 580 (*Unilever PLC*) remains a governing legal principle: “[i]t is the ‘inventive concept’ of the claim in question which must be considered, not some generalised concept to be derived from the specification as a whole.” Thus, as required by section 28.3 as well as the wording of *Sanofi*, it is the inventive concept(s) of the claim(s) in issue that must be the focus of an obviousness inquiry, not the inventive concept of the patent (*Ciba* at para. 72; *Bauer Hockey Corp. v. Easton Sports Canada Inc.*, 2010 FC 361 at para. 250, aff’d 2011 FCA 83; *Pfizer Canada Inc. v. Apotex Inc.*, 2017 FC 774 at para. 247, aff’d 2019 FCA 16 (*Pfizer Canada Inc.*)).

[Emphasis added.]

[369] Justice Rennie goes on at paragraphs 75 to 77 to explain how identifying the inventive concept is distinct from claims construction. He contextualizes the inventive concept within an obviousness analysis that is informed by both the jurisprudence and the statutory requirements of section 28.3 of the *Patent Act*.

[75] Although identification of the inventive concept follows from claims construction and is necessarily informed by it, they are nonetheless discrete exercises, with discrete purposes (*Mylan Pharmaceuticals ULC v. Eli Lilly Canada Inc.*, 2016 FCA 119 at paras. 40-41; *Bell Helicopter* at paras. 122-126). As noted earlier, the purpose of claims construction is to determine the scope of the claim by looking at the “subject matter of the claim”. It does not, on its own, determine a claim’s validity. Section 28.3, in codifying the common law requirement that an invention not be obvious, did not displace the longstanding jurisprudence that tells us how obviousness is determined.

[76] The inventive concept is an element of that determination. Its purpose is to help determine what, if anything, makes the claim, as constructed, inventive. This is the very inquiry section 28.3 asks of us. As noted in *Bristol-Myers*, *Sanofi* did not change the substantive law of obviousness by implication, and the term “inventive concept” is not materially different than the previously used term of “solution taught by the patent” (*Bristol-Myers* at paras. 65-68, 75). This is the lens that we should keep in mind when determining the inventive concept. This lens becomes particularly important if recourse to the specification is required. For example, in the case of a bare chemical formula claim, not all the chemical’s properties will inform its inventive concept (*Bristol-Myers* at para. 74; *Teva Canada Limited v. Pfizer Canada Inc.*, 2019 FCA 15 at para. 34).

[77] In sum, a single inventive concept must flow through a patent, but each claim’s specific inventive concept may be different. I will return to this point later when I consider Apotex’s argument that the judge erred in adopting an inventive concept that was redundant with some of the claims.

[Emphasis added.]

The inventive concept is thus, as Justice Rennie puts it above, what makes the claim inventive (*Shire*, para 76). One may otherwise define it as the solution taught by the patent to the problem that motivated the invention (see *Shire* at para 84, citing *Bristol-Myers* at para 75).

[370] The inventive concept should be primarily derived from the claims themselves, although recourse to assistance from the specification (i.e. the patent’s disclosure) is permissible (*Sanofi*,

para 77; see also *Apotex Inc. v ADIR*, 2009 FCA 222, para 58). Indeed, the inventive concept of a claim cannot be limited to the essential elements of the claim, as this would simply be a repetition of the claims construction exercise (*Shire*, para 74). Additionally, Justice Hughes warns in *Abbvie Corporation v Janssen Inc*, 2014 FC 55 at paragraph 123 (rev'd on other grounds 2014 FCA 242) that “[t]he Court is required to focus on the invention as claimed in the claims at issue, and not on some generalized concept of invention as expressed in the patent as a whole” (see also *Shire*, para 69, citing *Unilever PLC. v Chefaro Proprietaries Ltd.*, [1994] RPC 567 (Eng. C.A.) at 580).

[371] While each claim may have its own inventive element, there is nonetheless a “single, overarching concept [that] connects every claim of a patent, with its genesis usually in the independent claim(s)” (*Shire*, para 86). The discrete claims’ inventive concepts can thus be “stitched together” under a single, common inventive concept (*Ibid*, para 87, citing *Ciba* at para 72). The individual claims’ discrete inventive concepts may be redundant to a degree, so long as they are ultimately linked together to this common inventive concept for the patent as a whole (*Ibid*, para 88).

[372] The state of the art, to which the inventive concept is compared, is a reference to the prior art (*Ciba* at paras 56-59). “The matter cited as forming part of the prior art is simply the prior art relied upon by the person alleging obviousness” (para 60). It is different than the common general knowledge in that it is all publicly available information in Canada or elsewhere, no matter how obscure or generally unaccepted (*Patent Act*, s. 28.3; *Ciba*, paras 56-59, *Mylan Pharmaceuticals ULC v Eli Lilly Canada Inc.*, 2016 FCA 119 [*Mylan*], para 23). Recall that the

POSITA's common general knowledge is what was generally known by the POSITA at the relevant time in the field of art or science to which the patent relates; as such it is only a subset of what otherwise constitutes the state of the art (*Sanofi* at para 37; *Hospira*, para 84; *Mylan*, para 24). When comparing the state of the art to the inventive concept, all essential elements of the claimed invention must be taken into account (*Fox on Patents*, #14:16, citing *Bridgeview Manufacturing* at para 46).

(2) Application

(a) *Step One: The POSITA and their common general knowledge*

[373] As instructed by the Supreme Court in *Sanofi*, the four-step approach outlined in two English cases, (*Windsurfing* and *Pozzoli Spa v BDMO Sa*, [2007] FSR 37), brings a structured approach to obviousness analysis. It starts with identifying the notional persons of skill and the relevant common general knowledge.

[374] As discussed above, the POSITA is the same for all of the patents at issue (Morelli First Report, para 29; Bailey First Report, paras 50-55). Similarly, the same common general knowledge applies for all patents, as this is the knowledge the theoretical POSITA is reasonably expected to possess (*Valeant Canada LP/Valeant Canada S.E.C. v Generic Partners Canada Inc.*, 2019 FC 253, [*Valeant*] para 47, citing *Whirlpool*, para 74). In light of this, the first step of the *Sanofi* analysis will only be conducted once.

[375] The POSITA is defined above in the context of the claims construction analysis. I will not restate their qualifications here. Generally speaking, the person of skill is the addressee of a patent “with practical knowledge and experience in the kind of work in which the invention was intended to be used” (*Catnic Components*, at p 243). The person of skill is capable of understanding the patent, its nature and description; the person has a practical interest in the invention; the person is also one of ordinary skill and knowledge.

[376] In the words of Dickson J (later Chief Justice), in *Consolboard*, at p 523, “(t)he persons to whom the specification is addressed are ‘ordinary workmen’, ordinarily skilled in the art to which the invention relates and possessing the ordinary amount of knowledge incidental to that particular trade. The true interpretation of the patent is to be arrived at by a consideration of what a competent workman reading the specification at its date would have understood it to have disclosed and claimed”. That, in my estimation, does not require experience with the development of products compatible with older generations of products. Standard training and basic experience with plastic injection moulding, as with diaper cassettes, will suffice. The POSITA is capable of understanding the patent and practicing it. That is the standard required of the POSITA. The person may not be inventive, but the POSITA is reasonably diligent in keeping up to date with the diaper cassette market. She has a mind willing to understand the specification and is going to try to achieve success as opposed to looking for difficulties or seeking failure (*Free World Trust*, para 44). As put by Locke J, then of this Court, in *Teva Canada Limited v Janssen Inc*, 2018 FC 754, 157 CPR (4th) 391, at para 236:

One point to bear in mind here is that the skilled person is not defined claim-by-claim as is the inventive concept. A patent is read, and its claims are construed, from the point of view of the skilled person in the context of the patent as a whole. There cannot

be different skilled persons for different claims. The fact that some claims of a patent are not asserted cannot affect the characteristics of the skilled reader of the patent. ...

[377] However, there is a need to go further into detail on the common general knowledge they would possess, as the parties disagreed on what information was available to the POSITA in the context of an obviousness inquiry. During the claims construction analysis, the Court determined specifically that the POSITA would have knowledge of consumer products development and the manufacturing processes for producing such products. This would include plastic-injection moulding. They would also know geometric vocabulary, spatial geometry, technical and three-dimensional drawings, as well as CAD software. The POSITA would know the methodology of the industrial design process, well-known design elements, principles of mechanics and ergonomics, and general notions of safety and user experience. They would not have specific knowledge about product line extensions and the legacy issues that accompany the development of such products, nor about the development of disposable or consumable products.

[378] What remains to be discussed are the contentious issues raised by the parties that might affect the outcome of the obviousness analysis.

[379] The parties' views diverge on whether the common general knowledge includes the Diaper Genie products. The Defendants submit that they do, asserting that the POSITA keeps up with developments in their field, including trends in their industry. They rely on *Bauer Hockey Corp. v Easton Sports Canada Inc.*, 2010 FC 361 (Gauthier J) [*Bauer Hockey*] at paragraphs 225 and 228 to this effect, where the POSITA was expected to know about trends and developments in the ice skates industry. The Plaintiffs deny this, stating that the POSITA includes generalist

industrial designers who work on a variety of different products (PCA, para 343(a)(i)). As such, they would not be familiar with leading brands in all categories. Diaper pails and cassettes, they submit, would only have been known by a particular subset of industrial designers and knowledge of Diaper Genie branded products would not extend to the level of common general knowledge (PCA, para 343(a)(ii)-(iii)).

[380] The common general knowledge is not the prior art. It is the “common knowledge” shared by competent “ordinary workers” (*Free World Trust*, para 44). The Federal Court of Appeal, in *Mylan*, made the point vividly at paragraph 24: “Unlike the prior art, which is a broad category encompassing all previously disclosed information in the field, a piece of information only migrates into the common general knowledge if a skilled person would become aware of it and accept it as ‘a good basis for further action’: ...”. As found in *Valeant*, it “must be established with evidence on a balance of probabilities, and cannot be assumed ...” (para 47).

[381] I fail to see how the Diaper Genie products, a subset of products in this particular industry, would have achieved the level of acceptance required. The burden to show that those specific products have attained such status was not discharged. There is no cogent evidence in this case to support the contention that the Diaper Genie products reached any level of acceptance such that they have become a good basis for further action. In *Bell Helicopter*, Mainville JA found that “it is well established that the common general knowledge is limited to knowledge which is generally known at the relevant time by skilled persons in the field of art or science to which the patent relates” (para 65). Mr. Morelli, when questioned on cross-examination about the need to know about the Diaper Genie apparatus, responded that the skilled

person must be able to practice the patent. It will suffice to understand the cassette, its purpose, the issue it is meant to address and what embodiments are presented, such that the recipe is there to make the product (TT, Vol. 30, pp 43-47).

[382] I find the Plaintiffs' contention more compelling. The skilled person includes an ordinary person of skill in the art, a person who would work on a variety of products. That person does not hold a Ph.D. in diaper cassettes and pails. The common general knowledge could not include familiarity with every product on the market in every category. Indeed, diaper pails and cassettes are merely a subset of products that would be known by a small number of people. The most experienced designer at Munchkin, who arguably is much more knowledgeable than our POSITA, was not even aware of the Diaper Genie Twistaway system (TT, Vol. 21, pp 7(19) to 8:27). As it stands, the skilled person in this matter does not have to have as part of the common general knowledge the Diaper Genie products and their features. At any rate, I would echo Justice Gauthier, then of this Court, who wrote in *Bauer Hockey* that "this finding is not determinative of anything, for in my view all skates were relevant prior art" (para 229). As a matter of fact, the Defendants looked far and wide for diaper cassettes as their argument on the merits about obviousness showed. They were entitled to select the prior art. This is perfectly appropriate. Consideration of obviousness requires consideration of the relevant prior art and its cumulative effect. That would obviously include other Diaper Genie products. The mosaic is, of course, available. In *Camso*, Locke J, then of this Court, said:

[125] The assessment of obviousness is not limited to a single prior art reference as is the case for anticipation. Therefore, obviousness can be found by combining (or mosaicing) separate prior art references. However, this is permissible only where it can be shown that the skilled person, confronted with a particular citation, would turn to some other citation to supplement the

information provided by the first: ... The law of obviousness supposes that the skilled person can be given any individual piece of prior art and read it with the common general knowledge. The piece of prior art forms part of the “state of the art.” What the skilled person cannot do is to just link one piece of prior art with another, unless to do so would itself be uninventive: ...

[383] The prior art is asserted by the Defendants. The Federal Court of Appeal in *Ciba*, stated at paragraph 60:

The matter cited as forming part of the prior art is simply the prior art relied upon by the person alleging obviousness. Obviousness is not determined by reference to the prior art at large. The person alleging obviousness must point to one or more elements of prior art which make the impugned invention obvious. The choice of those elements of prior art is entirely in the hands of the party alleging obviousness, limited only by section 28.3 of the Act which sets out the cut-off date for opposable prior art.

If art is in fact cited in a patent, it will generally be seen as the patentee recognizing that such art is prior art inside the field of invention.

[384] I am less than persuaded that an industrial designer would routinely review patents as part of the development process for products. I agree with the Plaintiffs that a thorough patent search and analysis is not part of the remit of a designer: it is not part of their expertise and one may be concerned with potential liability if the search does not meet requirements (Morelli Second Report, para 50). This is corroborated by Munchkin’s Chief Designer (TT Kevin Johnson, Vol. 21.1, p 29:15 to 29:28). On the other hand, if patent markings were to be found on products, the designer would consider that the responsible thing to do would be to bring the information back to the client.

[385] Both Mr. Morelli and Mr. Bailey testified that designers do not routinely review patents as part of their work (Bailey First Report, para 48; Morelli Second Report, para 50). Mr. Bailey explains that a designer may only expand his search if asked or if they know or suspect that there may be patents relevant to a particular project on which they are working or if a client asks for such a review. This, he says, may trigger an informal patent review or work with the client's counsel to conduct a more extensive search (Bailey First Report, para 48). Mr. Bailey explains that the Diaper Genie Twistaway, Captiva, and Diaper Genie II cassettes were marked with certain patent information and asserts that this would have prompted such a review (*Ibid*, paras 304-305).

[386] I agree with Mr. Morelli that an extensive patent search is either too laborious or outside the expertise of a designer for its results to be considered knowledge that the POSITA would have reasonably found out, or too vague to produce a reliable body of knowledge that this Court can impute to the POSITA. Mr. Bailey spoke of a suspicion. In my view, this is not to be expected of a designer. I share the view of the Defendants though, who comment at footnote 349 of their written case, that the debate between the experts, whether it is the client or the designer who gathers information for the obviousness analysis, is largely irrelevant. In fact, they, as well as Mr. Tsang, agree that the information on relevant products would be brought to the attention of the POSITA.

[387] A final issue raised in this case concerns the knowledge of "mistake proofing" techniques. There is no persuasive evidence that this is part of the common general knowledge. The experts disagreed somewhat on whether the POSITA would have knowledge of "mistake

proofing” techniques in industrial design. Mr. Bailey, for a reason that remains largely unknown, insisted that there be such a thing as part of the CGK. I accept the evidence of Mr. Morelli, himself an accomplished industrial designer with teaching experience, that it is not applied by industrial designers or is taught in industrial design programs. That is not to say that the notion does not exist. But it is not part of the common general knowledge. Mr. Bailey explains “mistake-proofing” to be a design concept used to avoid human error by designing a product in such a way that someone without any prior experience with a particular product will be able to use it without difficulty (Bailey First Report, para 321). One notable example Mr. Bailey provides is when there are only a limited number of choices for how a consumer can fit one part into the other such that the correct assembly is clear (*Ibid*). This method can involve changing the shape or surface of an object to facilitate correct assembly or integrating features such as tapers or flanges that provide a complementary fit between two objects (*Ibid*, paras 322-324).

[388] Mr. Morelli agreed with the principles that underpin this idea, acknowledging that designers do remove material or alter surfaces to make shapes complementary and as such, prevent improper installation (Morelli Second Report, paras 254-255). His main point of disagreement in his expert report was that he understands Mr. Bailey to be using the benefit of hindsight to say that this would necessarily have been the solution taken up by the POSITA. Yet the fact that there may be more methods available to the POSITA to solve the improper orientation problem than by removing material or changing the shape of an object does not undermine that these methods were nonetheless available to them as part of a multitude of choices. I agree. I fail to see why an inventor should be deprived of his invention because there may be other possible solutions. The fact that the notion of mistake proofing exists does not in

any way solve the problem in a particular way. Where a solution is considered for ensuring the proper orientation of a cassette in the holder located in a diaper pail, the solution sought is in the nature of avoiding human error through the design of a product. The real question is whether the particular solution reached was obvious. That takes the Court to identifying the inventive concepts of the claims.

(b) *Step Two: The Inventive Concept of the Claims*

[389] The notion of inventive concept is meant to assist in the determination of what makes the claim inventive, what is the solution taught by the patent. The Plaintiffs are not wrong to point out that an amalgamation of known elements may result in a new and useful combination. They cite a Supreme Court of Canada case more than one hundred years old (*Smith v Goldie*, (1883) 9 SCR 46) for the proposition that an amalgamation of known elements, but forming a new and useful combination, is what constitutes most modern inventions. The inventiveness comes from the selection of the elements to unite them in the combination. The view expressed by the Federal Court of Appeal in *Bridgeview Manufacturing*, continues to operate:

[51] I agree with *Bridgeview* that the 334 patent discloses a combination invention. It is not fair to a person claiming to have invented a combination invention to break the combination down into its parts and find that, because each part is well known, the combination is necessarily obvious: see, for example, *Stiga Aktiebolag v. S.L.M. Canada Inc.* (1990), 34 C.P.R. (3d) 216 at page 245 (F.C.T.D.), which quotes this passage from *Wood & Amcolite Ltd. v. Gowshall Ltd.* (1936), 54 R.P.C. 37 at page 40 (per Greene L.J.):

The dissection of a combination into its constituent elements and the examination of each element in order to see whether its use is obvious or not is, in our view, a method which ought to be applied with great caution since it tends to obscure the fact that the invention claimed is the combination. Moreover, this method also tends to obscure the facts that the

conception of the combination is what normally governs and precedes the selection of the elements of which it is composed and that the obviousness or otherwise of each act of selection must in general be examined in the light of this consideration. The real and ultimate question is "Is the combination obvious or not?"

[390] The Plaintiffs also refer the Court to a Privy Council decision, close to one hundred years old, which was referred to in *Cutter (Canada) Ltd v Baxter Travenol Laboratories of Canada Ltd* (1983), 68 CPR (2nd) 179. In *Canadian General Electric Co Ltd v Fada Radio Ltd*, 1930 AC 97, the Privy Counsel said this at p 101:

The law on this subject is, in their Lordship's opinion, accurately summarized by Maclean J. in his judgment. His statement is as follows:

There must be a substantial exercise of the inventive power or inventive genius, though it may in cases be very slight. Slight alterations or improvements may produce important results, and may disclose great ingenuity. Sometimes it is a combination that is the invention; if the invention requires independent thought, ingenuity and skill, producing in a distinctive form a more efficient result, converting a comparatively defective apparatus into a useful and efficient one, rejecting what is bad and useless in former attempts and retaining what is useful, and uniting them all into an apparatus which, taken as a whole, is novel, there is subject-matter. A new combination of well known devices, and the application thereof to a new and useful purpose, may require invention to produce it, and may be good subject-matter for a patent.

[Emphasis added.]

The invention does not need to be monumental to qualify as an invention; slight alterations or improvements may well be sufficient.

[391] The identification of the inventive concept is different than claims construction. One determines the scope of claims while the other looks at what makes a claim inventive. The identification of the inventive concept is on the way to the determination of obviousness. As the Court of Appeal commented in *Shire*:

[76] The inventive concept is an element of that determination. Its purpose is to help determine what, if anything, makes the claim, as constructed, inventive. This is the very inquiry section 28.3 asks of us. As noted in *Bristol-Myers*, *Sanofi* did not change the substantive law of obviousness by implication, and the term “inventive concept” is not materially different than the previously used term of “solution taught by the patent” (*Bristol-Myers* at paras. 65-68, 75). This is the lens that we should keep in mind when determining the inventive concept. This lens becomes particularly important if recourse to the specification is required. For example, in the case of a bare chemical formula claim, not all the chemical’s properties will inform its inventive concept (*Bristol-Myers* at para. 74; *Teva Canada Limited v. Pfizer Canada Inc.*, 2019 FCA 15 at para. 34).

[Emphasis added.]

[392] What is the solution taught by the patent? The Court of Appeal in *Shire* states that “a single inventive concept must flow through a patent, but each claim’s specific inventive concept may be different” (para 76). As we shall see, this is encountered in this case. The Court of Appeal expands on the importance of the independent claims when it writes at paragraphs 87 and 88 of *Shire*:

[87] Despite the singular common inventive concept, “[d]ifferent claims can, and generally will, have different inventive concepts” (*Unilever PLC* at 580 as quoted in *Ciba* at para. 72). These are, in effect, inventive concepts that are stitched on, or bound to, the single, common concept (*Ciba* at para. 72, quoting *Unilever PLC* at 580; *Pozzoli SPA v. BDMO SA*, [2007] EWCA Civ. 588 (BAILII), [2007] F.S.R. 37 at para. 17; *Pfizer Canada Inc.* at para. 247; *Teva Canada Limited v. Janssen Inc.*, 2018 FC 754 at para. 176, *aff’d (sub nom Millenium Pharmaceuticals Inc. v. Teva Canada Limited)*, 2019 FCA 273, leave to appeal to SCC refused,

39007 (7 May 2020)). Practically speaking, however, so long as the single common inventive concept is found to be non-obvious, the Court will typically not need to explicitly consider any amendments to it made by later claims.

[88] I have spent some time elaborating the principles pertaining to the definition and role of the inventive concept of a claim or claims. At the risk of repetition (see paras. 72-77, above), each claim can give rise to its own inventive concept, and the inventive concepts of the various claims may overlap or replicate each other. This is permissible, provided they are joined or unified by an overarching, single inventive concept. Put otherwise, the potential for redundancy is inherent in the inventive concept exercise.

[393] The parties are in agreement regarding the inventive concept of most of the patents.

Generally, the parties limited themselves to identifying one overarching inventive concept per patent, with the Plaintiffs adding one element to certain patents.

(i) The 128 Patent

[394] The parties agree that the inventive concept of the 128 Patent is the structural features on the cassette's bottom and cover that improve shift-resistant stackability when the cassettes are stacked one-on-top-of-the-other and assist with the upright positioning and proper alignment of a cassette in the diaper pail's cassette holder (PCA, para 352; DCA, para 229). I agree as well. The claims directly speak of these structural features and how they operate together to improve shift-resistant stackability and the correct orientation of the cassette in the diaper pail's holder. This inventive concept is thus "readily apparent", both on a reading of the claims and as between the parties (*Shire*, para 67).

[395] The Plaintiffs also submit that the placement of the gap on the 128 Patent toward the inside of the cassette is an inventive concept, or part of the inventive concept, because it allows more surface area on which to place the structural features that assist with shift-resistance (PCA, para 352(a)). In line with the finding that this is an essential element of Claim 1 of the 128 Patent because of how it contributes to shift-resistant stackability, I am inclined to agree. Moreover, this concept emanates directly from the claims and is coherent with a claims-based approach to discerning the inventive concept (*Shire*, para 69), as it is found directly in the claims language of independent Claim 1.

(ii) The 384 Patent

[396] The parties agree generally that the 384 Patent's inventive concept is a cassette with a clearance at the bottom that prevents its improper installation in the diaper pail (PCA, para 353; DCA, para 230 (a)). This is because the clearance is paired with a complementary projection, either fixed or movable, located in the holder or that is part of the closing mechanism (*Ibid*). I agree. A cassette with a clearance properly installed allows for the movable portion of the diaper pail's closure mechanism to move, or the cassette fits a fixed part of the closing mechanism or an interference member in the holder. Both independent claims of Patent 384 define a clearance in the bottom of the cassette (Claims 1 and 6), with most dependent claims specifying further information, including as to the potential shapes of the clearance (Claims 2, 3, 7, 8, and 11). The remaining dependent claims define the inner and outer walls of the cassette and how they are integrally formed, which provides the reader insight into how the clearance operates in the context of the cassette's structure as a whole (Claims 4, 5, 9, and 10).

[397] The Plaintiffs suggest that the shape and location of the clearance are also part of the inventive concept of this patent (PCA, para 353). In particular, Mr. Morelli adds that the clearance reduces the interior volume of the cassette immediately adjacent to the clearance relative the portion that is above this part (Morelli Second Report, para 272(a)). This does not seem to add much to the shared inventive concept, as a clearance in the bottom of the cassette will necessarily remove some interior capacity in the cassette in the part of the storage area adjacent to it.

[398] The inventive concept of the 384 Patent is thus a cassette with a clearance in the bottom that allows space for a fixed or movable projection to assist with the improper orientation problem.

(iii) The 421 Patent

[399] The parties agree as well that the 421 Patent shares the same inventive concept as the 384 Patent (PCA, para 354, DCA, para 230 (a)). I agree, for the same reasons as for the 384 Patent. Independent Claim 1 claims a clearance and dependent Claims 5 and 6 define its shape and location. Many other dependent claims identify the shape and configuration of the walls that form the clearance when it is in the shape of a chamfer, or otherwise help contextualize how the clearance fits within the larger context of the cassette's structure.

[400] The Plaintiffs add two elements regarding the configuration of the cassette cover: that the cover is attached to the inside tubular wall and that the periphery of the cover has an inwardly recessed portion that allows easier access to the film. I agree insofar as these two additional

inventive concepts come from the claims language. The 421 Patent has one independent claim and 18 dependent claims. Claim element 1(d) of the one independent claim addresses the cover of the cassette and specifies that the cover has a convex edge portion and an inwardly recessed portion, which, as discussed during the claims construction analysis, is supposed to provide space that allows a user to fit their fingers easily into the film-dispensing gap and grab the plastic film. Claim 2 claims a cassette with a cover that has a periphery that is closer to the outer boundary of the cassette than to the tubular wall. The Plaintiffs submit that this provides a hygienic advantage, alluding to how the film will overlie the cassette's cover and shield it from contamination by soiled diapers (PCA, para 354; Morelli Second Report, para 167(b)). The fact that the film overlies the cover is contained in the patent's disclosure, corroborating the notion that the gap placement serves this purpose (421 Patent, p. 7). Moreover, the additional inventive concepts are complemented by dependent claims that do not otherwise assist in defining the clearance. Dependent Claim 4 gives further information on the cover, defining an intermediate portion that shows how the cover's inner edge portion and its periphery are located relative one another. Claim 19 specifies that the inwardly recessed edge portion is concave. I therefore agree that the 421 Patent also discloses inventive concepts that emanate from Claim element 1(d) and Claim 2.

(iv) The 159 Patent

[401] The parties agree that the inventive concept of the 159 Patent is the cassette that has a clearance configured for installation with a diaper pail that has a projection in its holder complementary to the cassette's clearance (PCA, para 355; DCA, para 230 (b)). I agree.

[402] The Plaintiffs add that the 159 Patent also includes the inventive concepts of the 421 Patent (PCA, para 355). I agree. In effect, the fact that the clearance and the projection are complementary is in essence a subset of what is novel about the 384 and 421 Patents: their clearances fit with the projection, whether it be the holder or the closing mechanism. The 159 Patent at Claims 19 and 38 also have claims language that takes up the same configuration of the cassette's cover as disclosed in Claim 1 of the 421, defining a cover with "a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent the convex edge portion". A claims-based approach to the inventive concept must lead to this same concept in both if they both have the same language, seen through the eyes of the same POSITA. Moreover, Claim 1 of the 159 Patent also discloses, at Claim element (d), a cover that is attached to the wall delimiting the central opening (i.e. the tubular wall) that extends outwardly therefrom, thereby defining a cover with a gap more toward the exterior of the cassette than the interior. Additionally, Claims 22 and 43 specify that the cover's outer edge portion is closer to the outer boundary of the cassette than its tubular wall. Claims 23, 40(d)(i)(3), 44, 51(d)(i)(3), 52(c), and 57 are explicit that the cover is connected to the tubular wall. The claims thus clearly express the same inventive concepts of the 421 Patent in terms of the configuration of the cover that it is attached to the inside tubular wall and that has an inwardly recessed portion that allows easier access to the film.

(v) The 415 Patent

[403] The parties agree that the inventive concept of the 415 Patent is an assembly between a cassette and a diaper pail that has a closing mechanism with a movable projecting member that extends above the bottom wall of the diaper pail's cassette holder. The projecting member is said

to be moveable relative to the bottom wall. This projecting member is designed such that it fits within the cassette's recessed area or clearance when the cassette is seated in the holder. The Plaintiffs specify that this particular assembly aims to ensure that the cassette is in the proper orientation (PCA, para 356). I agree with all of the above for effectively the same reasons as those of the 159 Patent: the movable closing mechanism that inserts itself into the cassette's recessed area is a subset of the inventive concept as disclosed in the 384 and 421 Patents. Moreover, this concept is defined clearly in independent Claim 1 at element (c). The dependent claims support this insofar as they assist in understanding how the projecting portion and cassette are configured in relation to one another. Claims 2 to 4 describe the structure of the cassette, namely its base wall and recessed area. Claim 5 specifies that the projecting member's purpose is to gather the tube of plastic film. Claim 6 defines a cassette loaded in the diaper pail's holder, which is the state in which the projecting member would engage the cassette's recessed area as per Claim element 1(c). The inventive concept, as defined above, is thus supported by the claims and is further supported by the parties' general agreement on the matter.

(vi) The 312 Patent

[404] The parties agree that the 312 Patent discloses effectively the same inventive concept as the 415 Patent. I agree as well, for the same reasons as those of the 415 Patent. Independent Claim 1, specifically in element (d), defines a projection of the closing mechanism that extends above the bottom wall of the holder and dependent Claim 3(c) expressly states that the projection is configured to engage the recessed area of the cassette when it is seated in the holder, with the projection itself being movable. The dependent claims assist in defining how the holder is configured, how the cassette is configured, and how the cassette would be seated in the holder,

all of which assist in understanding how the movable projecting of the closing mechanism would extend above the bottom wall of the holder and engage the recessed area of the cassette. The inventive concept thus emanates directly from the language of the claims. This is further supported by the parties' agreement on the inventive concept, which can be indicative that the inventive concept is "readily apparent" from the claims (*Shire*, para 67).

[405] The Plaintiffs add that another inventive concept is the diaper pail's partial lid with a funnel-shaped opening that covers the cassette and allows the insertion of diapers while the cassette is loaded in the holder (PCA, para 357). I agree insofar as this feature, defined at Claim 1(e), is unique and not otherwise captured by the overarching inventive concept discussed above. It thus cannot be subsumed into some generalized notion of the inventive concept, but must be taken into account in an analysis that is attentive to the language and subject-matter of the claims.

[406] The inventive concept of the 312 Patent is thus an assembly between a cassette and a diaper pail that has a closing mechanism with a movable projecting member that extends above the bottom wall of the diaper pail's cassette holder to assist with the proper orientation of the cassette, as well as the lid as described immediately above.

(c) *Step Three: Identifying the Gap between the "State of the Art" and the Inventive Concept*

(i) The 128 Patent

[407] The Captiva/Diaper Genie II pail and its flat-bottomed cassette constitute prior art for the purposes of the obviousness analysis. As discussed during the anticipation analysis, the Captiva

cassette, which is structurally identical to the Diaper Genie II, as well as its pail, were launched by Angelcare in December 2005 and were widely available prior to the claim date of the 128 Patent and as such forms part of the prior art (ASF, paras 102-103; Powell, TT Vol. 7, p. 9:17-13:22; Ex 94). The Defendants use this as the starting point for their obviousness analysis for the 128 Patent, as well as the Angelcare Patents (DCA, para 245; Closing, TT Vol. 34, p. 210:15-19). The Plaintiffs do not contest this, admitting that it is the element of prior art that comes closest to the inventive concept of the patents at issue (PCA, para 363; Closing, TT Vol. 34, p. 172:8-21).

[408] The Defendants submit that the only difference between the state of the art and the 128 Patent was that the 128 Patent enlarged the protuberances found at the bottom of the Captiva/Diaper Genie II cassette and paired them with complementary features in the pail's holder to solve the incorrect orientation problem (DCA, para 244(a)). The Defendants explain that the prior art Diaper Genie II/Captiva cassettes already had registration features that assist with shift-resistant stackability for cassettes stacked on top of one another, relying on Mr. Morelli's testimony (Morelli, TT Vol. 32, p. 40:19-42:14). The parties are in agreement to this effect (Bailey First Report, para 195; Morelli, TT Vol. 28, p. 82:7-86:16; PCA, para 384). As such, the difference between the state of the art and the inventive concept of the 128 Patent, as advanced by the Defendants, involves the assembly between a cassette and a diaper pail, rather than simply the stacking of cassettes.

[409] The Plaintiffs point out that Munchkin does not rely on a specific document or product to argue that there is no difference between the state of the art and the innovative concept of the 128 Patent. They contend that the use of registration features on the bottom of the cassette in combination with alignment features in the diaper pail's holder to ensure proper alignment and

orientation constituted a difference between the state of the art and the 128 Patent (PCA, para 363(b); Morelli, para 276 (b)). The structural features of the cassette at its bottom which engage with alignment features in the holder were not part of the state of the art. They submit that the inventive concept of the 128 Patent also includes the placement of the gap on the cover to create a larger area for registration features that assist with shift-resistant stackability (PCA, para 363(a); Morelli, para 276(a)).

[410] I agree that the placement of the gap is indeed a difference between the state of the art and the inventive concept of the 128 Patent, since this was not disclosed by the Captiva/Diaper Genie II cassette and entailed advantages specific to shift-resistant stackability. This was discussed in relation to the anticipation analysis, as well as claims construction. The placement of the gap is an essential element of the invention and thus must be taken into account during the obviousness analysis (*Bridgeview Manufacturing*, para 46). The upright positioning through structural features was not shown by the Defendants, who carry the burden, as being part of the state of the art.

(ii) The 384 Patent

[411] Similar to the 128 Patent, the Captiva/Diaper Genie II pails and cassettes formed part of the state of the art in 2007 and are a starting point for the obviousness analysis for the Angelcare Patents as well, as identified by Mr. Bailey in his reports (Bailey First Report, para 362; Bailey First Report, Schedule J, pp. 1-2).

[412] Mr. Bailey submits that there is no difference between the state of the art and the 384 Patent, save for a clearance with the shape of a chamfer (Bailey First Report, para 392). He says that all elements of independent Claims 1 and 6 of the 384 Patent are disclosed by the

Captiva/Diaper Genie II cassette, with the exception of the clearance in the bottom portion of the central opening (Bailey First Report, paras 381-382, 392; *Ibid*, Schedule J, pp. 1-6, 8-9). This, he says, is disclosed by prior art document US 3,536,192 (Couper) (“US 192”), published in 1970 (*Ibid*, pp. 3-6, 8-9). However, this is unconvincing given the Defendants’ own submissions as to what constitutes a clearance. In particular, during their non-infringement analysis, they denied that the Fourth Generation Munchkin cassette disclosed a clearance as claimed in the 384 Patent and explicitly compared its inner angled wall to that shown in the figures of the US 192 Patent (DCA, paras 118-119). The Plaintiffs similarly agreed that the Fourth Generation Munchkin cassette’s inner angled wall was not a clearance in accordance with Claims 1 and 6 of the 384 Patent (PCA, para 88). What the Defendants now assert to be a clearance in the US 192 Patent does indeed appear very similar to the inner angled wall of the Fourth Generation cassette. I accordingly conclude that, just like the Fourth Generation Munchkin cassette, the US 192 does not disclose a clearance as defined in the 384 Patent. The Defendants thus have failed to show that the clearance, as claimed in the 384 Patent and part of its inventive concept, was disclosed in the prior art.

[413] Mr. Bailey submits that the prior art disclosed different diaper pail components, including cassettes, that had complementary features and submits these could be used to assist the proper orientation of a cassette in a pail (Bailey First Report, para 393). He makes a link between this and the projecting portion of a holder that is complementary to the clearance or recessed area in a cassette in the Angelcare Patents (Bailey First Report, para 393). He submits that prior art patent WO 2006/029038 A2 (Stravitz & Chomik / Playtex) (“WO 038”), filed September 2, 2005 and claiming the priority date of September 2, 2004, disclosed a diaper pail system where a gear ring, forming part of the pail’s closing mechanism, had projections on it that could be connected to the

cassette (*Ibid*, paras 317, 393). He also raised the CA 2,479,484 A1 (Chomik / Playtex) (“CA 484”) Patent, filed August 30th and claiming priority date of September 2, 2003, that discloses a cassette with projecting ridges that complementarily engage a notched rotary ring (*Ibid*, paras 318, 393). Mr. Bailey points to cassettes with notches that engage steps in the housing of the pail, as well as cassettes with cut-out portions that engage projections in the pail’s main body, as disclosed in the CA 2,532,230 A1 (Angelcare/Morand) Patent (“CA 230”) (*Ibid*, paras 319, 393), bearing priority dates December 23, 2005 and April 25, 2005 and filed January 5, 2006. Finally, he states similar structural features were well-known in consumer products generally (*Ibid*, para 393). This is presumably a reference to complementary-shaped consumables Mr. Bailey mentions, such as the shape of water filters as they fit into water pitchers, cleaning solution refill bottles that insert into Swiffer mops, SD cards that fit into phones and Keurig K-cups that fit into coffee machines (Bailey First Report, para 325).

[414] Respectfully, none of these prior art patents disclose a projection that engages a clearance at the bottom of the cassette to solve the improper orientation problem. And that is not obvious. Mr. Morelli credibly asserts that none of these prior art pieces suggest the use of projections in a diaper pail that interact with a complementary shape of the cassette to ensure its proper installation in the diaper pail (Morelli Second Report, para 279). Indeed, as stated above, the prior art does not even disclose a clearance as claimed in the 384 Patent, let alone projections that can complementarily engage such a feature. The above patents and the features of the pails they disclose that engage the cassette keep the cassette in place so as to allow the rotation of a closing mechanism to seal the plastic film (Morelli Second Report, paras 249-250). As such, the inventive concept of the 384 Patent is not disclosed in the prior art.

(iii) The 421 Patent

[415] The 421 Patent has the same inventive concept as that of the 384 Patent, with the addition of the configuration of the cover. The difference with the state of the art resides in the clearance. As discussed above, the inventive concept of the 384 Patent is not found in the prior art. The Captiva/Diaper Genie II cassette discloses a cover that is structurally identical to that disclosed in the 421 Patent, as construed for independent Claim 1 at element (d). It contains a convex edge portion as well as an inwardly recessed edge portion, creating a gap in the cover of the cassette that allows a user to insert their fingers and grab the plastic film. Its gap placement is also on the outside of the cassette, as defined in independent Claim 2. The Plaintiffs readily admit this (PCA, para 363 (d); Morelli Second Report, paras 327-328).

(iv) The 159 Patent

[416] The state of the art does not disclose the inventive concept of the 159 Patent.

[417] Mr. Bailey attempted to locate a projecting portion of a holder complementary to a clearance in the bottom of the cassette in numerous prior art patents (Bailey First Report, para 393; *Ibid*, Schedule K). Mr. Bailey alleged that prior art patents WO 2006/029038 A2 (Stravitz) at paras 0191, 0193, 0205 and in figures 25 and 26 disclosed diaper pail components that used protrusions and recesses for positioning and orienting the cassette (Bailey First Report, Schedule K, p. 7). In this patent, projecting mechanisms on a diaper pail engaged notches on the bottom of the cassette to allow it to rotate along the diaper pail's gear ring, twisting up the tube of plastic film in which diapers are stored and sealing it shut (WO 2006/029038 A2, paras 145, 190-194, 204-205, Reference 210A in Figure 25). These notches do not assist at all with the improper orientation problem, but instead the so-called "rotational alignment of the cassette" (*Ibid*, paras

191, 205; Figure 25; Morelli Second Report, para 249). Moreover, it is presumably the flange at the top of the cassette, for example as visible in figures 10, 11 and 14 of this Patent, that solve the incorrect orientation problem, rather than the notches on the cassette paired with the protrusions on the gear ring. Mr. Bailey proposes that the US 2004/0020175 A1 (Stravitz), filed July 31, 2003, and US 2007/0180798 A1 (Stravitz), filed September 2, 2004, demonstrate a cassette and pail with complementary recesses and projections. But this has to do with keeping the cassette in place while the closing mechanism rotates and seals the bag containing diapers shut (Bailey First Report, Schedule K, p. 8 (footnote 4); Morelli Second Report, paras 251-252).

[418] Mr. Bailey also points to the CA 2,532,230 A1 (Morand) Patent (“CA 230”), filed January 5, 2006 and claiming priority dates of December 23, 2005 and April 25, 2005. He states that the pail’s holder or cassette could be adapted so as to fulfill the requirement that the holder have a projection, with a clearance in the cassette configured to receive said projection, as found in Claim elements 1 (h), 21(g), 40(c)(ii) and (d)(iv), 51(c)(ii) and (d)(iv), and 52(e) of the 159 Patent. Mr. Bailey points us to paragraph 0027, which describes the shape of the holder and how the cassette fits within it, referring to Figures 1 and 2 (Bailey First Report, Schedule K, p.8 (footnote 5)). However, these figures and the description thereof are of a flat-bottomed cassette and complementary flat-bottomed diaper pail, with no such projection engaging a complementary clearance (Morelli Second Report, para 264). The only indication that this could be possible is that the holder and cassette can take alternate configurations (at paragraph 0027), without making explicit a specific configuration where there is a projection in the holder and a complementary clearance in the cassette. As such, the inventive concept of the 159 Patent is not found in the prior art CA 230 Patent, or any other prior art patents the Defendants have put forward.

(v) The 415 Patent

[419] The experts agree that there is a difference between the state of the art and the inventive concept of the 415 Patent (Bailey First Report, paras 390, 394; Morelli Second Report, para 281 (d)). This would be the fact that the projection of the closing mechanism extends up above the bottom wall of the holder that engages the clearance of the cassette to ensure its proper orientation (*Ibid*).

(vi) The 312 Patent

[420] Given that the inventive concept of the 312 Patent is, as agreed-upon by the experts, the same as the 415 Patent, the state of the art similarly does not disclose this inventive concept.

(d) *Step Four: Bridging the Gap*

[421] The Plaintiffs position their argument on the statutory question by stating the following well known propositions:

- A modest contribution to the advancement of the art, the “scintilla of invention”, is sufficient;
- Virtually everything is obvious once discovered;
- The simplicity of a device does not make it obvious; there must be a first;
- Hindsight is not part of the analysis of obviousness. The oft-quoted statement of Fletcher Moulton L. J. in *British Westinghouse Electric and Manufacturing Company Ltd. v Braulik*, (1910), 27 RPC 209, at page 230 is worth noting:

I confess that I view with suspicion arguments to the effect that a new combination, bringing with it new and important consequences in the shape of practical machines, is not an invention, because, when it has once been established, it is easy to show how it might be arrived at by starting from something known, and taking a series of apparently easy steps. This ex post facto analysis of invention is unfair to the inventors, and in my opinion it is not countenanced by English Patent Law.

- In order to satisfy the obviousness test, the solution to the problem must be “crystal clear to the POSITA.”

[422] The Defendants for their part argued in their written case that where there is a finite number of predictable solutions, the POSITA would pursue the known options within their technical grasp. It follows that that success is not the product of innovation but rather of ordinary skill and common sense. In other words, there is no inventiveness. The use of tapers, flanges, and protuberances and recesses would have been familiar to the POSITA. That may be so but, contrary to what is contended, the notion of tapered walls does not lead to the clearances being in the nature of a solution. That is not to be found in the prior art: a taper is a taper, which does not correspond to the clearance of the Angelcare patents. In fact, the Defendants declare, rather than they show, that it would have been obvious to pair the shape of cassettes with projections and protuberances, or projections in holders on members of the closing mechanisms. In my view, following what were the usual solutions to an orientation problem would take a person of skill in the opposite direction from the solution arrived at by the invention of this case.

[423] The Court will examine the six Patents-in-suit to determine whether the gap between the prior art and the inventive concept has been bridged with the assistance of the CGK. The exercise requires that, without knowledge of the invention as alleged by the invention, would the person of skill have arrived at the solution? I have concluded that it is not the case.

(i) The 128 Patent

[424] The Captiva/Diaper Genie II cassette, which constitutes the prior art closest to the alleged inventions, had registration features on its cover and bottom that provide shift-resistant

stackability when the cassettes are stacked one-on-top-of-the-other (Bailey First Report, paras 298-300; PCA, para 384). However, the placement of the gap on the cassette's cover is an inventive concept that was not present in the state of the art, as seen during the anticipation analysis. The gap's placement entails distinct benefits for each position, with hygienic advantages associated with its placement towards the outside of the cassette that differs from the shift-resistant stackability advantages that come from its placement toward the inside of the cassette (Morelli First Report, paras 38-30; Morelli, TT Vol. 8, p. 64:11-65:23; Morelli Second Report, paras 68-70). The gap's placement toward the inside is, as seen during the claims construction analysis, an essential feature of the 128 Patent that contributes directly to its inventive concept of shift-resistant stackability by providing a larger surface where to place features on the outside periphery of the cover.

[425] The Defendants submit that it would have been obvious to the POSITA, faced with the Captiva/Diaper Genie II cassettes with the gap placed towards the outer periphery of the cover, to simply change the location of the gap to be closer to the inside (DCA, para 248). I do not see how that would have been obvious and that was not explained by the Defendants how it would be so. The Plaintiffs, relying on Mr. Morelli, convincingly observe that it would not have been obvious to give up the hygienic advantages of the gap placement towards the outer periphery of the cassette's cover for the stackability advantages of a placement toward the interior (PCA, para 389; Morelli Second Report, para 290(a)). I find this to be especially credible given that the Captiva/Diaper Genie II cassettes already had registration features on their covers and bottoms that assisted with shift-resistant stackability. Moreover, Mr. Bailey on cross-examination testified that the POSITA's common general knowledge would not include the differences

between an outside gap and an inside gap (Bailey, TT Vol. 27, p. 198:15-199:12). Determining the location of the gap in order to enhance stackability was an inventive step, especially when paired with the other advantages of the invention.

[426] The placement of the gap in the 128 Patent is, as discussed during the claims construction, an essential element of independent Claim 1 and all claims in the patent that rely upon it (Claims 2 to 10). This means that these dependent claims import this requirement into their subject-matter.

[427] As for the orientation of cassettes, Mr. Bailey submitted that the POSITA would be able to identify and use registration features to ensure the upright positioning of the cassette in the diaper pail, citing to this effect features such as the flange at the top of the US 2004/0020175 A1 (Stravitz) (“US 175”) Patent, filed July 31, 2003 (Bailey First Report, paras 333-334). He also pointed to the complementary features of the WO 038 and CA 484 Patents (*Ibid*, para 333, footnote 227). He states that it would have been obvious to add complementary features in the diaper pail to minimize risk of improper installment (*Ibid*, para 335). He states that there were “a finite number of identifiable and predictable solutions” to the improper orientation problem and that changing the surface of the cassette and its holder in the diaper pail would be easily worked out with CAD modelling (*Ibid*, paras 341-342).

[428] The inventive concept of the 128 Patent consisted of turning features of the cassettes and the bottom of the holder, structural features, in order to assist with the proper alignment of a cassette in the diaper pail’s cassette holder. The Defendants submit that in order to solve the

orientation problem, it was simply a matter of enlarging the features. I disagree. There was nothing presented in this case that could even suggest a general direction where a protuberance in a holder could be coupled to a registration feature, let alone such protuberance and recess being created for the purpose of forcing the user to associate the two to ensure that the proper orientation of the cassette was in place. It was inventive to use features for one purpose in order to ensure the proper orientation of a cassette in its holder.

[429] The prior art patents that show complementary features between the cassette and the diaper pail are not meant to assist with the improper orientation problem. More importantly they do not use features at the bottom of the cassette to do so. Instead, they are concerned with how the cassette is attached to the closing mechanism so that it can rotate and seal the plastic bag containing the soiled diapers (Morelli Second Report, paras 275). Mr. Morelli testified that nothing about these prior art articles would suggest to the POSITA the use of the cassette's registration features in combination with the diaper pail's alignment features to ensure that the cassette is properly installed in the diaper pail (*Ibid*, paras 275, 291). I agree. The example he uses repeatedly that assists with the proper orientation of a cassette in a diaper pail is a flange, which is nothing like how the 128 Patent solves the orientation problem. This, to my way of thinking, is completely different from the invention. The flange is a feature at the top of the cassette. In contrast, the 128 Patent and its inventive concept, as it relates to the improper orientation problem, uses registration features at the bottom of the cassette. Mr. Bailey simply asserts that the POSITA's use of mistake-proofing techniques, including registration means and tapers, would make the 128 Patent obvious, without delving any further into his analysis (Bailey First Report, para 335). This is not persuasive. This does not assist the Court in determining why

the particular solution chosen to the 128 Patent would have been taken up by the POSITA, as mistake-proofing is a broad skillset that could lead to many different types of solutions. It may in fact lead away from the solution than the one which became the invention. Indeed, he speaks of change that could be made to the outside of the diaper pail or to the inner, outer, and bottom walls of the cassette, as well as its cover (*Ibid*, para 341). With various permutations, those constitute a multitude of potential alternate designs. Other possible solutions to a problem do not prevent an inventive concept to emerge out of an inventive mind. It is not even clear that structural changes would be the POSITA's first instinct to solve the improper orientation problem, given that visual solutions like arrows, written warnings and complementary colour-coding would be easier to develop and put into practice (Morelli Second Report, para 293). Structural changes, by contrast, would require potential changes to the moulds from which the diaper pails and cassettes are made (Morelli Second Report, paras 294-297). As such, the 128 Patent's solution to the improper orientation problem, disclosed in Claim 11 and its dependent Claims 12 to 23, is not obvious.

(ii) The 384 Patent

[430] Bridging the gap between the flat-bottomed Captiva/Diaper Genie II cassette, paired with its corresponding pail, and the orientation-related claims of the 384 Patent would not have been obvious to the POSITA. As it stands, none of the prior art disclosed this patent's inventive concept. Mr. Bailey submits that the POSITA would, faced with the improper orientation problem, "quickly" consider making complementary changes to the shape of the cassette and the diaper pail (Bailey First Report, para 401). While the ability to make these types of changes is indeed within the POSITA's general common knowledge, it is not at all clear that the POSITA

would quickly turn to this solution, or turn to this solution at all. In particular, the choice to add a clearance to the cassette is a non-obvious choice, given the primacy of the internal storage area for the plastic film and the potential reduction of this internal volume that the addition of a clearance would entail. Both Mr. Morelli and Mr. Tsang testified that the internal volume of the cassette is a very important consideration in the design process (PCA, para 381, citing Tsang, TT Vol. 26 *in camera*, pp. 3:11-18, 5:8-6:11; Morelli Second Report, paras 320-326; Morelli, TT. Vol. 29, pp. 162:25-165:6). Reducing the internal volume would thus be counterintuitive to a POSITA who would not want to create a new problem of reduced amount of film when solving the improper orientation problem (Tsang, TT Vol. 26 *in camera*, pp. 5:8-6:11; Morelli Second Report, paras 320-326; Morelli, TT. Vol. 29, pp. 162:25-165:6). It was not at all obvious that Mr. Morand's experimentation with the metal rings, which obviously was meant to alleviate a significant concern about reducing the volume of the recipient, would have worked or yielded the result that it did: a virtually unaffected storage capacity for film inside the cassette (Morelli Second Report, para 324). This does not appear to be a predictable solution that would provide a reasonable expectation of success (*Corning Cable Systems LLC v Canada (Attorney General)*, 2019 FC 1065 [*Corning Cable*], para 94, citing *Pfizer Canada Inc. v Novopharm Limited*, 2009 FC 638 at para 56; *aff'd Novopharm Limited v Pfizer Canada Inc.*, 2010 FCA 242). On the contrary, this is rather counterintuitive.

[431] Mr. Bailey and the Defendants highlight that it took Mr. Morand less than a year to go from the conception of the idea to the manufacturing of the final product, submitting that this makes the steps routine (Bailey First Report, paras 411-421; DCA, paras 14-17, 264). The Defendants point specifically to a technical drawing dated November 8, 2006 that shows what

eventually became the closing mechanism in the Angelcare Patents and state that it only took Mr. Morand days, or a month at most, to produce drawings of a chamfered cassette (DCA, para 14; Ex 55). I do not accept that this makes the invention obvious or the steps routine. There is inventiveness. The Plaintiffs point out that Mr. Morand is an experienced designer with a more qualified profile than the POSITA; he has experience directly in the realm of diaper pails and cassettes (PCA, paras 411-412). As such, his ability to move through the steps of experimentation quickly does not necessarily negate the inventive nature of the cassette with a clearance in the bottom. Again, reducing the internal storage area of the cassette was a counter-intuitive solution to the problem at hand, making experimentations to this effect anything but routine.

[432] Moreover, Mr. Morelli testified that the POSITA would likely have sought out other potential solutions to the improper orientation problem before making structural changes by adding or removing material in both the diaper pail and the cassette. After all, this is what this invention entails. Both Mr. Morelli and Mr. Tsang explain that designers would try to provide or improve visual cues on the cassette to better signal to consumers how the cassette ought to be assembled with the diaper pail (PCA, para 403, citing Morelli Second Report, para 293 and Tsang Report, para 53). That said, Mr. Tsang explained that visual cues, such as changes to the label, would need to be paired with other elements of mistake-proofing, given the target consumer of diaper pails: tired parents (Tsang Report, paras 53-43). Nonetheless, the Plaintiffs credibly point out that, if modifying both components of the system were a route forward, this opens the door to an endless amount of potential changes and design options (PCA, para 401). Mr. Bailey gave similar testimony to this effect, explaining that many different structural

solutions could be employed on both the cassette or the holder, for example by adding protrusions or flanges, with the only limitations being the constraints given by the business or marketing group for whom the designer works (Bailey, TT Vol. 24 pp. 189:6-190:15; Bailey, TT Vol. 25, pp. 33:7-37:15; Bailey, TT Vol. 27, pp. 207:14-212:10). Despite Mr. Bailey's contention that there were a limited number of solutions to address the improper orientation problem (Bailey First Report, para 401), it actually seems like there were many possibilities. The particular one created by the Defendants becomes, with the benefit of hindsight, obvious. The existence of other possible solutions does not render an inventive solution less worthy of protection. It has not been shown how the prior art, consisting of a flat bottom cassette placed in a flat holder, turns into something less than inventive because there may have been other solutions than the one involving a clearance, with a purpose, at the bottom of cassettes.

[433] The problem with the orientation of the flat-bottomed cassettes was not self-evident, as the evidence showed. Playtex learned of issues with its cassettes being installed upside down through customer services. The inventor, Michel Morand, had not noticed the cassette was installed upside down until he witnessed the phenomenon at the daycare his child attended. That was in spite of directions given on the cassette itself as to the cassette's proper orientation once installed in the holder in the diaper pail. It may have been because the cassettes had indications on them as to the proper orientation that the problem did not emerge sooner in spite of the invention's expertise with cassettes. Mr. Kevin Johnson, the lead designer for Munchkin, did not know why the new cassette had what became known as a clearance at the bottom of the Angelcare cassette. That goes to show that the solution found by the inventor was not self-evident.

[434] It may be that other solutions may have been available: tapers and flanges have been referred too. There are possibly other solutions; that in my view does not make a structural change in the cassette to be paired with a complimentary projection uninventive or obvious. As such there is a significant gap between a flat bottom cassette and the inventive concept which is not filled by the existence of other possible solutions that, in fact, point in a different direction. The Plaintiffs did not seek to appropriate every remedy for bald men: they have only created one solution that had not been invented yet.

[435] The inventive concept of the 384 Patent is thus not at all a straightforward path for the POSITA, but instead would require a degree of ingenuity and risk-taking, putting it beyond the capacity of the notional uninventive POSITA.

(iii) The 421 Patent

[436] As discussed above, the differences between the inventive concepts disclosed by the claims of the 421 Patent and the state of the art are the same as those of the 384 Patent. Pursuant to the above analysis of the 384 Patent, bridging the gap between the state of the art and inventive concept would not be obvious to the POSITA.

(iv) The 159 Patent

[437] The 159 Patent's inventive concept is essentially a subset of the inventive concept of the 384 Patent: rather than any fixed or movable protrusion that engages with the clearance to assist with the improper orientation problem, it is specifically a projection in the holder that engages

with a clearance at the bottom of the cassette. As seen above, this did not exist in the state of the art, with the prior art patents announced by the Defendants being primarily concerned with preventing the cassette from rotating rather than correct orientation. While the US 192 patent discloses a clearance in the general sense of its construction (an empty space), no prior art document reveals a projection in the holder being used in tandem with this space for the purpose of proper orientation.

[438] The POSITA's common general knowledge includes, in particular, the ability to design components with complementary shapes such that they can only be assembled in a particular fashion. However, the sheer magnitude of options that were present to the POSITA for modifying both the shape of the diaper pail's holder and the cassette to solve the improper orientation problem is an impediment to concluding that the particular solution claimed in the 159 Patent is obvious. One such mistake-proofing technique that could have been employed to solve the improper orientation problem would be a flange at the top of the cassette, which was already revealed in the prior art and which experts from both sides agreed would be within the POSITA's abilities (Morelli, TT Vol. 32, pp. 64:22-65:10; Bailey, TT Vol. 24, p. 190:1-15). A solution like a flange would be of course less complex than a cassette with a clearance that would work with a projection to ensure the cassette is properly oriented. In my view, the point of the matter is not whether another solution could have been available. It is rather whether the solution found constitutes an invention. I find it more credible that the POSITA would have undertaken this simple solution that was likely to succeed, rather than one that potentially would have resulted in less plastic film on the inside of the cassette and that could entail a myriad of different structural solutions, with modifications to both the pail and the cassette.

[439] The notion of improper orientation of products may have been known in the state of the art. Surely that is quite a common issue, as the evidence showed concerning a variety of products. In this case, it is quite clear that the problem presented itself without warning. In fact, as already pointed out, the cassettes gave directions about installing the cassettes properly. The evidence to that effect appears to be uncontroverted: neither the inventor nor Playtex (when it acquired the rights to what became the Diaper Genie II) realized that there was an issue, which provided the motivation to find a solution. But that does not mean the particular solution created is obvious. Motivation is but one factor among others that assist in the obviousness analysis (*Corning Cable* at para 94, citing *Novopharm* at para 25). It alone cannot be determinative of the result. But if one is selling a product that is not as hygienic as consumers may wish, that is a product worth fixing. That is motivation.

[440] There is also the shape of the cover, with the convex edge portion and the inwardly recessed edge portion adjacent to it forming a hole into which users can insert their fingers and grab the film. This was revealed in the prior art, although Mr. Morelli submits that it is not obvious insofar as the invention integrates benefits of the state of the art while improving upon it (Morelli Second Report, paras 327-330). The shape of the cover is only disclosed as a dependent claim (Claim 19, depending on any of Claims 1 to 18), defining it in relation to the general notion of a cassette with a clearance configured to receive a projection when the cassette is seated in the holder, as per Claim 1. As such, it is indeed this feature, in combination with the rest of the inventive concept of the cassette, that is claimed. Failure to bridge the gap between a cassette with a clearance that engages with a complementary projection in the holder will thus

also mean that an invention that integrates both this and the configuration of the cover will not be obvious.

(v) The 415 Patent

[441] Mr. Bailey testified that there was no inventive ingenuity in having the movable portion of the closing mechanism sit up above the holder of the cassette and engage the cassette's clearance. He submits that the closing mechanism of the Captiva/Diaper Genie II system was almost identical to that found in the Angelcare Patents discussing how space a closing mechanism below the cassette holder had a two-part clamping system, biased in a closed position against one another, one of which was movable and one which was fixed (Bailey First Report, para 373). The movable one opened with the downward pressure of a soiled diaper being inserted into the pail and moved back to a closed position afterward (*Ibid*, paras 373-374). Mr. Bailey alleges that the diaper pails and cassettes described in the CA 2,532,230 A1 (Morand) ("CA 230") Patent look very similar to the Captiva/Diaper Genie II system and the figures in the Angelcare Patents (*Ibid*, paras 375-376). At paragraph 394 of his First Report, he showed two figures side-by-side, one from the CA 230 Patent and one from the Angelcare Patents. In the CA 230 Patent figure, the cassette seated in the diaper pail is shown in cross-section, with a flat-bottomed cassette and a closing mechanism whose movable member rests below the holder. In the Angelcare Patents, a chamfer-bottomed cassette is shown, with a similar closing mechanism displayed, but instead with the movable portion of the closing mechanism rising up above the bottom of the cassette's holder and into the cassette's chamfer-shaped clearance. Mr. Bailey submits that these two figures are almost identical, aside from these changes (Bailey First Report, para 394). He also points to prior art reference WO 2007/ 028,230 A1 (Morand), filed

July 27 2006 and claiming priority date of 7 September 2005. Specifically, Mr. Bailey discusses figure 7 thereof, which shows part of a closing mechanism that extends above the holder (Bailey First Report, para 395).

[442] These prior art references do not bridge the gap between the inventive concept and state of the art. The part of the closing member that is above the holder displayed in the WO 230 Patent is outside the diaper pail. That prior art closing mechanism does not engage with the cassette or otherwise assist with the improper orientation problem in any way. The engagement of the mechanism with the clearance/chamfer of the cassette is what constitutes the inventive concept that permits the cassette from being installed upside-down. The mechanism simply slides in and out of the pail, resting against the plastic tube to seal it shut. Moreover, while the two figures of the CA 230 and Angelcare Patents may appear similar, the differences between the CA 230 and the 415 Patents are notable: the existence of a clearance in the bottom of the cassette, as well as a closing mechanism that projects up above the bottom of the holder. I have already discussed why putting a clearance at the bottom of the cassette as a solution to the improper orientation problem was inventive in relation to the 384 Patent. It should also be noted that even Mr. Bailey stated that putting the protrusion that engages with the cassette on the movable portion of the closing mechanism, as opposed to the fixed portion, would be “a little bit more of a stretch” or his “second choice” (Bailey, TT Vol. 25 *in camera*, pp. 99:10-100:27). Mr. Bailey also writes that the use of a movable portion of the closing mechanism to prevent the *use* of the cassette in the incorrect installation is “new and perhaps even inventive” (Bailey First Report, para 404). He then clarifies that the 415 Patent does not actually claim this feature, but instead the use of a projection of the closing mechanism to prevent improper installation of the

cassette, regardless of how this affects the use of the cassette (*Ibid*, para 405). In my view, there is no real difference between these two elements. The consumer's inability to install the cassette upside-down also prevents them from using the cassette when it is installed upside-down. As such, it appears that Mr. Bailey concedes that the use of the closable portion of the closing mechanism is inventive and thus the inventive concept of the 415 Patent is not obvious.

(vi) The 312 Patent

[443] Given that the inventive concept of the 312 Patent is, as agreed upon by the experts, the same as that disclosed by the 415 Patent, the 312 Patent is similarly non-obvious for the reasons above. The only difference was the funnel-shaped lid at Claim element 1(e). As pointed out by Mr. Morelli in his Second Report, it is the combination between this lid and the movable portion of the closing mechanism that engages the clearance of the cassette that is inventive (Morelli Second Report, para 281(e)). Moreover, the Defendants did not submit any evidence that indicated the POSITA would have been able to bridge the gap between the lid as it existed in the state of the art and the lid as disclosed in the Angelcare Patents. At any rate, if one of these two elements is non-obvious, the combination must therefore be non-obvious. The inventive concept of the 312 Patent is thus not obvious.

C. *Overbreadth*

[444] In its final submissions, Munchkin claimed, in its factum, overbreadth with respect to cassettes with a clearance in the 384 and 421 Patents, overbreadth with respect to claims to

mechanisms in the 415 Patent and the 321 Patent as well as to insufficiency of the Angelcare Patent claims to cassette covers.

(1) Legal Principles

[445] If in some quarters it was argued that overbreadth does not constitute a proper ground of invalidity, such argument has been put to rest in two recent Federal Court of Appeal decisions: *Western Oilfield; Seedlings Life Science Ventures, LLC v Pfizer Canada ULC*, 2021 FCA 154 [Seedlings]. The Court found in *Western Oilfield*, and repeated in *Seedlings*, that overbreadth stems from subsections 27(3) and 27(4), and is a consequence of the bargain theory. Paragraph 129 from *Western Oilfield* captures the reasons why overbreadth remains a proper ground of invalidity:

[129] The concept of claim invalidity for overbreadth (or overclaiming) arises from the combination of the requirements that a patent specification (i) correctly and fully describe the invention (see subsection 27(3) of the Patent Act), and (ii) include “claims defining distinctly and in explicit terms the subject-matter of the invention for which an exclusive privilege or property is claimed” (see subsection 27(4)). One may also consider overclaiming as a natural consequence of the bargain theory of patent law as described in *Free World Trust* at para. 13: “[i]n return for disclosure of the invention to the public, the inventor acquires for a limited time the exclusive right to exploit it.” If a patent claims more than it describes, or more than the inventor has made, it gives the patentee more than the bargain entitles them to. Such a claim violates the bargain and is therefore invalid.

[446] As the *Seedlings* Court reminded, overbreadth can be advanced in two ways. Overclaiming could be because a claim is broader than the invention disclosed in the specification or it is broader than the invention made. Thus, “[t]he invention must be described in full, and the claims define a subset of the described invention that the inventor seeks as exclusive

property. It follows that the scope of the claims cannot exceed the disclosure” (*Seedlings*, para 51).

[447] The claims of a patent put fences around what constitutes the monopoly awarded by the state for what constitutes an invention. But the fences can properly be set within the limits of an invention. An inventor cannot claim more than what has been invented. For instance, a claim is invalid if it does not include an essential element, which is a limitation. In *Radio Corp of America v Raytheon Manufacturing Co*, (1957) 27 CPR 1 at p. 22, President Thorson wrote:

[44] ... It is, I think, consistent with principle to say that when a specification discloses the invention of a process for the manufacture of an article in which the use of a special feature of the invention is essential to the success of the invented process the inventor is not entitled to claim a process for the manufacture of the article in which the special feature is not used. He is not entitled to claim a monopoly more extensive than is necessary to protect that which he has invented ...

[448] The Federal Court of Appeal noted, however, that “[t]he fact that a feature is discussed in the specifications does not necessarily mean that such a feature is of the essence of the patent” (*Nova Chemicals Corp v Dow Chemical Co*, 2016 FCA 216, at para 50).

[449] It has often been said that overbreadth and insufficiency are the two sides of the same coin. Here is how the proposition was put in *Western Oilfield* at paragraph 130:

[130] Overbreadth often overlaps with other grounds of invalidity. For example, a claim that is invalid for anticipation because it encompasses embodiments that are described in the prior art may also be considered overbroad for claiming more than the inventor has truly invented. In addition, overbreadth might be considered the other side of the coin of insufficiency. Where a claim is broader than the description, it may fail for overbreadth, but it may also fail because the description does not adequately describe how

to put it into practice. Despite this possibility of overlap, overbreadth is a distinct ground of invalidity that must be considered separately.

Although Munchkin joined overbreadth and insufficiency together, I shall proceed with them separately starting with overbreadth.

[450] The inventor must delimit and claim only that which has been invented. This is derived from subsection 27(4) of the Act: “defining distinctly and in explicit terms the subject-matter of the invention for which an exclusive privilege or property is claimed.” It is within the claims that the monopoly will be defined and fenced.

[451] Subsections 27(3) and 27(4) dictate that the Patent’s specification must “correctly and fully describe the invention”, with claims that are drafted in explicit terms to ensure the protected monopoly is clearly defined.

27 (3) The specification of an invention must

(a) correctly and fully describe the invention and its operation or use as contemplated by the inventor;

(b) set out clearly the various steps in a process, or the method of constructing, making, compounding or using a machine, manufacture or composition of matter, in such full, clear, concise and exact terms as to enable any person skilled in the art or science to which it pertains, or with which it is most closely

27 (3) Le mémoire descriptif doit :

a) décrire d’une façon exacte et complète l’invention et son application ou exploitation, telles que les a conçues son inventeur;

b) exposer clairement les diverses phases d’un procédé, ou le mode de construction, de confection, de composition ou d’utilisation d’une machine, d’un objet manufacturé ou d’un composé de matières, dans des termes complets, clairs, concis et exacts qui permettent à toute personne versée dans l’art ou la science

connected, to make, construct, compound or use it;	dont relève l'invention, ou dans l'art ou la science qui s'en rapproche le plus, de confectionner, construire, composer ou utiliser l'invention;
(c) in the case of a machine, explain the principle of the machine and the best mode in which the inventor has contemplated the application of that principle; and;	c) s'il s'agit d'une machine, en expliquer clairement le principe et la meilleure manière dont son inventeur en a conçu l'application;
(d) in the case of a process, explain the necessary sequence, if any, of the various steps, so as to distinguish the invention from other inventions;	d) s'il s'agit d'un procédé, expliquer la suite nécessaire, le cas échéant, des diverses phases du procédé, de façon à distinguer l'invention en cause d'autres inventions.
(4) The specification must end with a claim or claims defining distinctly and in explicit terms the subject-matter of the invention for which an exclusive privilege or property is claimed.	(4) Le mémoire descriptif se termine par une ou plusieurs revendications définissant distinctement et en des termes explicites l'objet de l'invention dont le demandeur revendique la propriété ou le privilège exclusif.

Not only a claim may not be broader than the invention made or the invention disclosed in the patent, but the invention must be correctly and fully described together with its operation or use, so that the person of skill will be enabled to practice the invention. Thus a patent is overbroad and consequently invalid if the claims fail to achieve this specificity (*Western Oilfield*) at paragraph 128; *Pfizer Canada Inc. v Canada (Health)*, 2007 FCA 209, [*Pfizer Canada*], at paragraph 115.

[452] To determine whether a patent is overbroad, the Court assesses whether the claims, read fairly on what the patent discloses in the disclosure and the figures, are too wide and claim more

than was invented (*Pfizer Canada*, para 115, citing Thorson P. in *Lovell Manufacturing Co v Beatty Bros Ltd* (1962), 41 CPR 18 (Ex Ct) at p. 66). Meeting this threshold does not require that the patent describe all possible embodiments of the claims. In this regard, the claims may be broader than the embodiments, which are considered examples of what is protected by the patent's monopoly (*Valence Technology, Inc. v Phostech Lithium Inc.*, 2011 FC 174 (aff'd 2011 FCA 237) [*Valence Technology*], para 64). As discussed recently by Justice Grammond, findings of overbreadth will usually occur when the patent fails to claim an essential element of the invention (*Seedlings Life Science Ventures, LLC v Pfizer Canada ULC*, 2020 FC 1, para 173; see also *Pollard Banknote Limited v BABN Technologies Corp.*, 2016 FC 883, para 146; *Amfac Foods Inc v Irving Pulp & Paper, Ltd* (1986), 12 CPR (3d) 193 at 201-205 (FCA), paras 32-33).

(2) Analysis

(a) *The 384 and 421 Patents*

[453] Munchkin asserted that all claims of the 384 and 421 Patents are directed to a cassette with a clearance. They say that a cassette with a clearance cannot address the orientation issue that will be addressed with other components of the apparatus. A cassette with a clearance (chamfer) does nothing. Something else must make the clearance part of the solution. That, argues the Defendants, constitutes overbreadth.

[454] It is unclear how it can be said that more than this invention is claimed when, in the same breadth, Munchkin argues that the cassettes with clearance (chamfer) do nothing without the complementary projection that would force a consumer to place the cassette in the correct

direction. Yet, Munchkin argues overbreadth. The Plaintiffs respond that the clearance's function to solve the improper orientation problem in the 384 and 421 Patents is well described in the patents (PCA, para 452). They rely on Mr. Bailey's expert report to this effect, who points to various locations in the patent's disclosure that discuss this functionality (Bailey First Report, paras 388(a), 444). In light of this, they submit that the POSITA would understand the purpose of the clearance claimed within the context of the invention and that this prevents these two patents from being overbroad (PCA, para 453).

[455] The 384 and 421 Patents state unequivocally that they claim their invention to be a "cassette", with a variety of features. The features include a clearance which will be in the shape of a chamfer (at dependent Claim 2). That is the long and short of it. The patents claim a cassette with a clearance that will take the shape of a chamfer.

[456] The purpose of the clearance is well described in the disclosure of the 384 and 421 Patents, two patents that deal with a cassette with a clearance. Indeed, Munchkin's expert acknowledged, as he should, that the inventive concept of these patents involved the cassette with a clearance whose function is described and illustrated in the specification. Munchkin has not shown how these two Patents are overbroad in that the claims are broader than the invention disclosed in the specification or broader than the invention. Reading the disclosure, the POSITA would readily know that the invention claimed a cassette with a clearance as a feature, cassette which engages with elements in the pail for a particular purpose, that of ensuring its proper orientation. The invention has a clear function, and nothing is claimed that is broader than the invention.

(b) *The 312 and 415 Patents*

[457] The Defendants have also sought to argue that the claims to mechanisms in the 415 Patent and the 312 Patent are overbroad. The claims are directed, inter alia, to bag closing mechanisms. I note that the two Patents are directed at “an apparatus for packaging solid diaper” with a number of features. While the focus in the 384 and 421 Patents was on the cassette, the focus in the 312 and 415 Patents is on the apparatus itself which requires a closure member including a projection. Bag closing mechanisms or tube gathering mechanisms for use in diaper pails are essential features of the claims.

[458] The 415 Patent claims a “projecting member” at Claim 1(c)(iii) and the 312 Patent claims a “closure member including a projection” at Claim 1(d)(i), both of which are movable relative the bottom wall of the holder. These elements seal the plastic film in which the soiled diapers are stored and are part of the closing mechanism, otherwise called the “tube gathering mechanism”, of the Angelcare Patents. The Defendants submit that these patents (that of the 159 and added divisionals) only disclose a single type of bag closing mechanism: one that comprises two members that seal the plastic film shut and moves between an open to closed position (DCA, para 273). However, the Defendants allege that the claims of the 415 and 312 Patents confer a monopoly over any closing mechanism that includes a projection above the bottom wall of the holder and is movable relative this bottom wall, regardless of how the closing mechanism functions to seal the plastic film (DCA, para 273). They submit that this is broader than the closing mechanism disclosed in the patents and that the POSITA would not have been able to

design the full range of mechanisms that could fall within the scope of the claims (DCA, paras 274).

[459] Angelcare asserts for its part that it is how the “projecting member” and the “closure member including a projection” function to solve the incorrect orientation problem, rather than the particular method by which the plastic film is sealed shut, that is defined in the claims (PCA, paras 449-450). As such, all that is relevant and claimed is that the movable portion of the closing mechanism engages the cassette’s clearance (PCA, para 450).

[460] It may be that Munchkin argues that the disclosure of both Patents is limited to one bag closing mechanism, which is found in the Figures found in the two Patents. If I understand the argument, Angelcare was limited to the one closing mechanism found in the disclosure, the one that “comprises two members that squeeze a portion of plastic tubing, moving between open and closed positions” (Munchkin’s closing submissions, para 273). However, when one analyses the claims of the two Patents, one finds that the claims speak in terms of a closing mechanism which includes a projection that is movable above the base of the holder. In effect, Munchkin’s argument is to seek to limit Angelcare to the preferred embodiment. The exact configuration of the mechanism is not claimed while the two patents described an embodiment with its features. That, says Munchkin, makes the Patents invalid for overbreadth.

[461] I respectfully disagree. It is to be noted that the inventive concept consists of having cassettes which are created with a clearance that will engage with an element of the pail in order to ensure that the cassette will have to be in its proper orientation. Moreover, the engagement is

with elements that are identified: 1) a fixed projection that is found in the holder of the cassette situated in the pail; 2) a fixed portion in the closing mechanism; or 3) a movable portion of that closing mechanism.

[462] I am not convinced by the Defendants' submissions. The thrust of their argument and the evidence advanced in support of it are that the claims extend beyond the preferred embodiments described in the patent (DCA, para 273; Bailey First Report, para 441; Bailey Second Report, para 216). During cross-examination, Mr. Bailey re-emphasized that he believes the claims are overbroad because other mechanisms beyond the clamping mechanism found in the Diaper Genie pails can practice the claims of the 312 and 415 Patents (Bailey, TT Vol. 27, pp. 73:24-75:2, 77:8-15). However, as pointed out by counsel for the Plaintiffs during oral submissions, the very purpose of the claims may be to define an invention that is broader than the defined embodiments (Closing, TT Vol. 35, p. 192:5-22; see, e.g., *Valence Technology*, para 64). McOdrum in *Fox on Patents* explains that “[t]here is no rule that the claims must be construed precisely to match the embodiments in the description” (*Fox on Patents*, #8:6(h)). The jurisprudence allows a disclosure to represent a particular embodiment without exhausting the invention (*Whirlpool*, para 54, cited recently in *Bombardier Recreational Products Inc. v Arctic Cat, Inc.*, 2018 FCA 172 [*Bombardier FCA*], paras 43, 47). The claim being broader than the described embodiments will thus not, on its own, amount to a finding of overbreadth.

[463] Of course, there is a limit to how much broader the claims can be relative to the described embodiments, such as when the invention claims so broadly that it misses an essential element that would keep it tethered to the invention actually disclosed (see, for example, *Les*

Laboratoires Servier v Apotex Inc., 2019 FC 616, para 209; *Seedlings*, para 181). This is not the case for the claim elements at issue. In the case at hand, the claimed element is tailored to its purpose: sealing the plastic film with the advantage of keeping the cassette in its proper orientation. With this purpose in mind, the claims read fairly onto the invention and the described embodiments, even if they are not limited to the closing mechanism comprised of two members described therein. I accept Mr. Morelli's testimony that the overarching purpose of the Angelcare Patents, the 415 and the 312 included, is to solve the improper orientation problem, and that the movable projections as described in these two patents achieve this purpose (Morelli, TT Vol. 8, pp. 60:11-61:10, 195:22-200:15, 208:27-210:5). This is coherent with the fact that the prior art patent CA 230 reveals a similar closing mechanism or tube gathering mechanism to that found in the Angelcare Patents, but did not solve the improper orientation problem because nothing extends above the bottom wall of the holder to engage the cassette's clearance (Bailey First Report, paras 375-376). This would indicate, it seems, that the 312 and 415 Patents conserve the functionality of this prior art patent and claim that which would be required to solve the improper orientation problem.

[464] In *Seedlings*, the Court of Appeal faulted the trial judge who found overbreadth because some omitted elements in the claims were shown in all embodiments disclosed in the patent-in-suit in that case and there was "no teaching as to how to make the invention without these elements" (*Seedlings*, para 57). Here is how the Court of Appeal dealt with embodiments:

[58] In my view, and with respect, the first and third reasons cited by the Federal Court would, without more, be inadequate. The first reason effectively limits the scope of valid claims to the embodiments described in the disclosure; claims beyond the described embodiments being overbroad. That is incorrect. The purpose of a patent disclosure is to comply with the requirement of

subsection 27(3) of the Patent Act to “correctly and fully describe the invention and its operation or use as contemplated by the inventor.” Generally speaking, and in the present case, a patent describes preferred (or exemplary) embodiments, but does not attempt to describe all possible embodiments of the invention.

[Emphasis added.]

[465] The Court of Appeal went on to state that an invention does not have to claim every invention as described in the disclosure. Indeed divisional patents, as in this case, were used because more than one invention was described in the disclosure:

[59] The third reason provided by the Federal Court to support its conclusion of overbreadth is problematic because it suggests that a patent cannot describe an invention without claiming it – that any original invention must be claimed. This is clearly incorrect, as demonstrated by the well-known practice of filing divisional applications when a patent application describes more than one invention (see discussion at paragraph 53 above). An inventor is well-advised to claim any invention that is described in a patent disclosure, but is not obliged to do so. Likewise, the mere fact that certain elements or their arrangement are original does not mean that they must necessarily be claimed.

[Emphasis added.]

[466] Moreover, the claims themselves that deal with the “projecting member” at Claim 1(c)(iii) of the 312 Patent and the “closure member including a projection” at Claim 1(d)(i), are fairly detailed, with the closure member and its configuration within the tube gathering mechanism of the 312 Patent described in full in 14 lines of text. The 415 Patent describes the projecting member, movable relative to the bottom wall, in 5 lines of text and is contained within a greater description of the holder comprising 15 lines. Given the level of detail associated with these claims and the fact that they are primarily aimed at solving the improper orientation problem, I am unconvinced that they are so broad that they extend the patents’ monopoly beyond

what has been disclosed, even if the claims are not identical to the preferred embodiment. As such, the 312 and 415 Patents are not overbroad.

[467] It follows that the allegations of invalidity for overbreadth have not been shown on a balance of probabilities and have thus failed.

D. *Sufficiency and Ambiguity*

(1) Legal Principles

[468] Sufficiency and ambiguity are distinct, yet related bases for invalidity. Insufficiency finds its statutory basis in subsection 27(3) of the *Patent Act*, while ambiguity relies on both this subsection, and subsection 27(4), insofar as the invention and the claims that define the patent's monopoly must be fully and adequately described in clear and precise terms. Section 60 of the *Patent Rules*, SOR/2019-251 imposes a similar obligation of clarity and concision that ought to be supported by the patent's description (i.e. the disclosure):

60 The claims must be clear and concise and must be fully supported by the description independently of any document referred to in the description.

60 Les revendications sont claires et concises et se fondent entièrement sur la description, indépendamment des documents mentionnés dans celle-ci.

[469] McOdrum in *Fox on Patents* highlights that precision and clarity stand in opposition to ambiguity and obscurity, as the public ought to be able to discern the precise monopoly the patent defines (*Fox on Patents*, #7:11(a), citing *Minerals Separation North American Corp. v Noranda Mines, Ltd.*, 1949 CanLII 55 (SCC), [1947] Ex. CR 306, (Thorson P.), p. 352; see also

Free World Trust, para 14). Writing specifically on ambiguity, Justice Locke echoes this principle at paragraph 121 of *Western Oilfield*

The basis for invalidity due to ambiguity is that the patent must give adequate notice to the public as to what activities are claimed as exclusive to the patentee. If a skilled person is able to construe the claims, then it follows that that notice is provided.

[470] Sufficiency aims to ensure that the level of detail disclosed will enable the POSITA to practice the invention (*Pfizer Canada*, para 36; *Seedlings*, para 185). This does not preclude that the POSITA may have to undertake some non-inventive trial and error experiments to practice the invention (*Western Oilfield*, para 114, citing *Bombardier FCA*, para 78).

[471] Sufficiency and ambiguity are thus related concepts, both focused on clarity, precision, and a level of detail that ensures that what is claimed can be understood in concrete terms. However, they aim for comprehension by the POSITA for different ends: for practicing the invention in the case of sufficiency and for ascertaining what the patent monopolizes in the case of ambiguity. While these bases of invalidity are concerned with different results, what is required to ensure that the content of a patent is sufficient and non-ambiguous will likely be the same in practice.

(2) Analysis

(a) *The 415 and 312 Patents*

[472] Munckin submits that the 415 and 312 Patents are invalid for insufficiency because the description of the tube-gathering or closing mechanism with a projection movable relative the

bottom wall of the holder would not allow the POSITA to design the full range of mechanisms that fall within the scope of the claims (DCA, para 274).

[473] Angelcare did not address this directly in their oral submissions or in their closing arguments, but their arguments regarding overbreadth on this element are equally applicable as a response to the Plaintiffs' allegation of insufficiency.

[474] For a specification to be deemed sufficient, the POSITA must be able to practice the claims. As the cornerstone of their argument, the Defendants advance testimony from Mr. Morelli that the POSITA would not have been able to design the closing mechanism of Munchkin's PAIL and STEP diaper pails based on the Angelcare Patents (DCA, para 274; Morelli, TT Vol. 32, p. 126:17-26). However, as found in the infringement analysis, Munchkin's PAIL and STEP diaper pails do not practice the claims of the 312 or 415 Patents because neither contain projections that are movable relative the bottom wall. The fact that the 312 or 415 Patents do not disclose Munchkin's closing mechanism is thus irrelevant to the sufficiency analysis. There is very little that would allow me to conclude that the claims are insufficient. Indeed, the overbreadth analysis above, while distinct, provides additional indication of the precision and clarity of the claims, being tailored to the purpose of properly orienting the cassette when seated in the holder. Consequently, I do not find the claims of the 312 and 415 Patents to be invalid for insufficiency.

(b) *The 421 and 159 Patent*

[475] The allegation concerning insufficiency and ambiguity of the Angelcare Patents concerns the claims that include a cassette cover having “a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent to the convex edge portion”. These are found in Claim 1 of the 421 Patent and Claims 19 and 38 of the 159 Patent.

[476] The Defendants submit that the description of the cassette’s cover as claimed in Claim 1 of the 421 Patent and Claims 19 and 38 of the 159 Patent, which describe “a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent the convex edge portion”, is too ambiguous to be understood and practiced by the POSITA (DCA, para 275). These claims, they argue, similarly fail to precisely define the scope of their monopoly and as such are invalid for insufficiency (DCA, para 276). According to the expert retained by Munchkin, the claims do not fully describe the subject-matter; the skilled person would not be able to make cassettes with such covers. Mr. Bailey suggested that he would not know what to do, for all intents and purposes, with this feature of the cassette’s cover

[477] The Plaintiffs assert that the configuration of the cover, as described in the Claims of the 159 and 421 Patents, are not ambiguous because their proper construction, done from a top-down view, makes these claims clear (PCA, paras 445-447). They submit that the configuration of the cover was sufficiently disclosed insofar as it is illustrated in Figures 2B and 5B of the Angelcare Patents (PCA, para 456).

[478] The claims construction analysis revealed that the configuration of the cover was sufficiently described and unambiguous. Using a top-down perspective, this Court determined that the claims were sufficiently detailed, precise, and clear for the POSITA to ascertain what was being claimed. If the claims can be understood, then they equally serve the public notice function that ambiguity otherwise disrupts. Based on the construction taken up by this Court, Angelcare is correct in their assertion that Figures 2B and 5B of the Angelcare Patents illustrate this claim, disclosing it with enough precision and clarity for the POSITA to practice it and for the public to understand the monopoly claimed. Consequently, neither Claim 1 of the 421 Patent nor Claims 19 and 38 of the 159 Patent are insufficient or ambiguous.

E. *Utility*

[479] Both in their written case and in their submissions to the Court, the Defendants said very little about the defense of lack of utility. In fact, the matter was not even presented in Munchkin's oral argument (TT, Vol. 35, p. 282). It boils down to claiming that patents 384 and 421 do not have utility to the public. It is alleged that the "raison d'être" of a chamfered cassette was created to prevent the competition from selling cassettes that were compatible with the Diaper Genie pails. This, suggests Munchkin, is not of utility to the public.

[480] In their written case, Munchkin suggests more than it demonstrates, that Angelcare and Playtex sought to design a new cassette in order to prevent competitors from using its pails by having cassettes, with flat bottoms, which could be inserted in the Diaper Genie pails. Munchkin asserts that the cassettes with clearances (the 384 and 421 Patents) served the purpose of

excluding the competition from the market, but were of no value to the public. Accordingly, the 384 and 421 Patents are invalid for lack of utility to the public.

[481] In his oral argument, counsel for the Plaintiffs argued the cassettes are complementary to another product, also patented. Once the public uses the Diaper Genie cassette in a Diaper Genie pail, the public knows that it will not be using the cassette upside down. That satisfies the need for the cassette to have utility. The chamfered cassette is useful.

(1) Legal Principles

Section 2 of the *Patent Act* requires that an invention be “useful”:

<p>invention means any new and useful art, process, machine, manufacture or composition of matter, or any new and useful improvement in any art, process, machine, manufacture or composition of matter; (invention)</p>	<p>invention Toute réalisation, tout procédé, toute machine, fabrication ou composition de matières, ainsi que tout perfectionnement de l’un d’eux, présentant le caractère de la nouveauté et de l’utilité. (invention)</p>
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Justice Dickson, writing for the Supreme Court in *Consolboard* at page 525, took up the meaning of “not useful” laid down in *Halsbury’s Laws of England* (3rd ed.), vol. 29, at p. 59:

It means “that the invention will not work, either in the sense that it will not operate at all or, more broadly, that it will not do what the specification promises that it will do.”

[482] The Defendants have the burden of demonstrating invalidity for lack of utility (*Sanofi-Aventis Canada v Apotex Inc.*, 2009 FC 676, para 144, aff’d *Sanofi-Aventis Canada Inc. v Apotex Inc.*, 2011 FCA 300). Will it work? There is no doubt in my view that it did.

[483] In evaluating whether the Defendants pleading invalidity have met the burden, one keeps in mind that what will constitute a “useful” invention is not a particularly high threshold in view of the requirement being for the presence of scintilla of utility. The Supreme Court explained at paragraph 55 of *AstraZeneca Canada Inc v Apotex Inc*, 2017 SCC 36, [2017] 1 SCR 943

[*AstraZeneca*]:

The Act does not prescribe the degree or quantum of usefulness required, or that every potential use be realized — a scintilla of utility will do. A single use related to the nature of the subject-matter is sufficient, and the utility must be established by either demonstration or sound prediction as of the filing date (*AZT*, at para. 56).

[484] Moreover, Justice Dickson quotes from *Halsbury’s Laws of England*, in *Consolboard*, at p. 525:

the practical usefulness of the invention does not matter, nor does its commercial utility, unless the specification promises commercial utility, nor does it matter whether the invention is of any real benefit to the public, or particularly suitable for the purposes suggested.

[485] In *Western Oilfield*, the Federal Court of Appeal re-asserted that a scintilla of utility will do (citing *AstraZeneca*).

[486] The invention does not need to expressly say how the invention is useful, so long as the invention is adequately described (*Consolboard*, p. 526). The Court must assess whether the invention, as laid out in the patent’s specification, is useful by taking on the perspective of the POSITA (*Ibid*).

[487] It is the patent as a whole and not just the claims that are considered when assessing utility (*Fox on Patents*, #6:3, citing *Feherguard Products Ltd. v Rocky's of B.C. Leisure Ltd.*, FCJ No. 620, 60 CPR (3d) 512 (FCA)). The claims are thus read within the context of the patent's specification (*Fox on Patents*, #6:3, citing *Consolboard* at p. 520-521). Indeed, the utility of the invention is often demonstrated in the patent's disclosure (*Fox on Patents*, #6:4, citing *Apotex Inc v Wellcome Foundation Ltd*, 2002 SCC 77, [2002] 4 SCR 153 [*Apotex v Wellcome*], para 54).

[488] Utility is assessed at the filing date of the patent (*Teva Canada Ltd. v Pfizer Canada Inc.*, 2012 SCC 60, para 39, cited recently in *Bristol-Myers Squibb Canada Co. v Pharmascience Inc.*, 2021 FC 1, para 61). As of the filing date of the application, there must thus be "a demonstration of utility or a sound prediction of utility based on the information and science available at that date" (*Fox on Patents*, #6:13, citing *Apotex v Wellcome* at paras 52, 55, 56).

(2) Analysis

[489] Munchkin submits that the 384 and 421 Patents have no utility because they only claim a cassette with a chamfer-shaped clearance (DCA, paras 278-279). They argue that such an invention, by itself, can easily be inserted upside down into a diaper pail with a flat holder and, as such, is of no use to the public without a complementary diaper pail.

[490] The Plaintiffs make no representations in their closing factum on this issue. During closing arguments at trial, they explained that utility for the public means the public at large, not for the consumer in particular (Closing, TT Vol. 34, p. 197:1-7). This can include utility for a

corporations (*Ibid*). This seems to echo the jurisprudence on the types of utility laid out in *Consolboard*, canvassed above. Nonetheless, counsel for the Plaintiffs submits the invention is useful for the consumers insofar as it is one of two patented complementary products (one which the consumer buys again and again) to ensure that it is in the proper orientation when used with a complementary diaper pail (*Ibid*, p. 197:9-22).

[491] I agree with the Plaintiffs. A scintilla of utility is enough. There is more than a scintilla in this case. The disclosure and the figures of the Angelcare Patents make clear that the cassette with a chamfer-shaped clearance is for use with a complementary diaper pail. Utility asks us to consider the patent's specification as a whole and determine whether it demonstrates utility or has a sound prediction of utility, as of the filing date. The figures contained in the 384 and 421 Patents, present in all Angelcare Patents, show a clear use for the cassette with a clearance: it solves the improper orientation problem. As agreed upon by both Mr. Morelli and Mr. Bailey, this is what the POSITA would understand the 384 and 421 Patents to be about (Morelli First Report, paras 58-60, 239; Morelli Second Report, para 404; Bailey First Report, paras 388(a), 444). These patents' specification conveys a sound prediction of utility with diaper pails manufactured to complement the cassettes. This evidence is sufficient to conclude that the cassette with a chamfer-shaped clearance, as claimed in the 384 and 421 Patents, meets the definition of "useful" found at section 2 of the *Patent Act*.

[492] It is certainly not impossible that Angelcare had as one of its motivations to seek to prevent the competition from using its pails by substituting its cassettes for those of Playtex/Angelcare. That constitutes speculation not supported by evidence but, even if that were

the case, it has not been shown that this could negate the validity of an invention which has its utility. It just happens that the cassette with a clearance served a useful purpose in preventing users from being contaminated by placing it upside down when used with the apparatus. It has not been seriously contested that the invention allows for storage of soiled diapers in a hygienic manner by putting the diapers into the pail using a properly oriented cassette, thus avoiding contamination. There is clearly utility in the invention.

F. *Double Patenting*

[493] As with utility, the defense of double patenting received little attention at trial. The Defendants dedicated one paragraph in their written case and no oral submission addressed the issue.

[494] The Defendants appear to claim that there is double-patenting because Angelcare acquired the 128 Patent from Playtex at some point in time. In response in oral argument, Angelcare retorted that there are no authorities in Canada, the U.S. and the U.K. that support such proposition. If that were double-patenting, that would suggest that a third party could never acquire a patent which could assist in having fuller coverage in its portfolio of the own patents.

[495] Double-patenting is judge-made law in order to prevent “ever greening”, that is for an inventor to extend its monopoly by patenting an invention already claimed in a previous patent. The Federal Court of Appeal, in *Mylan*, described the doctrine in the following fashion at paragraphs 26 and 27:

[26] The double-patenting doctrine holds that a claim is invalid if it constitutes patenting of an invention that has already been claimed in a previous patent. It is aimed at the problem of evergreening; extending the monopoly that was granted on the first patent by filing a new patent that does not offer a new invention to the public. As such, the doctrine of double-patenting prevents a patentee from violating the bargain at the heart of the patent system.

[27] In *Whirlpool*, the Supreme Court of Canada recognized two types of double-patenting. The first is “same-invention” double-patenting, which occurs when the claims of the second patent are outright “identical or coterminous” to the first. This is not alleged in this case. The second is “obviousness-type” double-patenting, which occurs when the second patent is not identical to the first, but is nonetheless not “patentably distinct” from the first.

[496] Without an articulation of the argument, other than the 128 Patent and the Angelcare Patents currently have the same owner, the argument, if any, made on behalf of the Defendants cannot prevail. Suffice it to say that the Defendants have not met the onus of convincing the Court that this constitutes a case of double-patenting.

VI. Publication date of the 312 Patent

[497] In a completely unrelated matter from the action for infringement, the Plaintiffs contended that an alleged inaccurate date of publication was inserted by error in the 2,937, 312 Patent. The Plaintiffs seek from this Court a declaration according to which the publication date ought to have been a different date than the one appearing on the face of the Patent.

[498] The Plaintiffs explain that the 312 Patent, one of the Patents-in-suit in this case, was a divisional application of the 159 Patent, which is itself the result of a divisional application of the 384 Patent. They argue that the 312 Patent should have the same publication date as that of the

other divisional patents. However, the 312 Patent bears the publication date of October 7, 2016, which does not correspond to the publication dates of the other Angelcare Patents-in-suit. The discrepancy is due, say the Plaintiffs, to a “clerical error” at the Patent office. I have not been able to find any confirmation that such is the case.

[499] Furthermore, the Plaintiffs have not been able to satisfy the Court of its jurisdiction in the matter through the identification of some relevant provision or case law.

[500] The Defendants chose not to intervene in the matter. They neither agreed nor disagreed with the Plaintiffs. The Patent Office was not before the Court.

[501] As is well known, jurisdiction cannot be conferred by consent (*Mahjoub v Canada (Citizenship and Immigration)*, 2017 CAF 157, [2018] 2 FCR 344). This Court’s jurisdiction is statutory and jurisdiction must be found (*JP Morgan Asset Management (Canada) Inc. v Canada (National Revenue)*, 2013 FCA 250, [2014] 2 FCR 557, at para 63). Here, the Court has not been satisfied that jurisdiction to grant a remedy such as the one sought exists. As a result, it is more appropriate to decline the invitation to consider the matter outside of the action before the Court in view of an incomplete record and the presence of the jurisdictional issue that was not resolved.

VII. Conclusion

[502] As a result, with the exception of Claims 1, 3, 6 and 8 of the 384 Patent, which are invalid for anticipation, none of the claims which have been infringed suffers from any of the invalidity grounds alleged by Munchkin. That includes four claims from the 128 Patent which

were not asserted by Angelcare but were nonetheless challenged for invalidity by Munchkin. They are Claims 1, 2, 20 and 21 of the 128 Patent which, Angelcare reminded the Court in a letter dated April 29, 2021, were not asserted against any generation of Munchkin four generations of diaper cassettes. It is worth noting that the said claims have been found not to be invalid for anticipation as the dispensing gap in the cover of the 128 Patent is in a different location than the gap in the Captiva/Diaper Genie cassette which is claimed to disclose the invention of Claim 1 of the 128 Patent.

[503] Angelcare also noted in that same letter that Munchkin's fourth generation diaper cassettes were not any more asserted to infringe the following claims:

- 384 Patent: claims 2 and 7 (clearance in the shape of a chamfer)
- 159 Patent: claims 14 and 26 (clearance in the shape of a chamfer)
- 421 Patent: claim 5 (clearance in the shape of a chamfer)

[504] By order dated August 25, 2016, a Bifurcation Order in respect of this action was issued by Prothonotary Morneau. The said Order stipulated that the quantification issues were to be determined only after the liability issues were considered and adjudicated on. However, certain issues relating to potential entitlement to remedies have also, on consent of the parties, been further deferred. Thus, the Court ordered on May 7, 2021 that the following entitlement issues be also determined at a separate hearing (planned to last at least one day) within thirty days of this Court's final decision (subject to change if appropriate):

- a. The Plaintiffs' entitlement, if any, to declaratory relief;
- b. The Plaintiffs' entitlement, if any, to injunctive relief;
- c. The Plaintiffs' entitlement, if any, to delivery up;

- d. The Plaintiffs' entitlement, if any, to reasonable compensation;
- e. The Plaintiffs' entitlement, if any, to elect between damages and an accounting of profits; and
- f. The Plaintiffs' entitlement, if any, to punitive damages.

The matter of costs has also been deferred.

[505] The Court limits itself to finding that a number of claims included in the six Patents-in-suit have been infringed by Munchkin products, said claims being valid.

AMENDED JUDGMENT in T-151-16

THE COURT'S judgment is:

1. Out of the allegations of infringement relative to the six Patents-in-suit, the Court finds that there was infringement of the following claims:

128 Patent (asserted claims are 11, 12, 13, 16, 18, 19, 22, 23)

Claim 11

- infringed by Munchkin's Generations 1, 2, 3, 4 cassettes in PAIL and STEP diaper pails
- infringed by Munchkin's Generations 2-3 cassettes in the following Diaper Genie (DG) diaper pails:
 - Essentials
 - Elite
 - Complete
 - Expressions
 - Mini
- infringed by Munchkin's Generation 1 cassettes in the DG pail:
 - Mini
 - Expressions

Claim 12

- infringed by Munchkin's Generations 1, 2, 3, 4 cassettes in PAIL and STEP diaper pails
- infringed by Munchkin's Generations 2, 3 cassettes in DG diaper pails:
 - Essentials
 - Elite
 - Complete
 - Expressions
 - Mini
- infringed by Munchkin's Generation 1 cassettes in DG diaper pails:
 - Mini
 - Expressions

Claim 13

- infringed by Munchkin's Generations 1, 2, 3, 4 cassettes in PAIL and STEP diaper pails

Claim 16

- infringed by Munchkin's Generations 1, 2, 3, 4 cassettes in PAIL and STEP diaper pails

Claim 18

- infringed by Munchkin's Generations 1, 2, 3, 4 cassettes in PAIL and STEP diaper pails
- infringed by Munchkin's Generations 2, 3 cassettes in DG diaper pails:
 - Essentials
 - Elite
 - Complete
 - Expressions
 - Mini
- infringed by Munchkin's Generation 1 cassettes in DG diaper pails:
 - Expressions
 - Mini

Claim 19

- infringed by Munchkin's Generations 1, 2, 3, 4 cassettes in PAIL and STEP diaper pails
- infringed by Munchkin's Generations 2, 3 cassettes in DG diaper pails:
 - Essentials
 - Elite
 - Complete
 - Expressions
 - Mini
- infringed by Munchkin's Generation 1 cassettes in DG diaper pails:
 - Expressions
 - Mini

Claim 22

- infringed by Munchkin's Generations 1, 2, 3, 4 cassettes in PAIL and STEP diaper pails

Claim 23

- infringed by Munchkin's Generations 1, 2, 3, 4 cassettes in PAIL and STEP diaper pails
- infringed by Munchkin's Generations 2, 3 cassettes in DG pails:
 - Essentials
 - Elite
 - Complete
 - Expressions
- infringed by Munchkin's Generation 1 cassettes in DG pails:
 - Mini
 - Expressions

384 Patent (11 claims, with Claims ~~2, 7 and~~ 11 not asserted)

- ~~infringed by Munchkin's Generations 1, 2, 3 cassettes~~ Munchkin's Generations 1-3 cassettes infringe claims 2, 4, 5, 7, 9 and 10
- Munchkin's Generation 4 cassettes do not infringe the asserted claims, including the dependent claims

159 Patent (61 claims)

- Munchkin's Generation 1 cassettes are not asserted
- Munchkin's Generation 4 cassettes do not infringe any of the five independent claims
- Munchkin's Generations 2, 3 cassettes infringe Claims 1 to 50 and 52 to 61 of the 159 Patent. Munchkin's Generations 2, 3 cassettes infringe Claim 51 when assembled with DG diaper pails Mini and Expressions

421 Patent (19 claims)

- Munchkin's Generation 1 cassettes are not asserted
- Munchkin's Generation 4 cassettes do not infringe the independent and dependant claims

- Munchkin's Generations 2-3 cassettes infringe the independent claim; dependent Claims 2 to 12, and 14 to 19 are infringed

312 Patent (8 claims)

- independent Claim 1 is not infringed
- all claims dependent on Claim 1 are not infringed

415 Patent (6 claims)

- independent Claim 1 is not infringed
- all claims dependant on Claim 1 are not infringed

2. The following claims are found to have been infringed by the Plaintiffs'

inducement:

- Generations 1 to 4 of Munchkin's cassettes assembled with Munchkin's PAIL and STEP diaper pails infringe Claims 11, 12, 13, 16, 18, 19, 22 and 23 of the Canadian Patent 2,686,128
- Generation 1 of Munchkin's cassettes assembled with the DG diaper pails Expressions and Mini infringe Claims 11, 12, 18, 19 and 23 of the Canadian Patent 2,686,128
- Generations 2 and 3 of Munchkin's cassettes assembled with the DG diaper pails Essentials, Elite, Complete, Expressions and Mini infringe Claims 11, 12, 18, 19 and 23 of the Canadian Patent 2,686,128
- Generations 2 and 3 of Munchkin's cassettes assembled with the DG diaper pails Expressions and Mini infringe Claim 51 of the Canadian Patent 2,855,159

3. The Court finds claims 1, 3, 6 and 8 of the 384 Patent to be invalid.

4. This Court does not address at this stage the following matters:

- entitlement to declaration relief
- entitlement to injunctive relief
- entitlement to delivery up

- entitlement to reasonable compensation
- entitlement to elect between damages and accounting of profits
- entitlement to punitive damages

5. The issue of costs is equally deferred.

“Yvan Roy”

Judge

ANNEXE



Office de la Propriété
Intellectuelle
du Canada

Un organisme
d'Industrie Canada

Canadian
Intellectual Property
Office

An agency of
Industry Canada

CA 2686128 C 2013/01/08

(11)(21) **2 686 128**

(12) **BREVET CANADIEN
CANADIAN PATENT**

(13) **C**

(86) Date de dépôt PCT/PCT Filing Date: 2008/05/02

(87) Date publication PCT/PCT Publication Date: 2008/11/13

(45) Date de délivrance/Issue Date: 2013/01/08

(85) Entrée phase nationale/National Entry: 2009/11/02

(86) N° demande PCT/PCT Application No.: US 2008/062367

(87) N° publication PCT/PCT Publication No.: 2008/137643

(30) Priorité/Priority: 2007/05/04 (US11/800,324)

(51) Cl.Int./Int.Cl. *B65F 1/06* (2006.01)

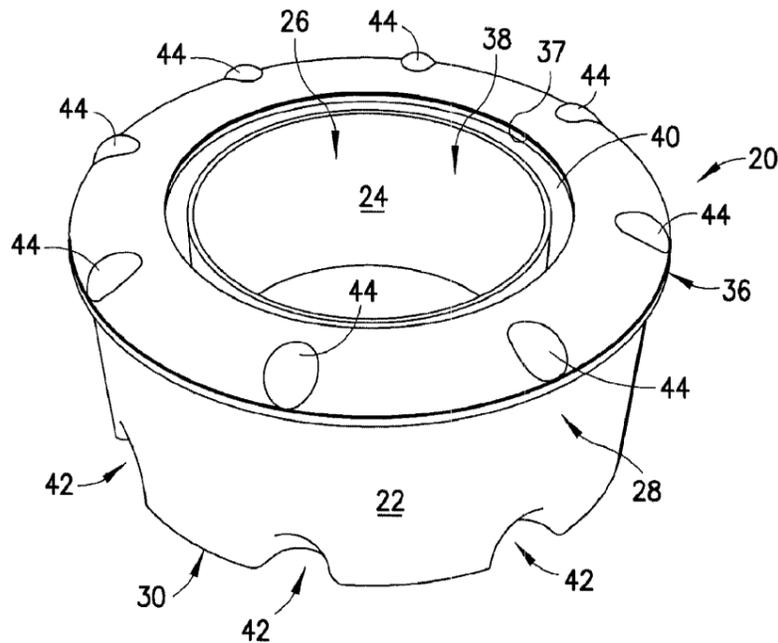
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(74) Agent: RICHES, MCKENZIE & HERBERT LLP

(54) Titre : CASSETTE POUR DISTRIBUER UN TUBE SOUPLE A PARTIR DE CELLE-CI

(54) Title: CASSETTE FOR DISPENSING FLEXIBLE TUBING THEREFROM



(57) Abrégé/Abstract:

In a cassette (20) for dispensing flexible tubing (34) a cassette body (22) includes a central tubular portion (24) defining an aperture (26) extending therethrough. An outer wall (28) surrounds the central tubular portion and a cassette bottom (30) extends between

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(11)(21) **2 686 128**(13) **C**

(57) **Abrégé(suite)/Abstract(continued):**

and connects the outer wall and the central tubular portion. The outer wall, the cassette bottom and the central tubular portion cooperate to define an interior area (32) that surrounds the central tubular portion. A length of flexible tubing (34) is positioned in the interior area. The cassette bottom includes first registration features (42) and a cover (36) is coupled to the body and at least partially overlies the interior area, the cover defining second registration features (44) matingly engageable with the first registration features so that cassettes can be stacked one-on-top-of-the-other with the cooperation of the first and second registration features (42, 44) preventing successively stacked cassettes from shifting relative to one another.

CA 02686128 2009-11-02

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
13 November 2008 (13.11.2008)

PCT

(10) International Publication Number
WO 2008/137643 A1

- (51) International Patent Classification:
B65F 1/06 (2006.01)
- (74) Agent: MICHAUD, Richard; Michaud-Duffy Group, LLP, 306 Industrial Park Road, Suite 206, Middletown, Connecticut 06457 (US).
- (21) International Application Number:
PCT/US2008/062367
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.
- (22) International Filing Date: 2 May 2008 (02.05.2008)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
11/800,324 4 May 2007 (04.05.2007) US
- (71) Applicant (for all designated States except US): PLAY-TEX PRODUCTS, INC. [US/US]; 300 Nyala Farms Road, Westport, Connecticut 06880 (US).
- (84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SI, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL, NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
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Published:
— with international search report

(54) Title: CASSETTE FOR DISPENSING FLEXIBLE TUBING THEREFROM

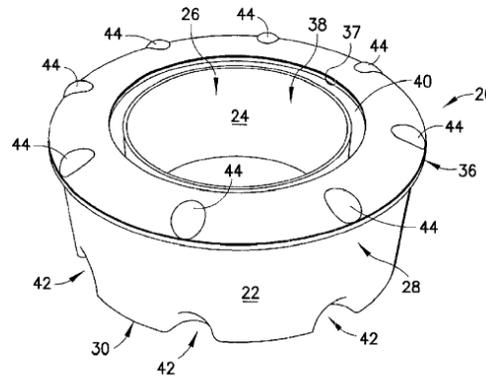


FIG. 1

(57) Abstract: In a cassette (20) for dispensing flexible tubing (34) a cassette body (22) includes a central tubular portion (24) defining an aperture (26) extending therethrough. An outer wall (28) surrounds the central tubular portion and a cassette bottom (30) extends between and connects the outer wall and the central tubular portion. The outer wall, the cassette bottom and the central tubular portion cooperate to define an interior area (32) that surrounds the central tubular portion. A length of flexible tubing (34) is positioned in the interior area. The cassette bottom includes first registration features (42) and a cover (36) is coupled to the body and at least partially overlies the interior area, the cover defining second registration features (44) matingly engageable with the first registration features so that cassettes can be stacked one-on-top-of-the-other with the cooperation of the first and second registration features (42, 44) preventing successively stacked cassettes from shifting relative to one another.

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Cassette for Dispensing Flexible Tubing Therefrom

Field of the Invention

The present invention is generally related to cassettes having plastic tubing therein
5 used in the disposal of waste products such as soiled diapers and is more particularly related
to said cassettes having registration features thereon for more efficient stacking as well as to
aid in the prevention of improper installation of the cassettes into a receptacle operable
therewith.

10 Background of the Invention

Historically, waste materials such as soiled diapers were disposed of by simply
placing them in the trash, however, this presented sanitary and odor problems. Moreover,
with regard to soiled diapers, these are typically disposed of, albeit temporarily, in the area
where the child is changed. Usually this is the nursery where the child sleeps and spends a
15 considerable amount of time. As such, maintaining a sanitary and relatively odor free
environment is important.

A number of systems have been developed to address the above-described disposal
and sanitary issues associated with soiled diapers. One such disposal system is referred to as
the Diaper Genie® manufactured by Playtex Products, Inc. of Westport, CT. This system
20 employs a receptacle having an interior waste storage area and an interior area for receiving
and retaining a cassette having a length of plastic tubing stored therein and dispensable
therefrom. When a soiled diaper is inserted into the receptacle, it is pushed through an
opening in the cassette where the soiled diaper is encased and substantially sealed within the
plastic tubing. Once the quantity of plastic tubing in the cassette has been exhausted, the
25 cassette is removed from the receptacle and replaced with a new cassette.

A problem that can sometimes occur when placing the cassette in the receptacle is that
the cassette can inadvertently be installed upside down. When this occurs and a soiled diaper
is inserted into the receptacle through the cassette, the diaper is exposed to parts of the
cassette prior to encountering the plastic tubing. This creates potential sanitary problems. In
30 addition, an overabundance of plastic tubing can be dispensed resulting in the cassette having
to be prematurely replaced. Moreover, the amount of plastic tubing remaining in the cassette
is not readily ascertainable.

Another difficulty associated with the above-described cassettes arises from the fact
that they are sold in stores as replacements for exhausted cassettes and therefore must be

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shipped in boxes to the various retail outlets. In order to be shipped and sold, the cassettes are generally stacked in the boxes and then stacked on top of one another on store shelves. The configuration of the cassettes has made them susceptible to toppling or shifting relative to one another when stacked on the store shelves. The cassette configuration has also made them difficult to stack so packing them into boxes for shipment is less than optimal.

Based on the foregoing, it is the general object of the present invention to provide a cassette and a cassette and receptacle system that improves upon or overcomes the problems and drawbacks associated with known cassettes and receptacles.

Summary of the Invention

The present invention resides in one aspect in a cassette for dispensing flexible tubing. The cassette includes a cassette body having a central tubular portion defining an aperture extending therethrough, through which, during use, waste materials such as soiled diapers are passed. The cassette includes an outer wall that surrounds the central tubular portion with a cassette bottom extending between and connecting the outer wall and the central tubular portion. The cooperation of the outer wall, the cassette bottom and the central tubular portion defines an interior area into which a length of flexible tubing is positioned to be dispensed from the cassette. A cover is coupled to the cassette body and at least partially overlies the interior area.

The cassette bottom includes first registration features located on an outwardly facing surface with the cover defining second registration features also located on an outwardly facing surface. The first registration features defined by the cassette bottom and the second registration features defined by the cover are matingly engageable with one another so that cassettes can be stacked one-on-top-of-the-other with the cooperation of the first and second registration features preventing successively stacked cassettes from shifting relative to one another.

In an embodiment of the present invention, one of the first and second registration features includes at least one and preferably a plurality of outwardly projecting protuberances with the other of the first and second registration features including at least one and preferably a plurality of recesses complementarily shaped to engage the protuberances. In a preferred embodiment of the present invention, the cassette bottom and the cover are each circular with the plurality of protuberances being defined by a plurality of raised bumps projecting outwardly from one of the cassette bottom and the cover, the raised bumps being radially and circumferentially spaced there around. Likewise, the recesses are radially and

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circumferentially spaced around the other of the cassette bottom and the cover. Each of the recesses is complementarily shaped to engage at least one of the protuberances when cassettes are successively stacked one-on-top-of-the-other.

In another embodiment of the present invention the first registration features are defined by one or more first steps, each having a first raised portion and a corresponding first recessed portion. The second registration features are defined by one or more second steps each having a second raised portion and a corresponding second recessed portion. The first raised portions are matingly engageable with the second recessed portions and the first recessed portions are matingly engageable with the second raised portions so that when cassettes are stacked one on top of the other, the first steps of one of the cassettes engage the second steps of another of the cassettes thereby minimizing relative movement between successively stacked cassettes.

In still another embodiment of the present invention, the first registration features include a first undulating surface formed by the cassette bottom and the second registration features include a second undulating surface formed by the cover. The first and second undulating surfaces are matingly engageable with one another so that when cassettes are stacked one on top of the other, the first undulating surface of one of the cassettes engages the second undulating surface of another of the cassettes thereby minimizing relative movement between successively stacked cassettes. Preferably, in this embodiment of the present invention, a lip extends along a peripheral surface defined by the cover so that an outer periphery defined by the cassette bottom is slidably engageable with the lip when one cassette is positioned on top of another cassette.

In yet another embodiment of the present invention, the cover and the cassette bottom are each substantially circular with one of the first and second registration features including a plurality of outwardly projecting ribs and the other of the first and second registration features including a plurality of recesses. When two or more cassettes are stacked on top of one another, the ribs defined by one cassette are matingly receivable in the recesses defined by another cassette. Preferably, and in addition to the ribs and recesses described above, the cassette bottom and the cover each define an outer peripheral edge with one of the cassette bottom and the cover defining an annular raised area positioned internally of the peripheral edge and the other of the cassette bottom and the cover defining an annular recessed portion positioned internally of the peripheral edge. The annular raised portion is slidably engageable with the annular recessed portion when cassettes are successively stacked on top of one another.

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The present invention resides in a second aspect in a cassette for dispensing flexible tubing and a receptacle for receiving the cassette. The cassette is configured essentially as described above with the exception that for this embodiment it is not necessary for the cover to include registration features. Accordingly, the cassette includes a cassette body having a central tubular portion defining an aperture extending therethrough. An outer wall surrounds the central tubular portion and a cassette bottom extends between and connects the outer wall and the central tubular portion. The outer wall, the cassette bottom and the central tubular portion cooperate to define an interior area that surrounds the central tubular portion and into which a length of flexible tubing is positioned. A cover is coupled to the body and at least partially overlies the interior area so that the flexible tubing can be dispensed through an opening defined by an inner peripheral edge of the cover and the central tubular portion. The cassette bottom includes first registration features. While the cover has been described as not necessarily including registration features, this embodiment of the present is not limited in this regard as the cover can include registration features mating engageable with the registration features defined by the cassette bottom so that the registration features of successively stacked cassettes engage one another.

The receptacle includes an opening sized at least to receive the cassette and defines alignment features matingly engageable with those defined by the cassette bottom thereby minimizing the likelihood of the cassette being improperly installed within the receptacle. In another aspect, the present invention resides in a cassette for dispensing flexible tubing, said cassette comprising: a cassette body having a central tubular portion defining an aperture extending therethrough, an outer wall surrounding said central tubular portion and a cassette bottom extending between and connecting said outer wall and said central tubular portion; said outer wall, said cassette bottom and said central tubular portion cooperating to define an interior area that surrounds said central tubular portion; said cassette bottom including first registration features, said first registration features are operable to establish an upright position of said cassette; a cover coupled to said body and at least partially overlying said interior area, said cover defining an interior peripheral edge which is spaced away from said central tubular portion thereby defining a gap therebetween, said cover defining second registration features positioned radially outward from said gap; said first and second registration features having complementary shapes and being operable to provide one-on-top-of-the-other shift resistant stackability of at least two of the cassettes.

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In yet another aspect, the present invention resides in a dispensing assembly comprising: a cassette comprising a cassette body having a central tubular portion defining an aperture extending therethrough, an outer wall surrounding said central tubular portion and a cassette bottom extending between and connecting said outer wall and said central tubular portion; said outer wall, said cassette bottom and said central tubular portion cooperating to define an interior area that surrounds said central tubular portion; said cassette bottom including first registration features; a cover coupled to said body and at least partially overlying said interior area; a receptacle including an opening sized at least to receive said cassette; and said receptacle defining alignment features formed on an interior surface defined by said receptacle and generally facing said first registration features; and said first registration features and said alignment features matingly engage one another such that said cassette is positioned upright in said receptacle.

Brief Description of the Drawings

FIG. 1 is a perspective view of an embodiment of the cassette of the present invention.

FIG. 2 is a cross-sectional side elevational view of the cassette of FIG. 1.

FIG. 3 is a perspective view of an embodiment of the cassette of the present invention.

FIG. 4 is a cross-sectional side elevational view of the cassette of FIG. 3.

FIG. 5 is a perspective view of an embodiment of the cassette of the present invention. FIG. 6 is a cross-sectional side elevational view of the cassette of FIG. 5.

FIG. 7 is a perspective view of an embodiment of the cassette of the present invention.

FIG. 8 is a cross-sectional side elevational view of the cassette of FIG. 7.

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FIG. 9 is a perspective view of an embodiment of the cassette of the present invention.

FIG. 10 is a cross-sectional side elevational view of the cassette of FIG. 9.

FIG. 11 is a perspective view of an embodiment of the cassette of the present invention.

FIG. 12 is a cross-sectional side elevational view of the cassette of FIG. 11.

FIG. 13 is a partial cross-sectional view illustrating the cassette of FIG. 1 positioned in a receptacle with the registration features defined by a bottom surface of the cassette matingly engaged with complementarily-shaped alignment features defined by a seating surface of the receptacle.

Detailed Description of the Preferred Embodiment of the Present Invention

As shown in FIGS. 1 and 2, a cassette for dispensing plastic tubing is generally designated by the reference number 20. The cassette includes a cassette body generally designated by the reference number 22. The cassette body is defined by a tubular central portion 24 having an aperture 26 extending therethrough. An outer wall 28 surrounds the tubular central portion 24 and is connected thereto by a cassette bottom 30. The tubular central portion 24, the outer wall 28 and the cassette bottom 30 cooperate together to define an interior area 32 into which a length of flexible tubing 34 is operably positioned. A cover generally designated by the reference number 36 is attached to the body 22. The cover 36 has an interior peripheral edge 37 that defines an opening 38 extending through the cover. The opening 38 is sized to form a gap 40 between the tubular central portion 24 and the interior peripheral edge 37 of the cover 36. While the cassette 20 has been shown in the illustrated embodiment as being cylindrical, the present invention is not limited in this regard as other shapes such as squares, rectangles, ovals, and the like, or combinations of these shapes, can be substituted without departing from the broader aspects of the present invention.

Still referring to FIGS. 1 and 2, the cassette bottom 30 defines first registration features, shown in the illustrated embodiment as a plurality of recesses 42 radially spaced around an outer periphery of the cassette bottom. Similarly, the cover 36 defines second registration features, shown in the illustrated embodiment as a plurality of protuberances or raised bumps 44. The recesses 42 and the raised bumps 44 are complementarily shaped relative to one another so that when cassettes 20 are stacked one-on-top-of-the-other, the raised bumps 44 of one cassette matingly engage the recesses 42 of the next successive cassette, thereby minimizing the potential for relative movement between successively

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stacked cassettes. While a plurality of recesses 42 and raised bumps 44 have been shown and described, the present invention is not limited in this regard as any number of recesses and raised bumps, even a single recess and raised bump can be employed. In addition, while the recesses and raised bumps, 42 and 44 respectively, have been shown as all being the same
5 size and shape, the present invention is not limited in this regard as different shapes, different sizes, and combinations of different sizes and shapes can be employed without departing from the broader aspects of the present invention.

As shown in FIGS. 3 and 4, an embodiment of the cassette 20 is shown therein and generally referred to by the reference number 120. The cassette 120 is similar in many
10 respects to the cassette 20, accordingly like elements will be given similar reference numbers preceded by the numeral 1. The cassette 120 differs from the cassette 20 in that instead of recesses 42 and raised bumps 44, the first and second registration features are in the form of first and second steps, 142 and 144 respectively. Each of the first steps 142 is formed by a raised portion 146 and an adjacent recessed portion 148. Likewise, each of the second steps
15 144 is formed by a raised portion 150 and a corresponding recessed portion 152. Accordingly, when two or more cassettes 120 are stacked one-on-top-of-the-other, the first and second steps, 142 and 144 respectively, matingly engage one another.

As shown in FIGS. 5 and 6, an embodiment of the cassette 20 is shown therein and generally referred to by the reference number 220. The cassette 220 is similar in many
20 respects to the cassette 20, accordingly like elements will be given similar reference numbers preceded by the numeral 2. The cassette 220 differs from the cassette 20 in that instead of recesses 42 and raised bumps 44, the first and second registration features are in the form of first and second undulating surfaces, 242 and 244 respectively. Each of the first and second undulating surfaces, 242 and 244 respectively, is formed by a by a series of successive peaks and valleys which in the illustrated embodiment vary in a sinusoidal pattern. Accordingly,
25 when two or more cassettes 220 are stacked one-on-top-of-the-other, the peaks of one of the first and second undulating surfaces, 242 and 244 respectively, matingly engage the valleys of the other of the first and second undulating surfaces thereby causing successively stacked cassettes to nest into one another. The cover 236 of the cassette 220 includes a lip 243
30 extending around an outer peripheral edge of the cover. When two or more cassettes 220 are stacked on top of one another, the lip 243 slidingly engages the outer wall 228 [not labeled on Figure] of the next successively stacked cassette thereby minimizing or preventing the potential for relative movement between the cassettes.

As shown in FIGS. 7 and 8, an embodiment of the cassette 20 is shown therein and generally referred to by the reference number 320. The cassette 320 is similar in many respects to the cassette 20, accordingly like elements will be given similar reference numbers preceded by the numeral 3. The cassette 320 differs from the cassette 20 in that instead of raised bumps 44, the second registration features defined by the cover 336 are in the form of outwardly projecting ribs 344 spaced radially around the cover. The second registration features defined by the cassette bottom 330 are in the form of recesses 342 sized and positioned to matingly engage the ribs 344 when cassettes 320 are stacked one-on-top-of-the-other. In addition to the ribs 344 the cover 336 also defines an annular raised portion 346 located internally of an outer peripheral edge 350 of the cover. In the illustrated embodiment, the annular raised portion 346 extends to the inner peripheral edge 337 defined by the cover. The cassette bottom 330 includes an annular recessed portion 352, best seen in FIG. 8, that is complementarily shaped to matingly engage the annular raised portion 346 defined by the cover 336 when two cassettes 320 are successively stacked on top of one another. While the ribs 344 and the recesses 342 have been shown and described as being located on the cover 336 and the cassette bottom 330 respectively, the present invention is not limited in this regard as the location of the ribs and recesses can be reversed. In such a situation, the ribs 344 would be located on the cassette bottom 330 and the recesses 342 would be located on the cover. Likewise, the locations of the annular raised portion 346 and the annular recessed portion 352 can be switched so that the annular raised portion is located on the cassette bottom 330 and the annular recessed portion is located on the cover 336, without departing from the broader aspects of the present invention.

As shown in FIGS. 9 and 10, an embodiment of the cassette 20 is shown therein and generally referred to by the reference number 420. The cassette 420 is similar in many respects to the cassette 20, accordingly like elements will be given similar reference numbers preceded by the numeral 4. The cassette 420 differs from the cassette 20 in that instead of raised bumps 44, the second registration features are in the form of semi-circular raised portions 444. The cassette bottom 430 includes semi-circular recesses 442, best seen in FIG. 10, that are complementarily shaped relative to the semi-circular raised portions 444 so that when cassettes 420 are stacked on top of one another, the semi-circular raised portions 444 matingly engage the semi-circular recessed portions 442. While the semi-circular raised portions 444 and the semi-circular recesses 442 have been shown and described as being located on the cover 436 and the cassette bottom 430 respectively, the present invention is not limited in this regard as the location of the raised portions and recesses can be reversed. In

such a situation, the semi-circular raised portions 444 would be located on the cassette bottom 430 and the semi-circular recesses 442 would be located on the cover 436.

As shown in FIGS. 11 and 12, an embodiment of the cassette 20 is shown therein and generally referred to by the reference number 520. The cassette 520 is similar in many
5 respects to the cassette 20, accordingly like elements will be given similar reference numbers preceded by the numeral 5. The cassette 520 differs from the cassette 20 in that instead of recesses 42 and raised bumps 44, the first and second registration features are in the form of slots 542 and key portions 544, located on the cover 536 and the cassette bottom 530 respectively. In addition the cover 536 defines an outwardly extending arcuate upper surface
10 550 and the cassette bottom 530 defines an inwardly extending arcuate recess 552 complementarily shaped to matingly engage the arcuate upper surface 550 when cassettes 520 are stacked on top of one another. Accordingly, when two or more cassettes 520 are stacked on top of one another, the key portions 544 engage the slots 542 and the arcuate raised portion 550 engages the arcuate recessed portion 552. While the slots 542 have been shown
15 and described as being positioned on the cover 536 and the key portions 544 have been shown and described as being located on the cassette bottom 530, the present invention is not limited in this regard as the positions of the slots and key portions can be reversed. Likewise, the locations of the arcuate raised portion 550 and the arcuate recessed portion 552 can also be reversed without departing from the broader aspects of the present invention.

Referring to FIG. 13, the above-described cassette 20 is shown positioned in a receptacle 600. The receptacle is only partially illustrated as it can take any number of forms. However, each receptacle 600 of the present invention will include a seat portion 602 defining alignment features 604 that are matingly engageable with the first registration features 42, 142, 242, 342, 442, and 542 defined by the cassette bottom 30, 130, 230, 330,
25 430, and 530. In this manner the cassette 20, 120, 220, 320, 420 and 520 can be passed through an opening 606 defined by the receptacle and positioned on the seat portion 602 so that the first engagement features mate with the alignment features thereby minimizing the potential for the cassette to be installed upside down.

Although this invention has been shown and described with respect to the detailed
30 embodiments thereof, it will be understood by those of skill in the art that various changes may be made and equivalents may be substituted for elements and steps thereof without departing from the scope of the invention. In addition, modifications may be made to adapt a particular situation to the teachings of the invention without departing from the essential scope thereof. Therefore, it is intended that the invention not be limited to the particular

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embodiments disclosed in the above detailed description, but that the invention will include all embodiments falling within the scope of the above description.

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We claim:

1. A cassette for dispensing flexible tubing, said cassette comprising:
 - a cassette body having a central tubular portion defining an aperture extending therethrough, an outer wall surrounding said central tubular portion and a cassette bottom extending between and connecting said outer wall and said central tubular portion;
 - said outer wall, said cassette bottom and said central tubular portion cooperating to define an interior area that surrounds said central tubular portion;
 - said cassette bottom including first registration features, said first registration features are operable to establish an upright position of said cassette;
 - a cover coupled to said body and at least partially overlying said interior area, said cover defining an interior peripheral edge which is spaced away from said central tubular portion thereby defining a gap therebetween, said cover defining second registration features positioned radially outward from said gap;
 - said first and second registration features having complementary shapes and being operable to provide one-on-top-of-the-other shift resistant stackability of at least two of the cassettes.
2. A cassette as defined by claim 1 wherein one of said first and second registration features includes at least one outwardly projecting protuberance and the other of said first and second registration features includes at least one recess complementarily shaped to engage said protuberance.
3. A cassette as defined by claim 2 wherein said at least one protuberance includes a plurality of protuberances and said at least one recess includes a plurality of recesses.
4. A cassette as defined by claim 3 wherein said cassette bottom and said cover are each circular and said plurality of protuberances include a plurality of raised bumps projecting outwardly from and spaced circumferentially around one of said cassette bottom and said cover, and said plurality of recesses are spaced circumferentially around the other of said cassette bottom and said cover, said recesses being complementarily shaped to engage said bumps when successive cassettes are stacked one-on-top-of-the-other.

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5. A cassette as defined by claim 1 wherein said first registration feature is defined by one or more first steps, each having a first raised portion and a corresponding first recessed portion and said second registration feature is defined by one or more second steps each having a second raised portion and a corresponding second recessed portion, and said first raised portions are matingly engageable with said second recessed portions and said first recessed portions are matingly engageable with said second raised portions so that when cassettes are stacked one on top of the other, said first steps of one of said cassettes engage said second steps of another of said cassettes thereby minimizing relative movement between successively stacked cassettes.

6. A cassette as defined by claim 1 wherein said first registration features include a first undulating surface formed by said cassette bottom and said second registration features include a second undulating surface formed by said cover and said first and second undulating surfaces are matingly engageable with one another so that when cassettes are stacked one on top of the other, said first undulating surface of one of said cassettes engages said second undulating surface of another of said cassettes thereby minimizing relative movement between successively stacked cassettes.

7. A cassette as defined by claim 6 further comprising a lip extending along a peripheral surface defined by said cover so that an outer periphery defined by said cassette bottom is slidably engageable with said lip when one cassette is positioned on top of another cassette.

8. A cassette as defined by claim 7 wherein said cover and said bottom are circular.

9. A cassette as defined by claim 1 wherein said cover and said cassette bottom are each substantially circular and one of said first and second registration features includes a plurality of outwardly projecting ribs and the other of said first and second registration features includes a plurality of recesses, said ribs being matingly receivable in said recesses when cassettes are successively stacked on top of one another.

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10. A cassette as defined by claim 9 wherein said cassette bottom and said cover each define a peripheral edge and one of said cassette bottom and said cover defines an annular raised portion positioned internally of said peripheral edge and the other of said cassette bottom and said cover defines an annular recessed portion positioned internally of said peripheral edge and said annular raised portion is slidably engageable with said annular recessed portion when cassettes are successively stacked on top of one another.

11. A dispensing assembly comprising:

a cassette comprising a cassette body having a central tubular portion defining an aperture extending therethrough, an outer wall surrounding said central tubular portion and a cassette bottom extending between and connecting said outer wall and said central tubular portion;

said outer wall, said cassette bottom and said central tubular portion cooperating to define an interior area that surrounds said central tubular portion;

said cassette bottom including first registration features;

a cover coupled to said body and at least partially overlying said interior area;

a receptacle including an opening sized at least to receive said cassette; and

said receptacle defining alignment features formed on an interior surface defined by said receptacle and generally facing said first registration features; and

said first registration features and said alignment features matingly engage one another such that said cassette is positioned upright in said receptacle.

12. The dispensing assembly of claim 11 wherein one of said first registration features and said alignment features includes at least one outwardly projecting protuberance and the other of said first registration features and said alignment features includes at least one recess complementarily shaped to engage said protuberance.

13. The dispensing assembly of claim 12 wherein said at least one protuberance includes a plurality of protuberances and said at least one recess includes a plurality of recesses.

14. The dispensing assembly of claim 11 wherein said first registration feature is defined by one or more first steps, each having a first raised portion and a corresponding

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first recessed portion and said alignment features are defined by one or more second steps each having a second raised portion and a corresponding second recessed portion, and said first raised portions are matingly engageable with said second recessed portions and said first recessed portions are matingly engageable with said second raised portions.

15. The dispensing assembly of claim 11 wherein said first registration features include a first undulating surface formed by said cassette bottom and said alignment features include a second undulating surface formed by said receptacle and said first and second undulating surfaces are matingly engageable with one another.

16. The dispensing assembly of claim 11 wherein one of said first registration features and said alignment features includes a plurality of outwardly projecting ribs and the other of said first registration features and said alignment features includes a plurality of recesses, said ribs being matingly receivable in said recesses.

17. The dispensing assembly of claim 11 wherein said cassette and said receptacle each define a peripheral edge and one of said cassette bottom and said receptacle defines an annular raised area positioned internally of said peripheral edge and the other of said cassette bottom and said receptacle define an annular recessed portion positioned internally of said peripheral edge and said annular raised portion is slidably engageable with said annular recessed portion.

18. The dispensing assembly of claim 11 wherein said cassette's first registration features minimize misalignment in conjunction with a receptacle, and said receptacle includes an opening sized at least to receive said cassette.

19. The dispensing assembly of claim 18 wherein said receptacle has alignment features that matingly engage said first registration features of said cassette.

20. A cassette as defined by claim 1, wherein said first registration features are operable to minimize the likelihood of the cassette being improperly installed.

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21. A cassette as defined by claim 1, wherein a length of the flexible tubing is positioned in said interior area.
22. The dispensing assembly of claim 11 wherein said first registration features are operable to minimize the likelihood of the cassette being improperly installed.
23. The dispensing assembly of claim 11 wherein a length of the flexible tubing is positioned in said interior area.

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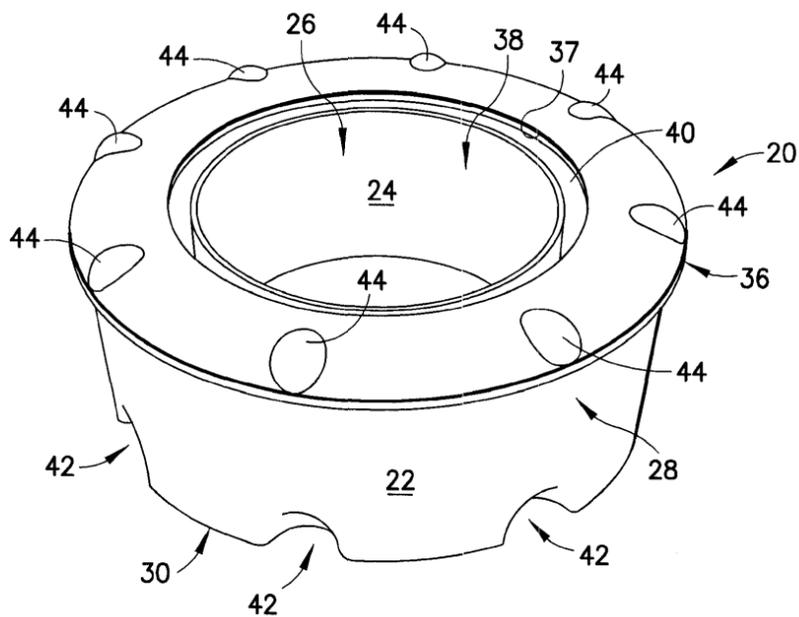


FIG. 1

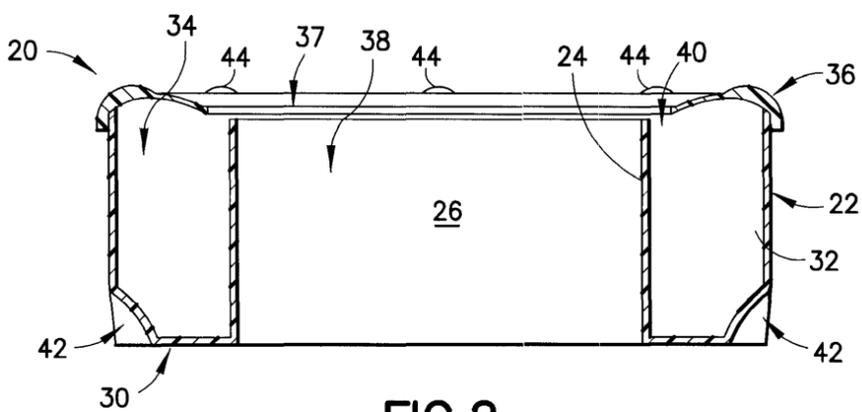


FIG. 2

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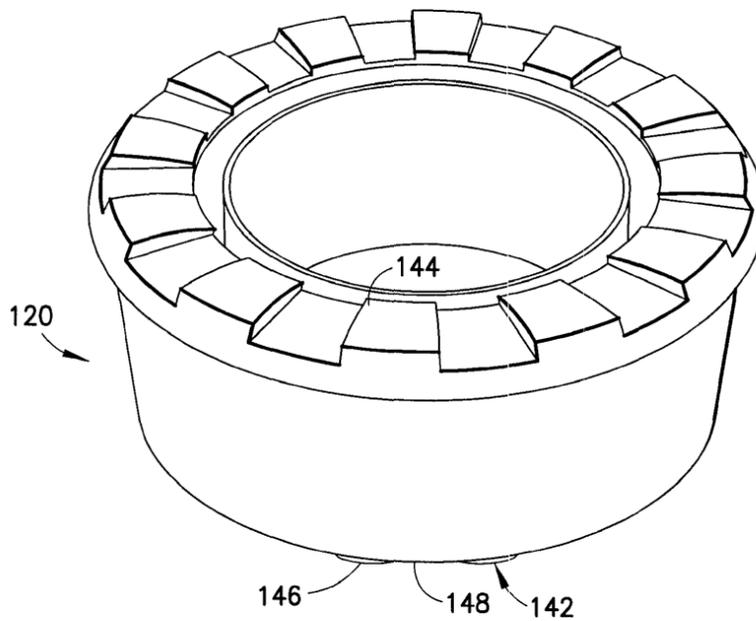


FIG. 3

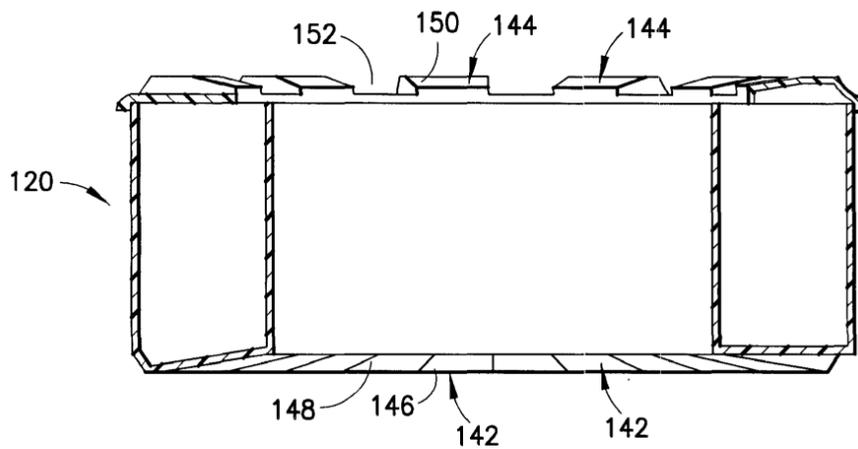


FIG. 4

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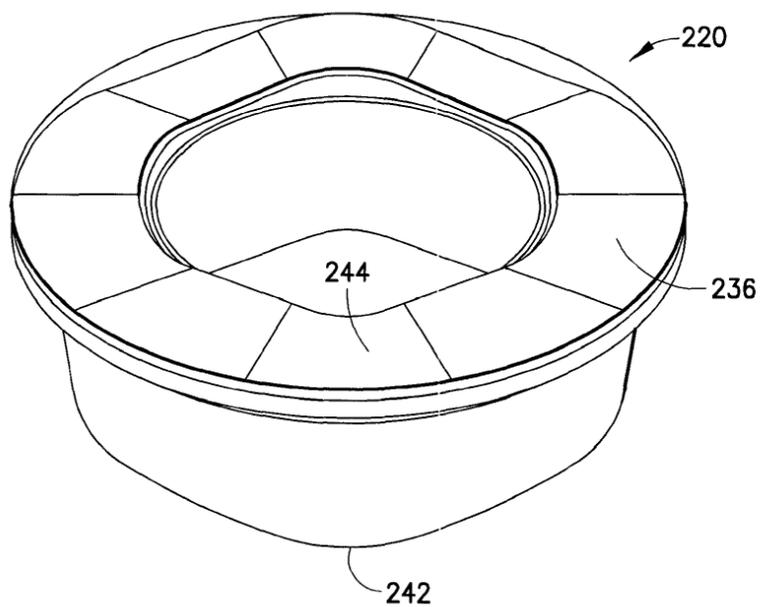


FIG. 5

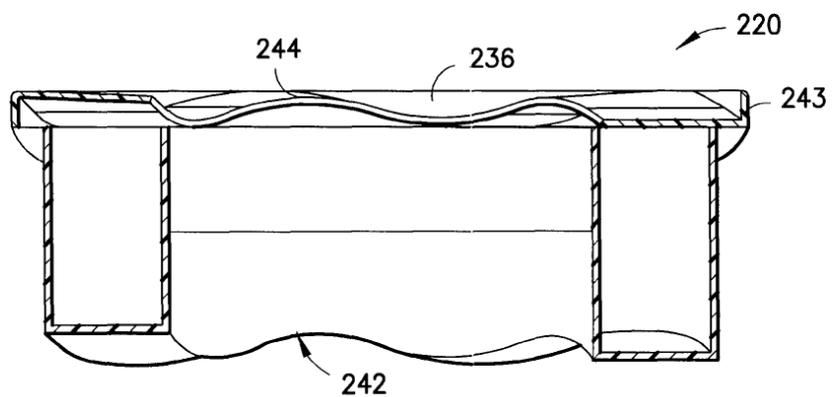


FIG. 6

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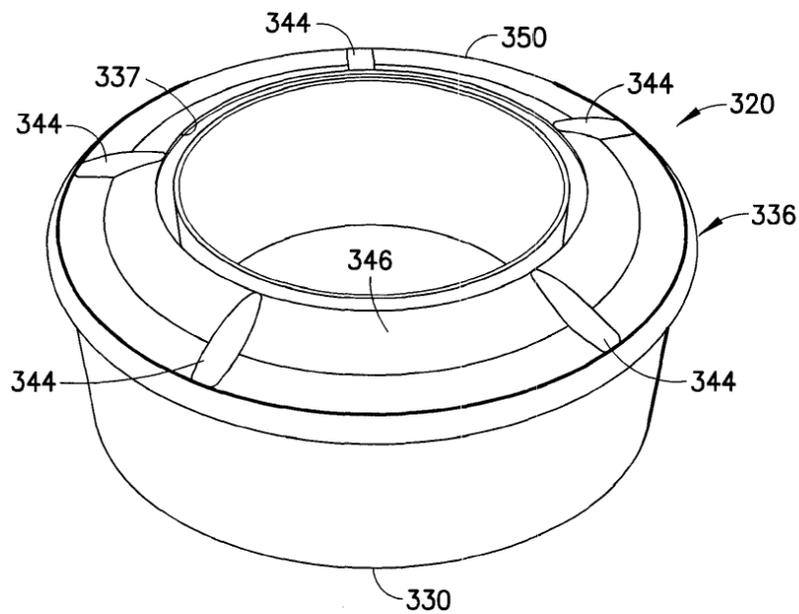


FIG. 7

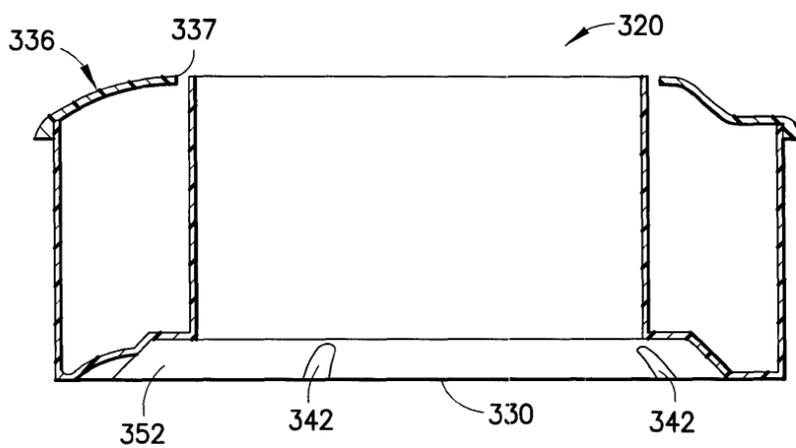


FIG. 8

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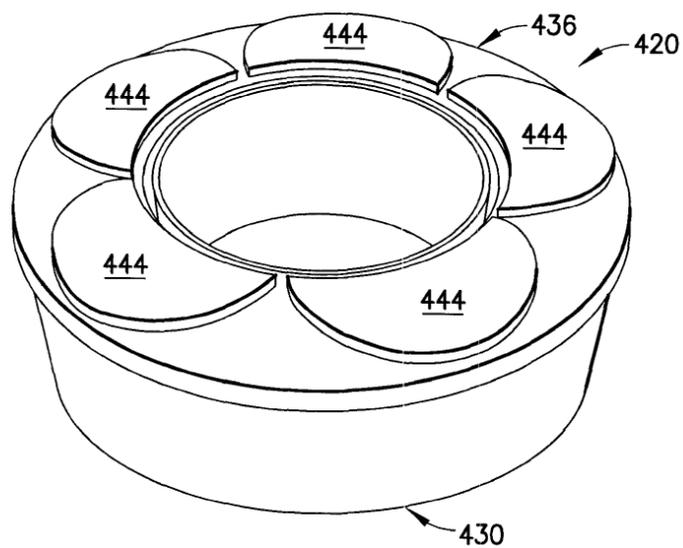


FIG. 9

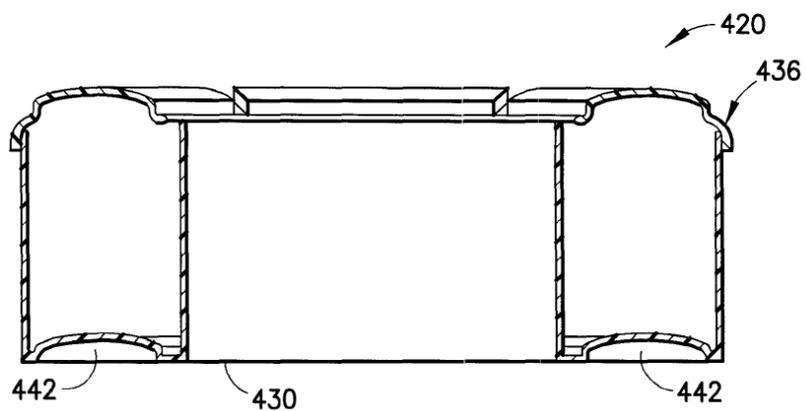


FIG. 10

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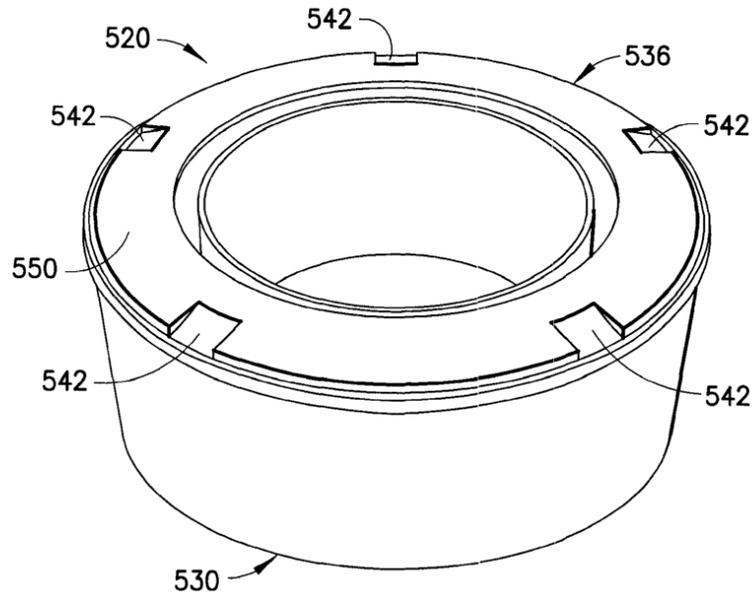


FIG. 11

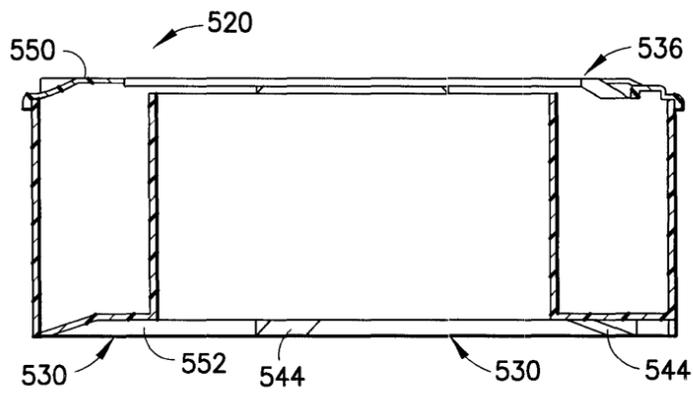


FIG. 12

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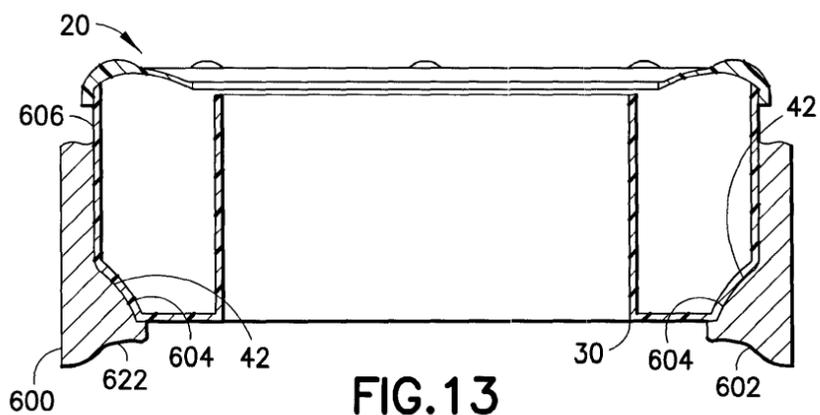
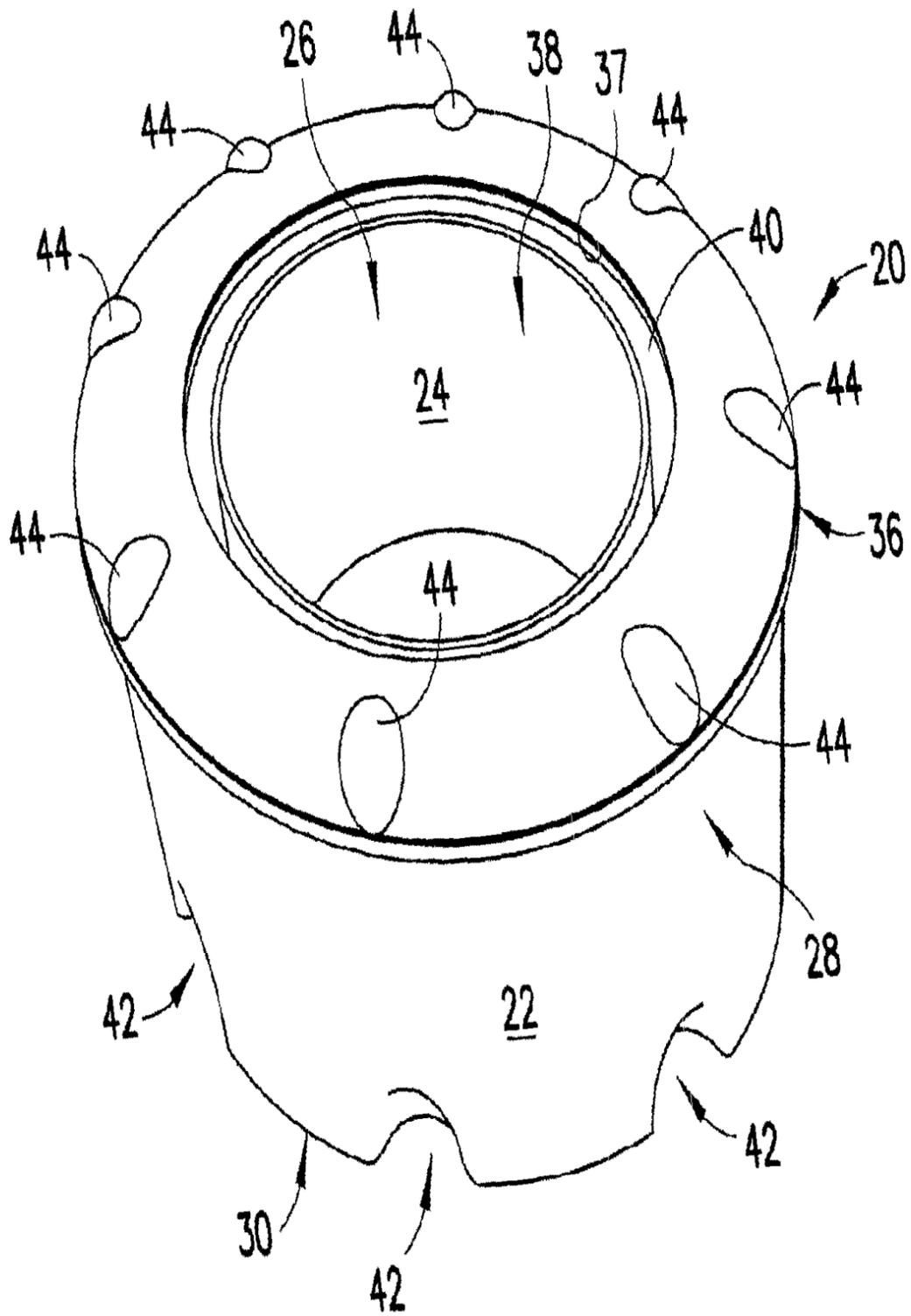


FIG. 13





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Industry Canada

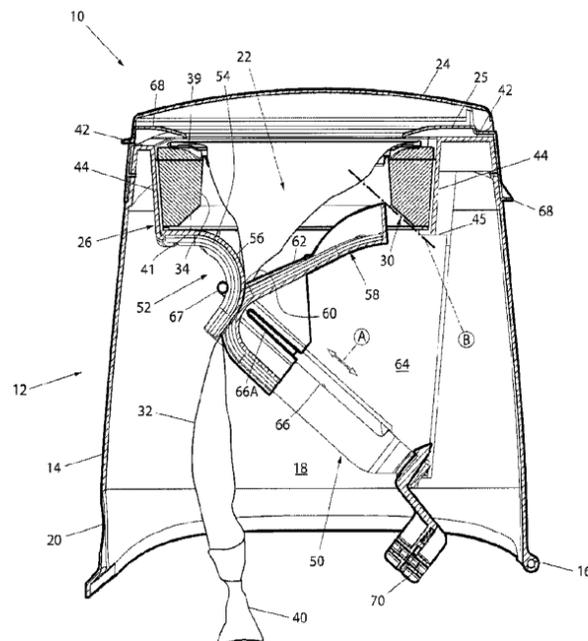
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(11)(21) **2 855 159**(12) **BREVET CANADIEN
CANADIAN PATENT**(13) **C**

(22) Date de dépôt/Filing Date: 2008/10/03
(41) Mise à la disp. pub./Open to Public Insp.: 2009/04/05
(45) Date de délivrance/Issue Date: 2016/11/08
(62) Demande originale/Original Application: 2 640 384
(30) Priorité/Priority: 2007/10/05 (EP07019571.4)

(51) Cl.Int./Int.Cl. *B65B 67/12* (2006.01),
B65B 5/04 (2006.01), *B65B 67/04* (2006.01)
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(54) Titre : CARTOUCHE ET APPAREIL D'EMBALLAGE D'OBJETS JETABLES DANS UN TUBE DE MATIERE SOUPLE
(54) Title: CASSETTE AND APPARATUS FOR PACKING DISPOSABLE OBJECTS INTO AN ELONGATED TUBE OF FLEXIBLE MATERIAL



(57) Abrégé/Abstract:

A cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition. An annular opening at an upper end of the annular receptacle is for dispensing the tubing. The annular receptacle defines a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of the central opening.

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ABSTRACT

A cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition. An annular opening at an upper end of the annular receptacle is for dispensing the tubing. The annular receptacle defines a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of the central opening.

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CASSETTE AND APPARATUS FOR PACKING DISPOSABLE OBJECTS
INTO AN ELONGATED TUBE OF FLEXIBLE MATERIAL

FIELD OF THE APPLICATION

The present application relates to an apparatus
5 for packaging disposable material or objects into a tube of
flexible plastic film material. More specifically, the
invention relates to an apparatus for use to package waste
material, for example babies' disposable diapers, or any
other kind of appropriate objects or material, into a tube
10 of flexible plastic film material and to store the so
packaged waste material in a hygienic and a substantially
odor-free manner, until it is collected.

BACKGROUND OF THE ART

Known apparatuses of the above-mentioned type
15 generally comprise a container having an open or openable
upper portion in which the waste to be disposed of may be
inserted and a bottom portion in which the disposed waste is
stored. A ring-shaped cassette is mounted in the upper
portion of the container, and contains, in a pleated form, a
20 tube of flexible plastic film material which is formed into
an elongated tube which is knotted at a bottom end and into
which the waste material may be inserted and temporarily
stored.

In use, the waste to be disposed of is inserted
25 into the tube at the upper portion of the container and the
tube and waste are then pushed through the open center of
the cassette towards the bottom portion of the container for
storage purposes. Closeable means are also provided for
closing the tube below the cassette and thus preventing bad
30 odors from escaping from the tube during storage.

In Canadian Patent No. 1,298,191, these closeable
means are disclosed as a core that can be turned by a lid
about a cylinder in order to twist the tube at regular
intervals to form successive "pouches" that are kept sealed
35 while they are stored.

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In Canadian laid-open Application No. 2,383,799, a squeezing device is mounted in the container below the cassette to pull the tube from the cassette and move it down together with the objects inserted into the container. This squeezing device comprises a pair of opposite rotatable members between which the tube is inserted. The rotatable members have a plurality of opposite bars extending transversely to the tube in order to squeeze the tube, keep it closed until other objects to be disposed of are inserted into the upper portion of the container, and pull it down to move the plastic film forming the tube and the objects contained therein towards the bottom portion of the container for storage purpose. Actuation of the rotatable members in unison and in opposite direction to achieve the requested squeezing, closing and pulling down of the plastic film tube is preferably obtained by actuation of a lever that is part of the container.

In Canadian laid-open Application No. 2,441,837, a plunging device is provided to compress the object to be disposed of, and push it into the tube and to the bottom part of the container. The plunging device includes two arms with pivoting flaps attached thereto and opposing pivotable slides.

All of these prior art devices have several disadvantages. Their mechanisms have many parts and are prone to breakage. These devices are also not user-friendly and difficult to understand the operation thereof when first purchased. They are costly to fabricate and they utilize excess film from the cassettes, adding to the cost of use. Some also do not effectively contain the odors of the disposed material. Some cause confusion in their installation, causing improperly oriented cassettes and contamination of the cassette walls.

SUMMARY OF THE APPLICATION

It is therefore an aim of the present invention to provide a novel apparatus for packing disposable objects

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into an elongated tube of flexible plastic film material that addresses issues associated with the prior art.

Therefore, in accordance with a first embodiment of the present application, there is provided a cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition, an annular opening at an upper end of the annular receptacle for dispensing the tubing, the annular receptacle defining a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of the central opening.

In accordance with the first embodiment, the clearance is in the shape of a chamfer.

In accordance with the first embodiment, a removable lid closes the annular opening of the annular receptacle.

In accordance with the first embodiment, an outer periphery of the annular receptacle tapers downwardly.

In accordance with the first embodiment, the annular opening is adjacent to an outer periphery of the annular receptacle.

In accordance with the first embodiment, the clearance extends on the full periphery of the central opening.

In accordance with the first embodiment of the present application, there is provided an apparatus for packing at least one disposable object into an elongated tube of flexible material, comprising a bin defining an enclosure with an opening defined at a top thereof for receiving at least one disposable object to be packed; a holder within the bin proximate the opening; a closing mechanism located below the holder comprising first and second portions, the second portion being biased in a closed position against the first portion and defining a receiving

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surface for receiving the at least one disposable object, the second portion being slidable from the closed position to an open position through application of a substantially vertical force against the receiving surface and being
5 slidable from the open position to the closed position under the action of biasing means, the closing mechanism in the open position defining a passage between the opening of the bin and a bottom portion of the enclosure located below the closing mechanism, the closing mechanism in the closed
10 position closing the said passage; and the cassette supported by the holder in the opening of the bin with the clearance allowing the cassette not to impede the motion of the closing mechanism from the closed position to the open position.

15 Still in accordance with the first embodiment, the holder comprises a first annular flange extending inwardly from an outer wall of the bin, a tubular wall extending generally downwardly from an inner end of the first annular flange, and a second annular wall extending inwardly from a
20 bottom end of the tubular wall, thus forming a seat for receiving the cassette.

Still in accordance with the first embodiment, the tubular wall tapers in a downward direction, and the annular body has a corresponding frustoconical outer periphery for
25 complementary engagement of the cassette in the holder.

Still in accordance with the first embodiment, the opening of the bin is surrounded by a removable lid, the lid opening/closing access to the opening of the bin, the lid being prevented from being installed properly when the
30 cassette is oriented upside down in the holder.

In accordance with a second embodiment of the present application, there is provided: a cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an
35 accumulated condition, an annular opening at an upper end of the annular receptacle for dispensing the tubing, the annular receptacle defining a central opening through which

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a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of an outer periphery of the annular receptacle.

In accordance with the second embodiment, the clearance forms a frusto-conical geometry at the bottom of the annular receptacle.

In accordance with a third embodiment, there is provided: an apparatus for packing at least one disposable object into an elongated tube of flexible material, comprising: a bin defining an enclosure with an opening defined at a top thereof for receiving at least one disposable object to be packed; a holder within the bin proximate the opening, and an interfering member at a bottom of the holder; a closing mechanism located below the holder comprising first and second portions, the second portion being biased in a closed position against the first portion and defining a receiving surface for receiving the at least one disposable object, the second portion being slidable from the closed position to an open position through application of a substantially vertical force against the receiving surface and being slidable from the open position to the closed position under the action of biasing means, the closing mechanism in the open position defining a passage between the opening of the bin and a bottom portion of the enclosure located below the closing mechanism, the closing mechanism in the closed position closing the said passage; a cassette supported by the holder in the opening of the bin and having an annular receptacle to accommodate a length of tubing in an accumulated condition, the annular receptacle having an upper annular opening for dispensing the tubing such that the tubing extends through a central opening of the annular receptacle and with a knotted end thereof into the enclosure of the bin to receive disposable objects, whereby the closing mechanism closes the tubing, the annular body having a clearance in a bottom portion of

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an outer periphery of the annular receptacle, so as to cooperate with the interfering member for the cassette to be aligned with the top of the bin in a desired orientation; and a removable lid positioned flush on the top of the bin only when
5 the cassette is in the desired orientation, the cover opening/closing access to the opening of the bin.

In accordance with another aspect, the invention provides a cassette for packaging soiled diapers into an elongated tube of flexible material. The cassette comprises: a
10 receptacle including a wall delimiting a central opening, the central opening extending along a generally vertical central axis; the receptacle defining a storage area circumscribing the central opening and receiving the elongated tube of flexible material outwardly of the wall; cassette including an outer
15 boundary spaced outwardly of the wall; a cover at a top portion of the storage area, the cover engaging the wall and extending outwardly therefrom toward the outer boundary of the cassette; the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outwardly of an
20 imaginary projection of the wall extending downwardly along the central axis; a first portion of the storage area that is located outwardly of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first
25 portion and above the clearance.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a
30 receptacle including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis; the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall; the cassette including an outer boundary

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spaced outward of the tubular wall; a cover at a top portion of the storage area, the cassette being configured to dispense the tube of flexible material from the storage area, through the central opening while the tube overlies the cover; the
5 receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outward an imaginary projection of the tubular wall extending downwardly along the central axis; a first portion of the storage area that is located outward of the clearance and that vertically
10 registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an
15 elongated tube of flexible material. The cassette comprises: a receptacle including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis; the receptacle defining a storage area receiving the elongated tube of flexible material outward of
20 the tubular wall; the cassette including an outer boundary spaced outward of the tubular wall; a cover at a top portion of the storage area, the cover having a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent to the convex edge portion; the receptacle defining a
25 clearance in a bottom portion of the central opening, the clearance being located outward of an imaginary projection of the tubular wall extending downwardly along the central axis; a first portion of the storage area that is located outward of the clearance and that vertically registers with the clearance
30 having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a

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receptacle including a tubular wall delimiting a central opening; the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall; said tubular wall having a lower end portion; an oblique
5 wall connecting with said lower end portion and extending radially outwardly and downwardly therefrom, the oblique wall defining a corner with the lower end portion having an angle substantially less than 270 degrees.

In accordance with another aspect, the invention
10 provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a generally annular storage area receiving the elongated tube of flexible material; the storage area including a tubular wall delimiting a central opening, the central opening extending
15 along a generally vertical central axis; the cassette having a top portion and an opposite bottom portion; a cross-section of the top portion of the cassette taken in a vertical plane containing the generally vertical central axis including a first wall segment that is adjacent the central opening and
20 which diminishes in height in a radially inward direction; a cross section of the bottom portion of the cassette taken in the vertical plane including a second wall segment adjacent the central opening and which increases in height in a radially inward direction.

In accordance with another aspect, the invention
25 provides use of a cassette in a diaper pail comprising a storage area for holding soiled diapers, an opening for introducing soiled diapers in the storage area and a holder for a cassette proximal the opening; the cassette configured for
30 dispensing an elongated tube in which soiled diapers are enclosed when introduced in the storage area, the cassette including a receptacle for storing the elongated tube in a folded condition, the receptacle defining a central opening and having a top and a bottom, the cassette dispensing the

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elongated tube from the top of the receptacle; the cassette being configured to: create an interference with a component of the diaper pail to prevent proper operation of the diaper pail when the receptacle is loaded in the holder upside down, with
5 the top of the receptacle located down; avoid the interference when the receptacle is loaded in the holder with the top located; wherein the component includes a lid assembly, the cassette and the diaper pail cooperating such that the cassette interferes with the lid assembly to prevent proper operation of
10 the lid assembly when the receptacle is loaded in the holder upside down, with the top of the receptacle located down.

In accordance with another aspect, the invention provides a diaper pail comprising: a storage area for holding soiled diapers; an opening for introducing soiled diapers in
15 the storage area; a holder for removably receiving a cassette proximal the opening; a cassette loaded in the holder, the cassette configured for dispensing an elongated tube in which soiled diapers are enclosed when introduced in the storage area, the cassette including an annular receptacle for storing
20 the elongated tube in a folded condition, the annular receptacle defining a central opening and having a top and a bottom, the cassette dispensing the elongated tube from the top of the of the annular receptacle through the central opening; the cassette being configured to: create an interference with a
25 component of the diaper pail to prevent proper operation of the diaper pail when the annular receptacle is loaded in the holder upside down, with the top of the annular receptacle facing down; avoid the interference when the annular receptacle is loaded in the holder in the correct orientation with the top
30 facing up; wherein the component includes a lid, the cassette and the diaper pail cooperating such that the cassette interferes with the lid to prevent proper operation of the lid when the annular receptacle is loaded in the holder upside down, with the top of the annular receptacle facing down.

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In accordance with another aspect, the invention provides an apparatus for packaging soiled diapers within an elongated tube of flexible plastic material, comprising: a storage area for receiving soiled diapers; an entrance for
5 introducing soiled diapers in the storage area; a holder configured for releasably receiving a cassette for dispensing the tube material, the cassette having a central opening, the cassette dispensing the tube material from a top thereof through the central opening, the cassette including a recessed
10 area on a lower portion thereof, the holder being proximal the entrance and including: a generally upwardly extending wall; a bottom wall; a projecting member upwardly extending above the bottom wall, the projecting member configured to engage the recessed area of the cassette when the cassette is fully seated
15 in the holder and the cassette engages the bottom wall of the holder, wherein the projecting member is movable relative to the bottom wall.

In accordance with another aspect, the invention provides an apparatus for packaging soiled diapers in an
20 elongated tube of plastic flexible material, the apparatus comprising: a storage area for receiving soiled diapers; an entrance for introducing soiled diapers in the storage area; a holder configured for releasably receiving a supply of the tube material such that the supply of the tube material extends
25 through the entrance, the holder being proximal the entrance and including: a recess including an upwardly extending side wall; a bottom generally horizontally extending wall, the bottom wall being generally circular and surrounding the entrance; a tube gathering mechanism for sealing the tube when
30 no soiled diaper is being pushed through the entrance, the tube gathering mechanism including: a closure member including a projection extending above the bottom wall of the holder, the closure member engaging the tube and being moveable with relation to the bottom wall to gather the tube; the closure

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member being responsive to pressure by a hand of a user to progressively open and allow insertion of a soiled diaper in the storage area; a stationary wall portion located below the bottom wall for slidably supporting the closure member during
5 the movement of the closure member with respect to the bottom wall; a device connected to the closure member for driving the moveable member to move relative the bottom wall to gather the tube; a lid hingedly moveable between a closed position and an opened position, in the closed position the lid closing the
10 holder, in the opened position the lid allowing access to the holder to permit installation of a new supply of tube material, the lid having a central funnel-shaped portion defining an aperture generally aligning with the entrance to the storage area, the aperture permitting insertion of a soiled diaper into
15 the storage area.

In accordance with another aspect, the invention provides a cassette for use in a diaper pail. The diaper pail comprises: a storage area for holding soiled diapers; an opening for introducing soiled diapers in the storage area; a
20 holder for the cassette proximal the opening, including : a bottom wall; a projecting portion extending above the bottom wall, the projecting portion being radially inward from the bottom wall with relation to an axis of the opening; the cassette configured for dispensing an elongated tube of
25 flexible material, including: a receptacle including: a tubular wall delimiting a central opening; a bottom located outwardly of the tubular wall, the tubular wall connecting with the bottom; a cover at a top portion of the storage area, the cover engaging the tubular wall and extending outwardly therefrom
30 toward an outer boundary of the cassette; the receptacle defining a storage space in which the elongated tube of flexible material is stored outwardly of the tubular wall; the bottom of the receptacle configured to sit on the bottom wall of the holder when the cassette is loaded in the holder; the

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receptacle defining a clearance located inwardly of the bottom, the clearance configured to receive the projecting portion when the bottom of the receptacle sits on the bottom wall of the holder.

5 In accordance with another aspect, the invention provides an assembly of a diaper pail and cassette comprising:
 a storage area for holding soiled diapers; an opening for introducing soiled diapers in the storage area; a holder for the cassette proximate the opening including : a bottom
10 wall; a projecting portion extending above the bottom wall, the projecting portion being radially inward from the bottom wall with relation to an axis of the opening; the cassette configured for dispensing an elongated tube of flexible material, including: a receptacle including: a tubular wall
15 delimiting a central opening; a bottom located outwardly of the tubular wall, the tubular wall connecting with the bottom; a cover at a top portion of the storage area, the cover engaging the tubular wall and extending outwardly therefrom toward an outer boundary of the cassette; the receptacle defining a
20 storage space in which the elongated tube of flexible material is stored outwardly of the tubular wall; the bottom of the receptacle supported by the bottom wall of the holder when the cassette is loaded in the holder; the receptacle defining a clearance located inwardly of the bottom, the clearance
25 receiving the projecting portion when the bottom of the receptacle sits on the bottom wall of the holder.

 In accordance with another aspect, the invention provides a diaper pail. The diaper pail comprises: a top portion and a bottom portion connected by a hinge, the bottom
30 portion defining a storage area for receiving soiled diapers, the top portion including a holder; the top portion being pivotable about the hinge to open the storage area and allow removal of a soiled diapers load from the storage area; a diaper pail refill received in the holder, the diaper pail

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refill configured for dispensing an elongated tube in which soiled diapers are enclosed when introduced in the storage area, the diaper pail refill having an annular receptacle storing the elongated tube in a folded condition, the annular
5 receptacle including a downwardly extending annular wall defining a central opening; a cutter mounted to the top portion, the cutter being proximate the hinge; a length of the elongated tube extending from the diaper pail refill to the storage area, the length of the elongated tube extending past
10 the cutter to allow a user desirous to empty the storage area to sever the elongated tube with the cutter in order to separate a portion of the elongated tube containing soiled diapers from a portion that is free of soiled diapers.

15 BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-sectional view of an apparatus according to a first embodiment of the present invention;

20 Fig. 2A is a bottom perspective view of a cassette to be used with the apparatus of Fig. 1;

Fig. 2B us a top perspective view of the cassette of Fig. 2A;

25 Fig. 3A is a cross-sectional view of the apparatus of Fig. 1, without tubing, with a closing mechanism in a closed position;

Fig. 3B is a cross-sectional view of the apparatus of Fig. 3A, with the closing mechanism displaced toward an open position;

30 Fig. 3C is a cross-sectional view of the apparatus of Fig. 3A, with the closing mechanism in the fully open position;

Fig. 4 is a cross-sectional view of an apparatus according to a second embodiment of the present invention;

Fig. 5A is a bottom perspective view of a cassette to be used with the apparatus of Fig. 4;

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Fig. 5B is a top perspective view of the cassette of Fig. 5A;

Fig. 6 is an enlarged perspective view of an apparatus in accordance with a third embodiment of the present invention; and

Fig. 7 is a sectional view illustrating the cassette of Fig. 2A as used with an apparatus having interfering members.

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DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. 1, there is shown an apparatus 10 for packaging disposable objects in an elongated tube of flexible plastic film material. The apparatus 10 comprises a bin 12 having a top portion 14 and a bottom portion (not shown) hingedly connected to each other by a hinge member 16, with outer walls of the top portion 14 and bottom portion defining an enclosure 18 of the bin 12.

The top portion 14 and bottom portion are locked together with a mechanism such as a push button latch (not shown) received in eyelet 20, located opposite of the hinge member 16. Upon actuation of the push button, the top portion 14 and bottom portion are disconnected and can be pivoted apart about the hinge member 16 to provide access to the enclosure 18, for example to empty the bin 12.

The top portion 14 defines an opening 22 for receiving disposable objects therethrough. The bin 12 further comprises a lid 24 hingedly connected to a ring 25, for instance in the shape of a funnel (hereinafter funnel 25), although multiple shapes are considered such as a flat ring, as long as the ring forms an opening guidance. The funnel 25 is mounted to the top portion 14 such as to selectively open and close access to the opening 22 through pivoting motion of the lid 24. Although in the embodiment shown the apparatus has a generally circular opening 22, the bin 12 is not limited to circular openings and could function with openings of different shapes.

Still referring to Fig. 1, the apparatus 10 also comprises a holder 26 located within the top portion 14 proximate the opening 22 for holding a cassette 30 of flexible plastic film tubing 32. The cassette 30 has an annular body defining a central opening 34 which is generally aligned with the bin opening 22 when the cassette 30 is accommodated in the holder 26.

Referring concurrently to Figs. 1, 2A and 2B, the cassette 30 has a lid 36 and a bottom annular receptacle 38. After the lid 36 is removed, the flexible tubing 32 exits

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from an upper annular opening of the receptacle 38, adjacent an outer periphery thereof. It is pointed out that once the lid 36 is removed, there remains an upper flange 39 adjacent to the annular opening that maintains the compressed tubing 5 32 in the receptacle 38. The cassette 30 comprises a length of flexible plastic film material that is accumulated (e.g., folded). As shown in Fig. 1, a knot 40 is found at the free end of the tubing 32 to form a bag end. The knot 40 and a length of the tubing 32 extend from the cassette 30 into the 10 enclosure 18 of the bin 12, passing through the central opening 34 of the cassette 30. To better contain odors, it is preferable that the film material of the tubing 32 be a multiple layer film having an odor barrier therein such that odors do not permeate through the film material. The 15 receptacle 38 of the cassette 30 defines a chamfer clearance 41 at a bottom of the central opening 34. The chamfer clearance 41 is provided in order to ensure that the cassette 30 is properly installed in the holder 26 when the apparatus 10 is in use, as will be described hereinafter. 20 The chamfer clearance 41 is provided on the full periphery of the cassette 30, but may also be partial (i.e., not on the full periphery of the central opening of the cassette).

Referring to Fig. 1, the holder 26 includes a top annular flange 42 extending inwardly from the top of the bin 25 12. A tubular wall 44 extends downwardly from an inner end of the top annular flange 42. The holder 26 has a horizontal flange 45 at a bottom of the wall 44, so as to define a seat supporting the cassette 30. One will also appreciate that the holder 26 may take many alternate shapes 30 and forms.

Referring to Figs. 1 and 3A-3C, the apparatus 10 further includes a closing mechanism 50 whose purpose is to provide access to the flexible tubing 32 extending therebelow and preventing odors from escaping from the 35 flexible tubing 32. In one form of use, it permits the disposable objects to push down against the bottom of the tubing 32 (at the knot 40) to draw out loose flexible tubing

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from the receptacle 38 of the cassette 30. One aspect of note is that the flexible tubing 32 passes over receptacle 38 and the closing mechanism 50, thereby isolating the receptacle 38 and the mechanism 50 from the disposable
5 objects to be packaged, reducing the need for constant cleaning of the walls defining the opening 34 and the mechanism 50. In this respect, one will appreciate that one of the preferred uses for the apparatus 10 is the disposal of baby diapers.

10 The closing mechanism 50 comprises a fixed portion 52, which comprises a generally "C"-shaped member rigidly connected to the wall 44 of the holder 26. Alternate types of connections are also possible for the fixed portion 52, including connection to an additional support member
15 connected to the holder 26 or to another part of the top portion 14. The curved fixed portion 52 defines a rounded apex 54 which projects into the opening 22, as can be seen in Fig. 1. The fixed portion 52 defines a receiving surface 56 downwardly inclined toward a movable portion 58 of the
20 closing mechanism 50.

The movable portion 58 of the closing mechanism 50 is also generally "C"-shaped in cross-section and is biased against the fixed portion 52 in a closed position shown in Figs. 1 and 3A such as to generally close the opening 22 of
25 the apparatus 10, thereby sealing the tubing 32 shut. The curved movable portion 58 defines a rounded apex 60 projecting into the opening 22, as can be seen in Fig. 1. The movable portion 58 defines a receiving surface 62 downwardly inclined toward the fixed portion 52, the two
30 receiving surfaces 56,62 forming a trough directing an object therebetween. In the closed position, contact between the two portions 52,58 is between the apex 60 of the movable portion 58 and a lower part of the fixed portion 52 located below the apex 54 thereof. These portions are wave-
35 shaped in cross-section to provide an ergonomical shape in view of hands contacting them, as illustrated in Fig. 1. Moreover, these wave-shaped portions provide efficient

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sealing of a plastic film tube 32 engaged or pinched therebetween.

The movable portion 58 is slidingly supported by a pair of spaced-apart, generally vertical walls 64 (only one of which is shown in Fig. 1) extending downwardly from the holder 26, with the opening 22 being aligned therebetween. Each of the walls 64 has an angled slot 66. In the embodiment shown, the slots 66 are angled at approximately 40 degrees with respect to the horizontal, although any other working angles are suitable.

The movable portion 58 includes aligned sliding members 66A extending therefrom and engaging the slots 66, such that the movable portion 58 is slidingly movable along an angular direction defined by the slots 66, and thus along direction A. The movable portion 58 can move between a closed position, as illustrated in Figs. 1 and 3A, in which the movable portion 58 abuts against the fixed portion 52 to seal the tubing 32 shut, and an opened position (shown in Fig. 3C) enough to let a disposable object to pass between the portions 52 and 58. The movable portion 58 is biased to the closed position of Fig. 1, for using an elongated helical spring 67 connected to and extending between the sliding members 66A of the movable portion 58 and around the back of the fixed portion 52. The concave shape of the back of the fixed portion 52 helps maintain the spring aligned in a plane defined by the slots 66.

It is of particular importance that the cassette 30 be installed in the appropriate orientation. In the appropriate orientation, as illustrated in Fig. 1, the tubing 32 is deployed from the top of the cassette 30. Accordingly, the tubing 32 covers the side walls of the cassette 30 in the opening 34. Accordingly, as the tubing 32 covers the cassette 30, there is no risk of contamination of the walls of the cassette.

As is clearly seen in Fig. 1, the chamfer clearance 41 is positioned downwardly. A path of movement of the movable portion 58 is illustrated at B. It is

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observed that the movable portion 58 passes closely to the wall defining the chamfer clearance 41. If the chamfer clearance 41 were not provided, the cassette 30 would impede the movement of the movable portion 58. Accordingly, if the cassette 30 were installed upside down, the movable portion 58 would be prevented from moving along its path. Therefore, if a user person wants to use the cassette 30 properly, the cassette 30 must be oriented properly.

Alternately, the fixed portion 52 can be replaced by a portion movable opposite of the movable portion 58, the two being biased together in the closed position. Such a configuration could be, for example, two sliding members symmetrical with respect to one another about a vertical axis defined at the point of contact therebetween, such as two "C"-shaped members similar in configuration to the movable member 58 shown, two rollers, etc., which are slidable away from each other upon downwardly pushing an object thereon, and are biased together for example by being interconnected by one or a plurality of springs. However, such a mechanism includes additional parts.

In order to assist the user in correctly placing the disposable object in the tubing 32, the apparatus 10 advantageously has the funnel 25 removably installed over the cassette 30, providing a downward shape around the openings 22,34, which creates a funnel effect and guides the user's hand. A handle 68 is provided to remove the lid 24/funnel 25 assembly.

Referring to Fig. 1, the apparatus 10 can further include, within the bin 12, an integrated cutting tool 70, which can be for example attached to one of the vertical walls 64, and which includes a blade located between two spaced-apart protective fingers sized such as to prevent a user's finger from reaching the blade but still allowing a portion of tubing 32 to be inserted between the fingers to be cut with the blade.

In order to prepare the apparatus 10 for use, and with reference to Fig. 1, a user person removes the lid 24

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and funnel 25 assembly and inserts the cassette 30 in the correct orientation (i.e., with the chamfer clearance 41 facing downward. The user person withdraws a free end of the tubing 32 from the cassette 30, takes a leading edge of flexible tubing 32, ties it into the knot 40 and pushes the knot 40 through the openings 22,34 and beyond the closing mechanism. It is pointed out that the knot 40 may be made prior to the cassette 30 being installed. The movable portion 58 opens as a result of the downward pressure, whereby the knot 40 reaches the enclosure 18 below the closing mechanism 50.

Alternately, the tube end with the knot 40 could be pulled down to the bottom of the bin 12, for example by pivoting and opening the top portion 14 such as to gain access to the enclosure 18, and pulling the tube end with the knot 40 through the closing mechanism 50 and beyond to the bottom of the bin 12. The top portion 14 is then re-engaged with the bottom portion, and the lid 24/funnel 25 assembly is reinstalled on the top portion 14. Accordingly a length of empty flexible tubing 32 extends to the bottom and is now ready to receive disposable objects therein. Therefore, the film material is not pulled from the cassettes 30 as disposable objects are placed into the tube.

In use, when a disposable object needs to be packaged, the lid 24 of the apparatus 10 is lifted, thereby providing access to the opening 22. The disposable object to be packaged is placed into the opening 22 (in this case, the cassette 30 of flexible tubing 32 surrounds the object). The receiving surfaces 56,62 of the fixed and movable portions 52,58 of the closing mechanism 50 biased together in the closed position form a trough which directs the disposable object in the hand of a user person toward a contact region therebetween.

The user person pushes the disposable object in a downward direction, gradually opening the movable portion 58, as is shown in Figs. 3B and 3C. The angled receiving surface 62 of the movable portion 58 helps the downward

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force to be easily converted along the direction of the slots 66 such as to force the movable portion 58 from its closed position in contact with the fixed portion 52 (Fig. 3A) to its open position (Fig. 3C) against the force of the spring 67, through a sliding movement illustrated by direction A in Fig. 1. Since the movable portion 58 is moved by the force applied on the disposable object, it slides only enough for the disposable object to go past the closing mechanism 50, with most of the opening created by the movement of the movable portion 58 being blocked by the disposable object such as to minimize the propagation of odors through the opening 22.

Once the disposable object passes beyond the apex 60 of the movable portion 58, the user person releases the disposable object and withdraws his or her hand. The movable portion 58, under the action of the spring 67, rapidly returns to the closed position of Figs. 1 and 3A, through a sliding movement, effectively sealing the object within the flexible tubing 32. The curved profile of the fixed portion 52 below the apex 60 and, more importantly, of the movable portion 58 below the apex 60 helps push the disposable object further down, if there is resistance, as the movable portion 58 returns to the closed position to apply a downward pushing force.

It is pointed out that different configurations of the cassette are considered. For instance, clearances of different shapes can be used instead of a chamfer. The use of a chamfer shape does not substantially reduce the volume of the receptacle 38 of the cassette 30, thereby generally preserving the quantity of tubing 32 received in the cassette 30.

In an alternative embodiment illustrated in Figs. 4, 5A and 5B, the cassette 30' is provided with a tapered clearance 41' (forming a frustoconical geometry at the outer periphery of the bottom of the cassette 30') as opposed to a chamfer clearance 41. The tapered clearance 41' is used in conjunction with a tapered flange 44' in the

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holder 26 of the apparatus 10, as is clearly illustrated in Fig. 4 (i.e., the flange 44' defines an interference member of frustoconical shape). Accordingly, this complimentary shape ensures that the cassette 30' is properly oriented in the holder 26, otherwise the funnel 25 could not be installed properly on the top of the bin 12. Moreover, the lid 24 and funnel 25 assembly would have problems closing with the improper orientation of the cassette 30'. It is pointed out that like reference numerals refer to like elements in Figs. 1 and 4.

For each new disposable object to be packed, the process is repeated, each time either dropping the disposable object within the already drawn length of flexible tubing 32 within the enclosure 18, or drawing out an additional length of flexible tubing 32 from the cassette 30 to accommodate another disposable object as the disposable object moves down into the tube inside the apparatus 10, until the enclosure 18 is full, containing an object-filled segment of flexible film tubing 32. In this case, the top portion 14 is pivoted away from the bottom portion. The flexible tubing 32 is then cut, for example by using the cutting tool 70 provided, and then tied to form a substantially sealed pouch which can be removed from the bin 12. The top portion 14 is pivoted back into engagement with the bottom portion to use the apparatus 10 again as described above.

In another embodiment of the apparatus 10 using the cassette 30 of Figs. 2A and 2B, the fixed portion 52' of the closing mechanism 50 has an upper end 54' that extends upwardly in the opening 22 of the bin 12. The upper end 54' is sized such that it also extends into the opening 34 of the cassette 30 when the cassette 30 is positioned in the holder 26. If it were positioned upside down, the cassette 30 would extend above the annular flange 42, and the ring 68 would not be positionable on the bin 12.

In another embodiment illustrated by Fig. 7, the holder 26 features an interfering member 70 that has a shape

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that is complementary to that of the cassette 30 with the chamfer clearance 41. With the presence of the interfering member 70, the cassette 30 must properly be installed in the holder 26 to be used. AS illustrated in Fig. 7, a pair of
5 interfering members 70 may optionally be provided on both side of the holder 26.

Advantages of the apparatus 10 include the use of a wedge-type closing mechanism 50 of simple construction with few parts to seal the flexible tubing 32. The cassette
10 configurations ensure that the cassette 30 is properly installed in the holder 26, thereby preventing contamination of the walls of the cassette (and the hands of the user person) as the properly installed cassette is mostly covered by the tubing 32 as is shown in Fig. 1. The mechanism 50
15 greatly reduces the complexity of the apparatus 10, makes the assembly simple, and allows for the use of a lesser quantity of flexible tubing 32 than prior-art devices. Furthermore, angling the course of the movable portion 58 permits the optimization of little horizontal clearance
20 versus the force required to bias the movable portion 58. Finally, the shape of the individual portions of the mechanism prevents disposable objects from "coming back up" - that is, once a disposable object has been inserted under pressure to pull film material, it will be forced to
25 remain in the flexible tubing by the closing mechanism 50.

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CLAIMS:

- 1) A cassette for packaging soiled diapers into an elongated tube of flexible material, the cassette comprising:
 - a) a receptacle including a wall delimiting a central opening, the central opening extending along a generally vertical central axis;
 - b) the receptacle defining a storage area circumscribing the central opening and receiving the elongated tube of flexible material outwardly of the wall;
 - c) the cassette including an outer boundary spaced outwardly of the wall;
 - d) a cover at a top portion of the storage area, the cover engaging the wall and extending outwardly therefrom toward the outer boundary of the cassette;
 - e) the cassette dispensing the elongated tube of flexible material from the top portion of the storage area;
 - f) the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outwardly of an imaginary projection of the wall extending downwardly along the central axis;
 - g) a first portion of the storage area that is located outwardly of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance;
 - h) the cassette configured for installation in a soiled diaper disposal device, the soiled diaper disposal device including a holder for receiving the cassette, the holder having a projection, the clearance being configured for

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receiving the projection when the cassette is seated in the holder.

- 2) A cassette as defined in claim 1, wherein the wall is a tubular wall, the cover having an outer edge portion, the outer edge portion being located closer to the outer boundary of the cassette, than to the tubular wall.
- 3) A cassette as defined in claim 2, wherein the cover has an inner edge portion connected to said tubular wall.
- 4) A cassette as defined in claim 3, wherein the cover has an intermediate portion between said inner edge portion and said outer edge portion.
- 5) A cassette as defined in claim 4, wherein the inner edge portion terminates at a location below the intermediate portion.
- 6) A cassette as defined in anyone of claims 2 to 5, wherein the tubular wall has a lower edge, the lower edge being circular and uninterrupted.
- 7) A cassette as defined in claim 6, wherein the cassette has a bottom wall.
- 8) A cassette as defined in claim 7, wherein the bottom wall has an inner edge located radially outwardly of the lower edge.
- 9) A cassette as defined in claim 8, comprising a transition wall extending from the lower edge of the tubular wall to the inner edge of the bottom wall.

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- 10) A cassette as defined in claim 9, wherein the transition wall is symmetric about the central axis.
- 11) A cassette as defined in claim 10, wherein a cross-section of the transition wall taken in a vertical imaginary plane in which lies the central axis, is substantially straight.
- 12) A cassette as defined in anyone of claims 2 to 11, wherein the tubular wall is an inner tubular wall, the receptacle includes an outer tubular wall defining the outer boundary of the cassette.
- 13) A cassette as defined in claim 12, wherein the outer tubular wall and the inner tubular wall are integrally formed.
- 14) A cassette as defined in anyone of claims 1 to 13, wherein the clearance has the shape of a chamfer.
- 15) A cassette as defined in anyone of claims 1 to 14, wherein the clearance extends on a full periphery of the central opening.
- 16) A cassette as defined in anyone of claims 1 to 15, wherein the cassette has an outer periphery that tapers downwardly.
- 17) A cassette as defined in anyone of claims 1 to 16, wherein the elongated tube is stored in the storage area in an accumulated condition.
- 18) A cassette as defined in anyone of claims 1 to 17, wherein the elongated tube of flexible material is dispensed from the storage area through the central opening while overlying the cover.

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- 19) A cassette as defined in anyone of claims 1 to 18, wherein the cover having a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent the convex edge portion.
- 20) A cassette as defined in claim 19, wherein the inwardly recessed edge portion is concave.
- 21) A cassette for packing soiled diapers into an elongated tube of flexible material, the cassette comprising:
 - a) a receptacle including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis;
 - b) the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall;
 - c) the cassette including an outer boundary spaced outward of the tubular wall;
 - d) a cover at a top portion of the storage area, the cassette being configured to dispense the tube of flexible material from the storage area through the central opening while the tube overlies the cover;
 - e) the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outward an imaginary projection of the tubular wall extending downwardly along the central axis;
 - f) a first portion of the storage area that is located outward of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance;

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- g) the cassette configured for installation in a soiled diaper disposal device, the soiled diaper disposal device including a holder for receiving the cassette, the holder having a projection, the clearance being configured for receiving the projection when the cassette is seated in the holder.
- 22) A cassette as defined in claim 21, wherein the cover has an outer edge portion, the outer edge portion being located closer to the outer boundary of the cassette than to the tubular wall.
- 23) A cassette as defined in claim 22, wherein the cover has an inner edge portion connected to said tubular wall.
- 24) A cassette as defined in claim 23, wherein said cover has an intermediate portion between said inner edge portion and said outer edge portion.
- 25) A cassette as defined in claim 24, wherein the inner edge portion terminates at a location below the intermediate portion.
- 26) A cassette as defined in anyone of claims 21 to 25, wherein the clearance has the shape of a chamfer.
- 27) A cassette as defined in anyone of claims 21 to 26, wherein the clearance extends on a full periphery of the central opening.
- 28) A cassette as defined in anyone of claims 21 to 27, wherein the tubular wall has a lower edge, the lower edge being circular and uninterrupted.

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- 29) A cassette as defined in claim 28, wherein the cassette has a bottom wall.
- 30) A cassette as defined in claim 29, wherein the bottom wall has an inner edge located radially outwardly of the lower edge.
- 31) A cassette as defined in claim 30, comprising a transition wall extending from the lower edge of the tubular wall to the inner edge of the bottom wall.
- 32) A cassette as defined in claim 31, wherein the transition wall is symmetric about the central axis.
- 33) A cassette as defined in claim 32, wherein a cross-section of the transition wall taken in a vertical imaginary plane in which lies the central axis, is substantially straight.
- 34) A cassette as defined in anyone of claims 21 to 33, wherein the tubular wall is an inner wall, the receptacle including an outer wall defining the outer boundary of the cassette.
- 35) A cassette as defined in claim 34, wherein the outer wall and the inner wall are integrally formed.
- 36) A cassette as defined in anyone of claims 21 to 35, wherein the cassette has an outer periphery that tapers downwardly.
- 37) A cassette as defined in anyone of claims 21 to 36, wherein the elongated tube is stored in the storage area in an accumulated condition.

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- 38) A cassette as defined in anyone of claims 21 to 37, wherein the cover having a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent the convex edge portion.
- 39) A cassette as defined in claim 38, wherein the inwardly recessed edge portion is concave.
- 40) A cassette for use in a diaper pail, the diaper pail comprising:
- a) a storage area for holding soiled diapers;
 - b) an opening for introducing soiled diapers in the storage area;
 - c) a holder for the cassette proximal the opening, including :
 - i) a bottom wall;
 - ii) a projecting portion extending above the bottom wall, the projecting portion being located radially inward from the bottom wall with relation to an axis of the opening;
 - d) the cassette configured for dispensing an elongated tube of flexible material, including:
 - i) a receptacle including:
 - (1) a tubular wall delimiting a central opening;
 - (2) a bottom located outwardly of the tubular wall, the tubular wall connecting with the bottom;
 - (3) a cover at a top portion of the receptacle, the cover engaging the tubular wall and extending outwardly therefrom toward an outer boundary of the cassette;
 - ii) the receptacle defining a storage space in which the elongated tube of flexible material is stored outwardly of the tubular wall;

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- iii) the bottom of the receptacle configured to sit on the bottom wall of the holder when the cassette is loaded in the holder;
 - iv) the receptacle defining a clearance located inwardly of the bottom, the clearance configured to receive the projecting portion when the bottom of the receptacle sits on the bottom wall of the holder.
- 41) A cassette as defined in claim 40, the cassette being configured to dispense the tube of flexible material from the storage space, through the central opening while the tube overlies the cover.
- 42) A cassette as defined in claim 41, wherein the tubular wall is an inner tubular wall, the receptacle includes an outer wall located outwardly from the inner tubular wall.
- 43) A cassette as defined in claim 42, wherein the cover has an outer edge portion, the outer edge portion being located closer to the outer wall than to the inner tubular wall.
- 44) A cassette as defined in claim 43, wherein the cover has an inner edge portion connected to said inner tubular wall.
- 45) A cassette as defined in claim 43, wherein the tube of flexible material is dispensed through a gap defined between the outer edge portion and the outer wall.
- 46) A cassette as defined in claim 40, wherein the clearance extends continuously along the tubular wall.

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- 47) A cassette as defined in claim 40, wherein the receptacle includes an intermediate wall connecting the tubular wall with the bottom of the receptacle, the intermediate wall forming a boundary of the clearance.
- 48) A cassette as defined in claim 47, wherein the tubular wall includes a lower edge portion, the intermediate wall connecting with the lower edge portion.
- 49) A cassette as defined in claim 48, wherein the intermediate wall is an obliquely extending wall.
- 50) A cassette as defined in claim 49, wherein the tubular wall, the intermediate wall and the bottom extend continuously.
- 51) An assembly of a diaper pail and cassette comprising:
- a) a storage area for holding soiled diapers;
 - b) an opening for introducing soiled diapers in the storage area;
 - c) a holder for the cassette proximate the opening including :
 - i) a bottom wall;
 - ii) a projecting portion extending above the bottom wall, the projecting portion being located radially inward from the bottom wall with relation to an axis of the opening;
 - d) the cassette configured for dispensing an elongated tube of flexible material, including:
 - i) a receptacle including:
 - (1) a tubular wall delimiting a central opening;
 - (2) a bottom located outwardly of the tubular wall, the tubular wall connecting with the bottom;

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- (3) a cover at a top portion of the storage area, the cover engaging the tubular wall and extending outwardly therefrom toward an outer boundary of the cassette;
 - ii) the receptacle defining a storage space in which the elongated tube of flexible material is stored outwardly of the tubular wall;
 - iii) the bottom of the receptacle being supported by the bottom wall of the holder when the cassette is loaded in the holder;
 - iv) the receptacle defining a clearance located inwardly of the bottom, the clearance receiving the projecting portion when the bottom of the receptacle sits on the bottom wall of the holder.
- 52) A cassette for dispensing pleated film tubing, configured for one-way insertion in a waste storage container, the cassette comprising:
- a) a receptacle including:
 - i) an inner tubular wall delimiting a central opening;
 - ii) an outer tubular wall spaced outwardly from the inner tubular wall, the inner tubular wall and the outer tubular wall defining therebetween a storage compartment circumscribing the central opening;
 - b) the pleated film tubing being received in the storage compartment;
 - c) a cover at a top portion of the storage area, the cover engaging the inner tubular wall and extending outwardly therefrom toward the outer tubular wall, the cover including an outer edge portion defining with the outer tubular wall a film tubing dispensing gap;

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- d) the cover and the inner tubular wall defining a structure configured to support and guide the film tubing as the film tubing is dispensed from the dispensing gap through the central opening;
 - e) clearance means in a bottom portion of the receptacle for inter-fitting engagement with a projection in a cassette holder of the waste storage container, the clearance means operating to establish a use position of the cassette in the waste storage container in which the film tubing is dispensed through the central opening.
- 53) A cassette as defined in claim 52, wherein the central opening extends along a generally vertical axis, the clearance means includes an upwardly tapering frusto-conical wall in the bottom portion of the receptacle that is symmetrical around the vertical axis.
- 54) A cassette as defined in claim 53, wherein the frusto-conical wall includes an external face and an opposite internal face, the internal face being oriented towards the storage compartment and defining a boundary of the storage compartment which extends obliquely with relation to the vertical axis.
- 55) A cassette as defined in claim 54, wherein the boundary operates to contain the pleated film tubing inside the storage compartment.
- 56) A cassette as defined in claim 55, wherein the frusto-conical wall has an upper end portion connecting with a lower end portion of the inner tubular wall.

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- 57) A cassette as defined in claim 56, wherein the cover includes an inner edge portion, which engages the inner tubular wall, the inner edge portion being located below the outer edge portion.
- 58) A cassette as defined in claim 52, wherein the outer edge portion includes a lip which projects upwardly, when the film tubing is dispensed through the dispensing gap, the lip slidingly engaging the film tubing.
- 59) A cassette as defined in claim 52, wherein the dispensing gap is generally annular.
- 60) A cassette as defined in claim 52, wherein the inner tubular wall is generally annular.
- 61) A cassette as defined in claim 52, wherein the outer tubular wall is generally annular.

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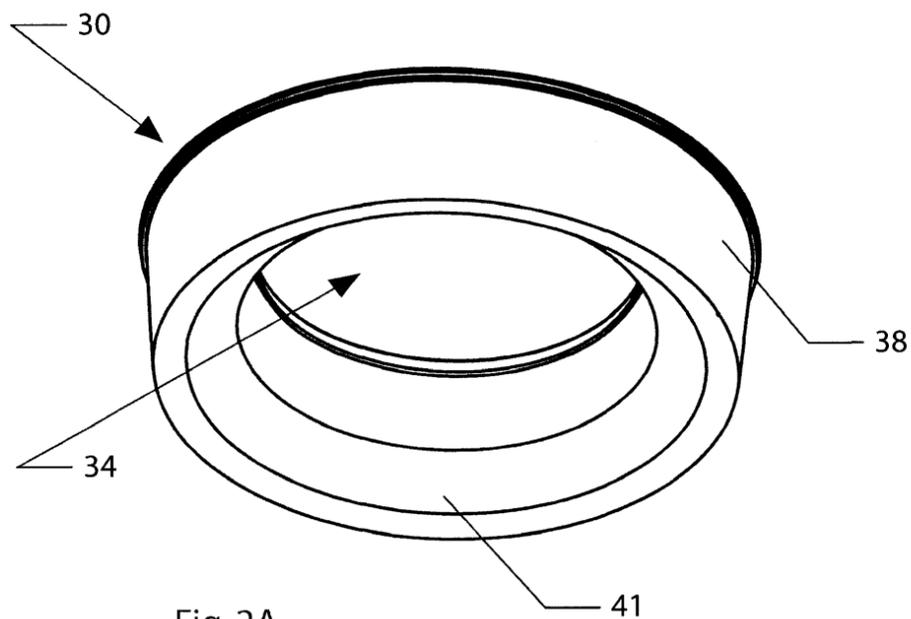


Fig. 2A

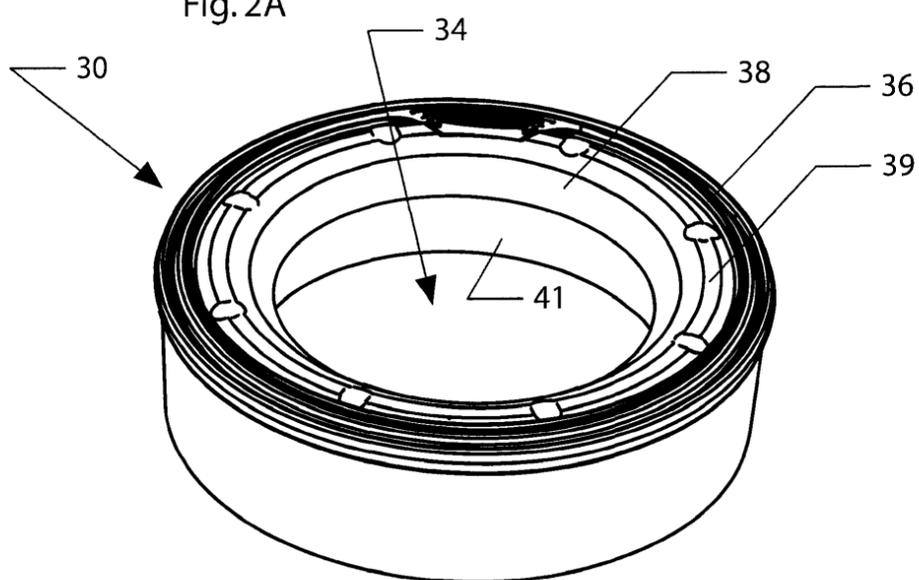


Fig. 2B

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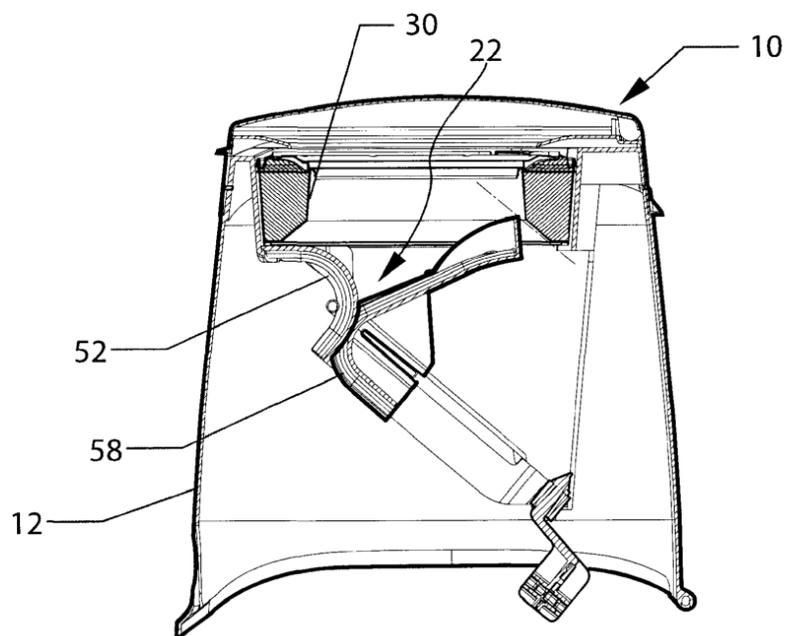


Fig.3A

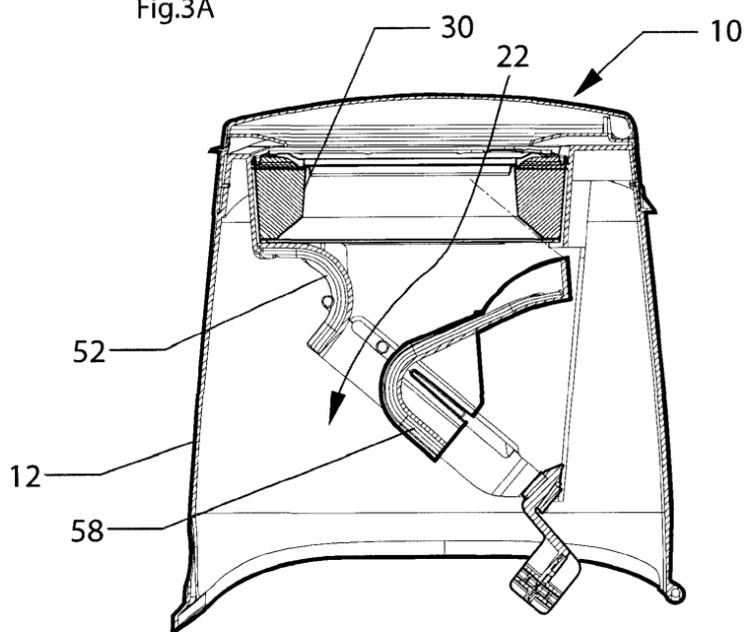


Fig.3B

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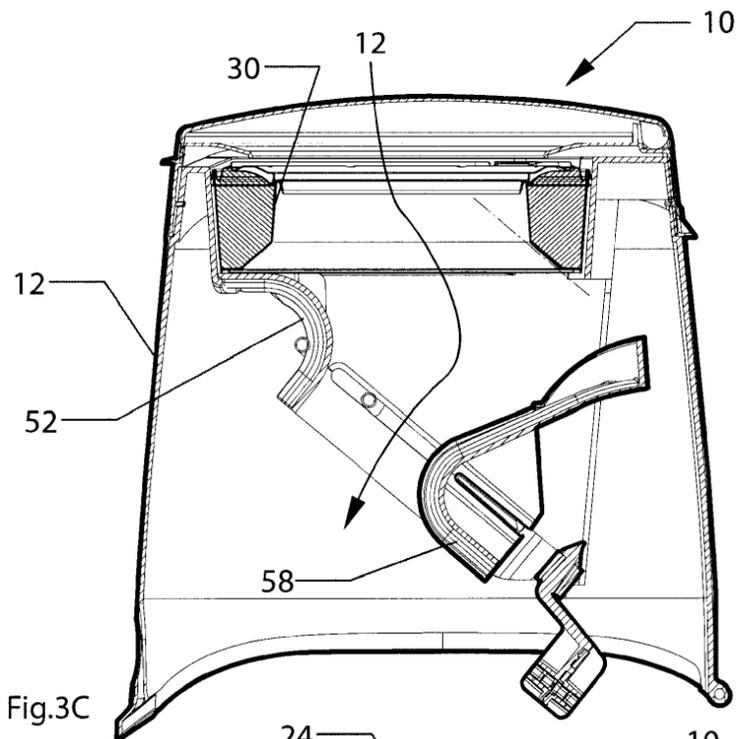


Fig.3C

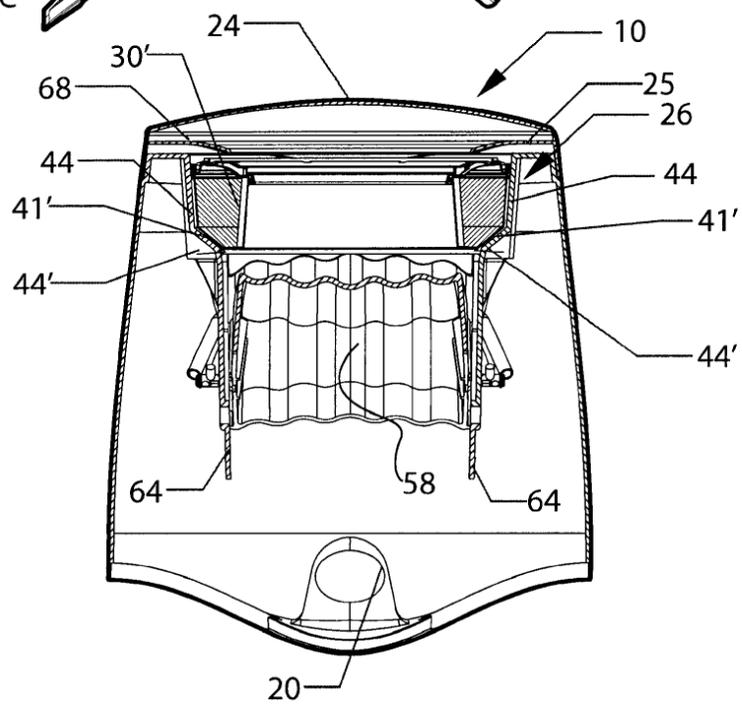
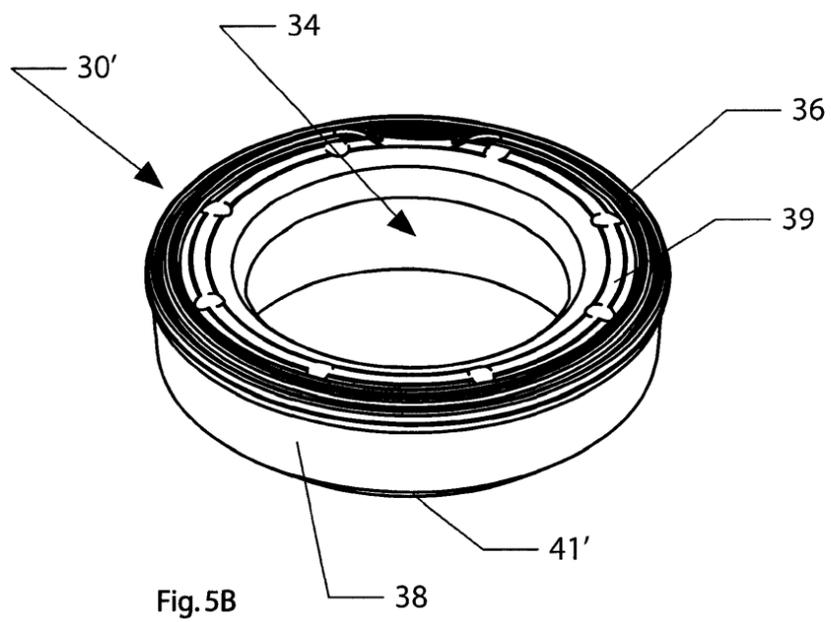
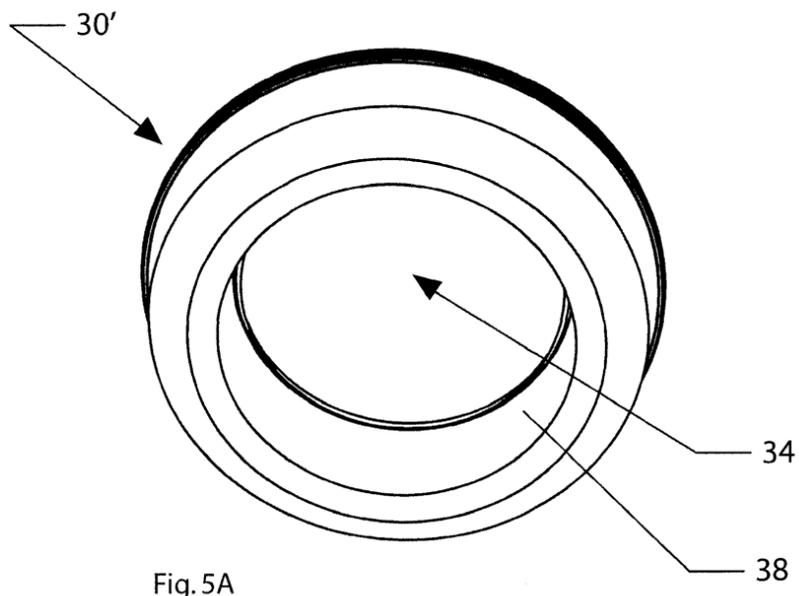


Fig.4

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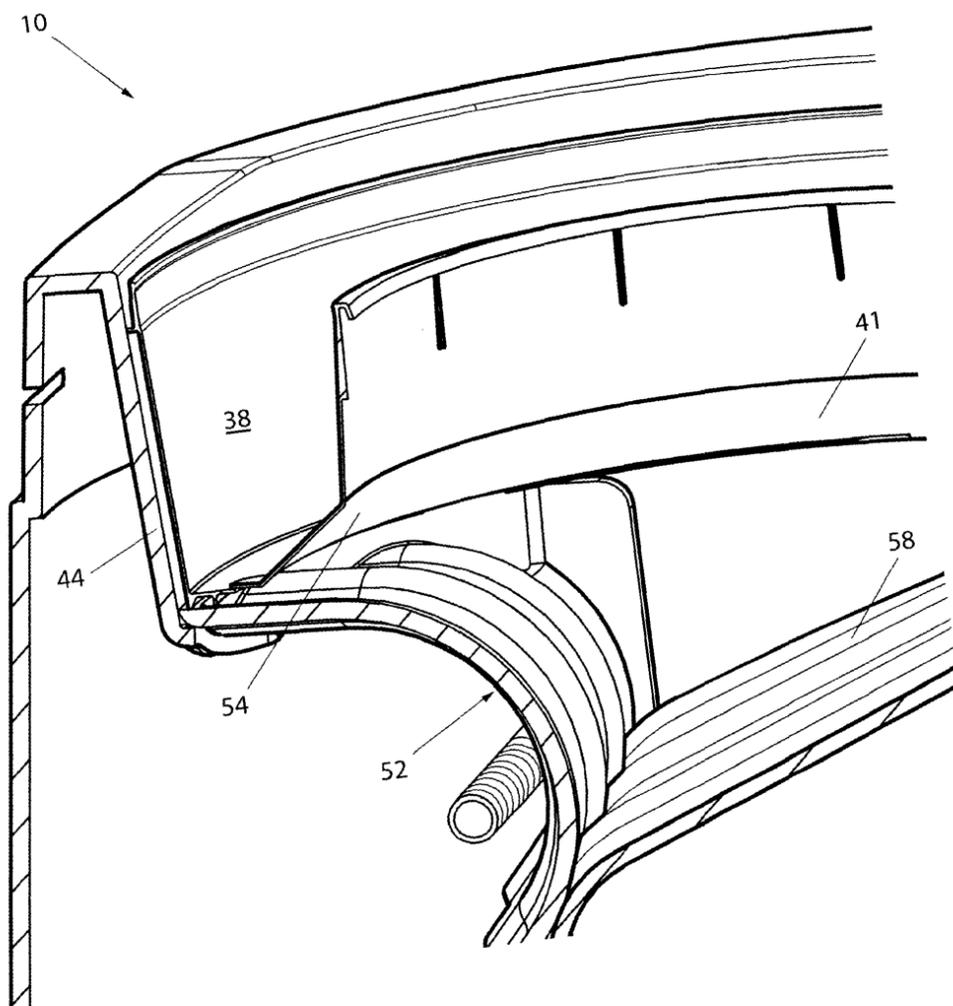


Fig.6

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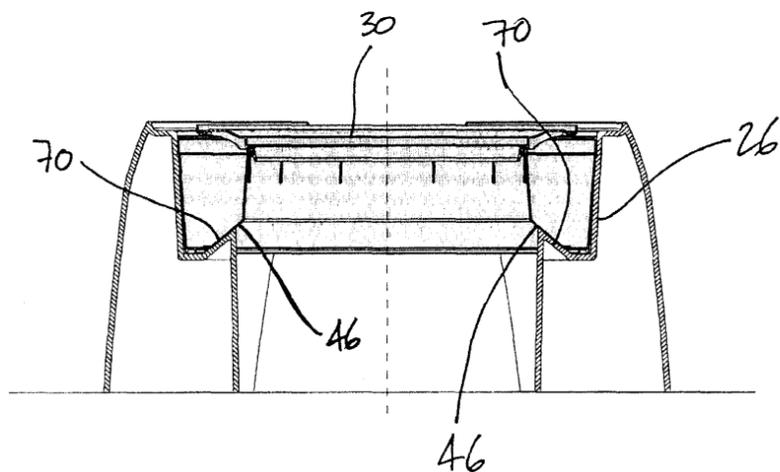


Fig. 7



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CA 2937312 C 2017/04/11

(11)(21) **2 937 312**

(12) **BREVET CANADIEN
CANADIAN PATENT**

(13) **C**

(22) Date de dépôt/Filing Date: 2008/10/03

(41) Mise à la disp. pub./Open to Public Insp.: 2016/10/07

(45) Date de délivrance/Issue Date: 2017/04/11

(62) Demande originale/Original Application: 2 855 159

(30) Priorité/Priority: 2007/10/05 (EP07019571.4)

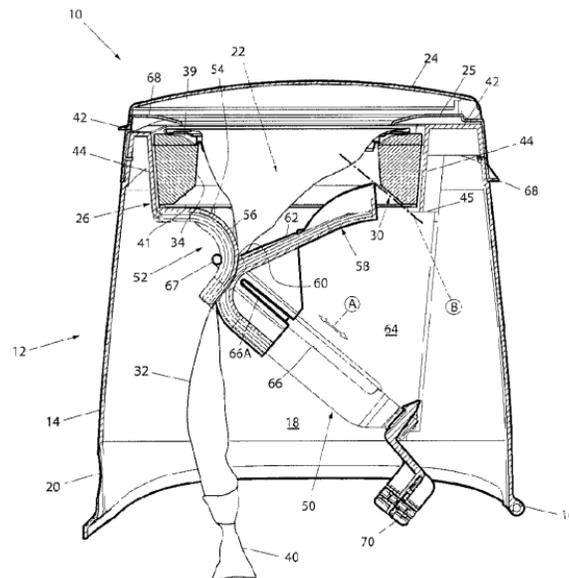
(51) Cl.Int./Int.Cl. *B65B 9/10* (2006.01),
B05B 1/04 (2006.01), *B05B 1/20* (2006.01),
B05B 12/00 (2006.01), *B05B 17/00* (2006.01),
B05B 17/08 (2006.01), *B65B 67/12* (2006.01),
B65F 1/06 (2006.01)

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(54) Titre : CARTOUCHE ET APPAREIL D'EMBALLAGE D'OBJETS JETABLES DANS UN TUBE DE MATIERE SOUPLE
(54) Title: CASSETTE AND APPARATUS FOR PACKING DISPOSABLE OBJECTS INTO AN ELONGATED TUBE OF FLEXIBLE MATERIAL



(57) Abrégé/Abstract:

A cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition. An annular opening at an upper end of the annular receptacle is for dispensing the tubing. The annular receptacle defines a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of the central opening.

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CASSETTE AND APPARATUS FOR PACKING DISPOSABLE OBJECTS
INTO AN ELONGATED TUBE OF FLEXIBLE MATERIAL

FIELD OF THE APPLICATION

The present application relates to an apparatus for packaging disposable material or objects into a tube of flexible plastic film material. More specifically, the invention relates to an apparatus for use to package waste material, for example babies' disposable diapers, or any other kind of appropriate objects or material, into a tube of flexible plastic film material and to store the so packaged waste material in a hygienic and a substantially odor-free manner, until it is collected.

BACKGROUND OF THE ART

Known apparatuses of the above-mentioned type generally comprise a container having an open or openable upper portion in which the waste to be disposed of may be inserted and a bottom portion in which the disposed waste is stored. A ring-shaped cassette is mounted in the upper portion of the container, and contains, in a pleated form, a tube of flexible plastic film material which is formed into an elongated tube which is knotted at a bottom end and into which the waste material may be inserted and temporarily stored.

In use, the waste to be disposed of is inserted into the tube at the upper portion of the container and the tube and waste are then pushed through the open center of the cassette towards the bottom portion of the container for storage purposes. Closeable means are also provided for closing the tube below the cassette and thus preventing bad odors from escaping from the tube during storage.

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In Canadian Patent No. 1,298,191, these closeable means are disclosed as a core that can be turned by a lid about a cylinder in order to twist the tube at regular intervals to form successive "pouches" that are kept sealed while they are stored.

In Canadian laid-open Application No. 2,383,799, a squeezing device is mounted in the container below the cassette to pull the tube from the cassette and move it down together with the objects inserted into the container. This squeezing device comprises a pair of opposite rotatable members between which the tube is inserted. The rotatable members have a plurality of opposite bars extending transversely to the tube in order to squeeze the tube, keep it closed until other objects to be disposed of are inserted into the upper portion of the container, and pull it down to move the plastic film forming the tube and the objects contained therein towards the bottom portion of the container for storage purpose. Actuation of the rotatable members in unison and in opposite direction to achieve the requested squeezing, closing and pulling down of the plastic film tube is preferably obtained by actuation of a lever that is part of the container.

In Canadian laid-open Application No. 2,441,837, a plunging device is provided to compress the object to be disposed of, and push it into the tube and to the bottom part of the container. The plunging device includes two arms with pivoting flaps attached thereto and opposing pivotable slides.

All of these prior art devices have several disadvantages. Their mechanisms have many parts and are prone to breakage. These devices are also not user-friendly and difficult to understand the operation thereof when first

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purchased. They are costly to fabricate and they utilize excess film from the cassettes, adding to the cost of use. Some also do not effectively contain the odors of the disposed material. Some cause confusion in their installation, causing improperly oriented cassettes and contamination of the cassette walls.

SUMMARY OF THE APPLICATION

It is therefore an aim of the present invention to provide a novel apparatus for packing disposable objects into an elongated tube of flexible plastic film material that addresses issues associated with the prior art.

Therefore, in accordance with a first embodiment of the present application, there is provided a cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition, an annular opening at an upper end of the annular receptacle for dispensing the tubing, the annular receptacle defining a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of the central opening.

In accordance with the first embodiment, the clearance is in the shape of a chamfer.

In accordance with the first embodiment, a removable lid closes the annular opening of the annular receptacle.

In accordance with the first embodiment, an outer periphery of the annular receptacle tapers downwardly.

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In accordance with the first embodiment, the annular opening is adjacent to an outer periphery of the annular receptacle.

In accordance with the first embodiment, the clearance extends on the full periphery of the central opening.

In accordance with the first embodiment of the present application, there is provided an apparatus for packing at least one disposable object into an elongated tube of flexible material, comprising a bin defining an enclosure with an opening defined at a top thereof for receiving at least one disposable object to be packed; a holder within the bin proximate the opening; a closing mechanism located below the holder comprising first and second portions, the second portion being biased in a closed position against the first portion and defining a receiving surface for receiving the at least one disposable object, the second portion being slidable from the closed position to an open position through application of a substantially vertical force against the receiving surface and being slidable from the open position to the closed position under the action of biasing means, the closing mechanism in the open position defining a passage between the opening of the bin and a bottom portion of the enclosure located below the closing mechanism, the closing mechanism in the closed position closing the said passage; and the cassette supported by the holder in the opening of the bin with the clearance allowing the cassette not to impede the motion of the closing mechanism from the closed position to the open position.

Still in accordance with the first embodiment, the holder comprises a first annular flange extending inwardly from an outer wall of the bin, a tubular wall extending generally downwardly from an inner end of the first annular

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flange, and a second annular wall extending inwardly from a bottom end of the tubular wall, thus forming a seat for receiving the cassette.

Still in accordance with the first embodiment, the tubular wall tapers in a downward direction, and the annular body has a corresponding frustoconical outer periphery for complementary engagement of the cassette in the holder.

Still in accordance with the first embodiment, the opening of the bin is surrounded by a removable lid, the lid opening/closing access to the opening of the bin, the lid being prevented from being installed properly when the cassette is oriented upside down in the holder.

In accordance with a second embodiment of the present application, there is provided: a cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition, an annular opening at an upper end of the annular receptacle for dispensing the tubing, the annular receptacle defining a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of an outer periphery of the annular receptacle.

In accordance with the second embodiment, the clearance forms a frusto-conical geometry at the bottom of the annular receptacle.

In accordance with a third embodiment, there is provided: an apparatus for packing at least one disposable object into an elongated tube of flexible material, comprising: a bin defining an enclosure with an opening

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defined at a top thereof for receiving at least one disposable object to be packed; a holder within the bin proximate the opening, and an interfering member at a bottom of the holder; a closing mechanism located below the holder comprising first and second portions, the second portion being biased in a closed position against the first portion and defining a receiving surface for receiving the at least one disposable object, the second portion being slidable from the closed position to an open position through application of a substantially vertical force against the receiving surface and being slidable from the open position to the closed position under the action of biasing means, the closing mechanism in the open position defining a passage between the opening of the bin and a bottom portion of the enclosure located below the closing mechanism, the closing mechanism in the closed position closing the said passage; a cassette supported by the holder in the opening of the bin and having an annular receptacle to accommodate a length of tubing in an accumulated condition, the annular receptacle having an upper annular opening for dispensing the tubing such that the tubing extends through a central opening of the annular receptacle and with a knotted end thereof into the enclosure of the bin to receive disposable objects, whereby the closing mechanism closes the tubing, the annular body having a clearance in a bottom portion of an outer periphery of the annular receptacle, so as to cooperate with the interfering member for the cassette to be aligned with the top of the bin in a desired orientation; and a removable lid positioned flush on the top of the bin only when the cassette is in the desired orientation, the cover opening/closing access to the opening of the bin.

In accordance with another aspect, the invention provides a cassette for packaging soiled diapers into an

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elongated tube of flexible material. The cassette comprises: a receptacle including a wall delimiting a central opening, the central opening extending along a generally vertical central axis; the receptacle defining a storage area circumscribing the central opening and receiving the elongated tube of flexible material outwardly of the wall; cassette including an outer boundary spaced outwardly of the wall; a cover at a top portion of the storage area, the cover engaging the wall and extending outwardly therefrom toward the outer boundary of the cassette; the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outwardly of an imaginary projection of the wall extending downwardly along the central axis; a first portion of the storage area that is located outwardly of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a receptacle including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis; the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall; the cassette including an outer boundary spaced outward of the tubular wall; a cover at a top portion of the storage area, the cassette being configured to dispense the tube of flexible material from the storage area, through the central opening while the tube overlies the cover; the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outward an imaginary projection of the tubular wall

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extending downwardly along the central axis; a first portion of the storage area that is located outward of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a receptacle including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis; the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall; the cassette including an outer boundary spaced outward of the tubular wall; a cover at a top portion of the storage area, the cover having a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent to the convex edge portion; the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outward of an imaginary projection of the tubular wall extending downwardly along the central axis; a first portion of the storage area that is located outward of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a receptacle including a tubular wall delimiting a central opening; the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall; said tubular wall having a lower end portion;

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an oblique wall connecting with said lower end portion and extending radially outwardly and downwardly therefrom, the oblique wall defining a corner with the lower end portion having an angle substantially less than 270 degrees.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a generally annular storage area receiving the elongated tube of flexible material; the storage area including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis; the cassette having a top portion and an opposite bottom portion; a cross-section of the top portion of the cassette taken in a vertical plane containing the generally vertical central axis including a first wall segment that is adjacent the central opening and which diminishes in height in a radially inward direction; a cross section of the bottom portion of the cassette taken in the vertical plane including a second wall segment adjacent the central opening and which increases in height in a radially inward direction.

In accordance with another aspect, the invention provides use of a cassette in a diaper pail comprising a storage area for holding soiled diapers, an opening for introducing soiled diapers in the storage area and a holder for a cassette proximal the opening; the cassette configured for dispensing an elongated tube in which soiled diapers are enclosed when introduced in the storage area, the cassette including a receptacle for storing the elongated tube in a folded condition, the receptacle defining a central opening and having a top and a bottom, the cassette dispensing the elongated tube from the top of the receptacle; the cassette

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being configured to: create an interference with a component of the diaper pail to prevent proper operation of the diaper pail when the receptacle is loaded in the holder upside down, with the top of the receptacle located down; avoid the interference when the receptacle is loaded in the holder with the top located; wherein the component includes a lid assembly, the cassette and the diaper pail cooperating such that the cassette interferes with the lid assembly to prevent proper operation of the lid assembly when the receptacle is loaded in the holder upside down, with the top of the receptacle located down.

In accordance with another aspect, the invention provides a diaper pail comprising: a storage area for holding soiled diapers; an opening for introducing soiled diapers in the storage area; a holder for removably receiving a cassette proximal the opening; a cassette loaded in the holder, the cassette configured for dispensing an elongated tube in which soiled diapers are enclosed when introduced in the storage area, the cassette including an annular receptacle for storing the elongated tube in a folded condition, the annular receptacle defining a central opening and having a top and a bottom, the cassette dispensing the elongated tube from the top of the of the annular receptacle through the central opening; the cassette being configured to: create an interference with a component of the diaper pail to prevent proper operation of the diaper pail when the annular receptacle is loaded in the holder upside down, with the top of the annular receptacle facing down; avoid the interference when the annular receptacle is loaded in the holder in the correct orientation with the top facing up; wherein the component includes a lid, the cassette and the diaper pail cooperating such that the cassette interferes with the lid to prevent proper operation

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of the lid when the annular receptacle is loaded in the holder upside down, with the top of the annular receptacle facing down.

In accordance with another aspect, the invention provides an apparatus for packaging soiled diapers within an elongated tube of flexible plastic material, comprising: a storage area for receiving soiled diapers; an entrance for introducing soiled diapers in the storage area; a holder configured for releasably receiving a cassette for dispensing the tube material, the cassette having a central opening, the cassette dispensing the tube material from a top thereof through the central opening, the cassette including a recessed area on a lower portion thereof, the holder being proximal the entrance and including: a generally upwardly extending wall; a bottom wall; a projecting member upwardly extending above the bottom wall, the projecting member configured to engage the recessed area of the cassette when the cassette is fully seated in the holder and the cassette engages the bottom wall of the holder, wherein the projecting member is movable relative to the bottom wall.

In accordance with another aspect, the invention provides an apparatus for packaging soiled diapers in an elongated tube of plastic flexible material, the apparatus comprising: a storage area for receiving soiled diapers; an entrance for introducing soiled diapers in the storage area; a holder configured for releasably receiving a supply of the tube material such that the supply of the tube material extends through the entrance, the holder being proximal the entrance and including: a recess including an upwardly extending side wall; a bottom generally horizontally extending wall, the bottom wall being generally circular and

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surrounding the entrance; a tube gathering mechanism for sealing the tube when no soiled diaper is being pushed through the entrance, the tube gathering mechanism including: a closure member including a projection extending above the bottom wall of the holder, the closure member engaging the tube and being moveable with relation to the bottom wall to gather the tube; the closure member being responsive to pressure by a hand of a user to progressively open and allow insertion of a soiled diaper in the storage area; a stationary wall portion located below the bottom wall for slidably supporting the closure member during the movement of the closure member with respect to the bottom wall; a device connected to the closure member for driving the moveable member to move relative the bottom wall to gather the tube; a lid hingedly moveable between a closed position and an opened position, in the closed position the lid closing the holder, in the opened position the lid allowing access to the holder to permit installation of a new supply of tube material, the lid having a central funnel-shaped portion defining an aperture generally aligning with the entrance to the storage area, the aperture permitting insertion of a soiled diaper into the storage area.

In accordance with another aspect, the invention provides a cassette for use in a diaper pail. The diaper pail comprises: a storage area for holding soiled diapers; an opening for introducing soiled diapers in the storage area; a holder for the cassette proximal the opening, including : a bottom wall; a projecting portion extending above the bottom wall, the projecting portion being radially inward from the bottom wall with relation to an axis of the opening; the cassette configured for dispensing an elongated tube of flexible material, including: a

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receptacle including: a tubular wall delimiting a central opening; a bottom located outwardly of the tubular wall, the tubular wall connecting with the bottom; a cover at a top portion of the storage area, the cover engaging the tubular wall and extending outwardly therefrom toward an outer boundary of the cassette; the receptacle defining a storage space in which the elongated tube of flexible material is stored outwardly of the tubular wall; the bottom of the receptacle configured to sit on the bottom wall of the holder when the cassette is loaded in the holder; the receptacle defining a clearance located inwardly of the bottom, the clearance configured to receive the projecting portion when the bottom of the receptacle sits on the bottom wall of the holder.

In accordance with another aspect, the invention provides an assembly of a diaper pail and cassette comprising: a storage area for holding soiled diapers; an opening for introducing soiled diapers in the storage area; a holder for the cassette proximate the opening including : a bottom wall; a projecting portion extending above the bottom wall, the projecting portion being radially inward from the bottom wall with relation to an axis of the opening; the cassette configured for dispensing an elongated tube of flexible material, including: a receptacle including: a tubular wall delimiting a central opening; a bottom located outwardly of the tubular wall, the tubular wall connecting with the bottom; a cover at a top portion of the storage area, the cover engaging the tubular wall and extending outwardly therefrom toward an outer boundary of the cassette; the receptacle defining a storage space in which the elongated tube of flexible material is stored outwardly of the tubular wall; the bottom of the receptacle supported by the bottom wall of the holder when the cassette

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is loaded in the holder; the receptacle defining a clearance located inwardly of the bottom, the clearance receiving the projecting portion when the bottom of the receptacle sits on the bottom wall of the holder.

In accordance with another aspect, the invention provides a diaper pail. The diaper pail comprises: a top portion and a bottom portion connected by a hinge, the bottom portion defining a storage area for receiving soiled diapers, the top portion including a holder; the top portion being pivotable about the hinge to open the storage area and allow removal of a soiled diapers load from the storage area; a diaper pail refill received in the holder, the diaper pail refill configured for dispensing an elongated tube in which soiled diapers are enclosed when introduced in the storage area, the diaper pail refill having an annular receptacle storing the elongated tube in a folded condition, the annular receptacle including a downwardly extending annular wall defining a central opening; a cutter mounted to the top portion, the cutter being proximate the hinge; a length of the elongated tube extending from the diaper pail refill to the storage area, the length of the elongated tube extending past the cutter to allow a user desirous to empty the storage area to sever the elongated tube with the cutter in order to separate a portion of the elongated tube containing soiled diapers from a portion that is free of soiled diapers.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-sectional view of an apparatus according to a first embodiment of the present invention;

Fig. 2A is a bottom perspective view of a cassette to be used with the apparatus of Fig. 1;

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Fig. 2B us a top perspective view of the cassette of Fig. 2A;

Fig. 3A is a cross-sectional view of the apparatus of Fig. 1, without tubing, with a closing mechanism in a closed position;

Fig. 3B is a cross-sectional view of the apparatus of Fig. 3A, with the closing mechanism displaced toward an open position;

Fig. 3C is a cross-sectional view of the apparatus of Fig. 3A, with the closing mechanism in the fully open position;

Fig. 4 is a cross-sectional view of an apparatus according to a second embodiment of the present invention;

Fig. 5A is a bottom perspective view of a cassette to be used with the apparatus of Fig. 4;

Fig. 5B is a top perspective view of the cassette of Fig. 5A;

Fig. 6 is an enlarged perspective view of an apparatus in accordance with a third embodiment of the present invention; and

Fig. 7 is a sectional view illustrating the cassette of Fig. 2A as used with an apparatus having interfering members.

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DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. 1, there is shown an apparatus 10 for packaging disposable objects in an elongated tube of flexible plastic film material. The apparatus 10 comprises a bin 12 having a top portion 14 and a bottom portion (not shown) hingedly connected to each other by a hinge member 16, with outer walls of the top portion 14 and bottom portion defining an enclosure 18 of the bin 12.

The top portion 14 and bottom portion are locked together with a mechanism such as a push button latch (not shown) received in eyelet 20, located opposite of the hinge member 16. Upon actuation of the push button, the top portion 14 and bottom portion are disconnected and can be pivoted apart about the hinge member 16 to provide access to the enclosure 18, for example to empty the bin 12.

The top portion 14 defines an opening 22 for receiving disposable objects therethrough. The bin 12 further comprises a lid 24 hingedly connected to a ring 25, for instance in the shape of a funnel (hereinafter funnel 25), although multiple shapes are considered such as a flat ring, as long as the ring forms an opening guidance. The funnel 25 is mounted to the top portion 14 such as to selectively open and close access to the opening 22 through pivoting motion of the lid 24. Although in the embodiment shown the apparatus has a generally circular opening 22, the bin 12 is not limited to circular openings and could function with openings of different shapes.

Still referring to Fig. 1, the apparatus 10 also comprises a holder 26 located within the top portion 14 proximate the opening 22 for holding a cassette 30 of flexible plastic film tubing 32. The cassette 30 has an

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annular body defining a central opening 34 which is generally aligned with the bin opening 22 when the cassette 30 is accommodated in the holder 26.

Referring concurrently to Figs. 1, 2A and 2B, the cassette 30 has a lid 36 and a bottom annular receptacle 38. After the lid 36 is removed, the flexible tubing 32 exits from an upper annular opening of the receptacle 38, adjacent an outer periphery thereof. It is pointed out that once the lid 36 is removed, there remains an upper flange 39 adjacent to the annular opening that maintains the compressed tubing 32 in the receptacle 38. The cassette 30 comprises a length of flexible plastic film material that is accumulated (e.g., folded). As shown in Fig. 1, a knot 40 is found at the free end of the tubing 32 to form a bag end. The knot 40 and a length of the tubing 32 extend from the cassette 30 into the enclosure 18 of the bin 12, passing through the central opening 34 of the cassette 30. To better contain odors, it is preferable that the film material of the tubing 32 be a multiple layer film having an odor barrier therein such that odors do not permeate through the film material. The receptacle 38 of the cassette 30 defines a chamfer clearance 41 at a bottom of the central opening 34. The chamfer clearance 41 is provided in order to ensure that the cassette 30 is properly installed in the holder 26 when the apparatus 10 is in use, as will be described hereinafter. The chamfer clearance 41 is provided on the full periphery of the cassette 30, but may also be partial (i.e., not on the full periphery of the central opening of the cassette).

Referring to Fig. 1, the holder 26 includes a top annular flange 42 extending inwardly from the top of the bin 12. A tubular wall 44 extends downwardly from an inner end of the top annular flange 42. The holder 26 has a

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horizontal flange 45 at a bottom of the wall 44, so as to define a seat supporting the cassette 30. One will also appreciate that the holder 26 may take many alternate shapes and forms. .

Referring to Figs. 1 and 3A-3C, the apparatus 10 further includes a closing mechanism 50 whose purpose is to provide access to the flexible tubing 32 extending therebelow and preventing odors from escaping from the flexible tubing 32. In one form of use, it permits the disposable objects to push down against the bottom of the tubing 32 (at the knot 40) to draw out loose flexible tubing from the receptacle 38 of the cassette 30. One aspect of note is that the flexible tubing 32 passes over receptacle 38 and the closing mechanism 50, thereby isolating the receptacle 38 and the mechanism 50 from the disposable objects to be packaged, reducing the need for constant cleaning of the walls defining the opening 34 and the mechanism 50. In this respect, one will appreciate that one of the preferred uses for the apparatus 10 is the disposal of baby diapers.

The closing mechanism 50 comprises a fixed portion 52, which comprises a generally "C"-shaped member rigidly connected to the wall 44 of the holder 26. Alternate types of connections are also possible for the fixed portion 52, including connection to an additional support member connected to the holder 26 or to another part of the top portion 14. The curved fixed portion 52 defines a rounded apex 54 which projects into the opening 22, as can be seen in Fig. 1. The fixed portion 52 defines a receiving surface 56 downwardly inclined toward a movable portion 58 of the closing mechanism 50.

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The movable portion 58 of the closing mechanism 50 is also generally "C"-shaped in cross-section and is biased against the fixed portion 52 in a closed position shown in Figs. 1 and 3A such as to generally close the opening 22 of the apparatus 10, thereby sealing the tubing 32 shut. The curved movable portion 58 defines a rounded apex 60 projecting into the opening 22, as can be seen in Fig. 1. The movable portion 58 defines a receiving surface 62 downwardly inclined toward the fixed portion 52, the two receiving surfaces 56,62 forming a trough directing an object therebetween. In the closed position, contact between the two portions 52,58 is between the apex 60 of the movable portion 58 and a lower part of the fixed portion 52 located below the apex 54 thereof. These portions are wave-shaped in cross-section to provide an ergonomical shape in view of hands contacting them, as illustrated in Fig. 1. Moreover, these wave-shaped portions provide efficient sealing of a plastic film tube 32 engaged or pinched therebetween.

The movable portion 58 is slidably supported by a pair of spaced-apart, generally vertical walls 64 (only one of which is shown in Fig. 1) extending downwardly from the holder 26, with the opening 22 being aligned therebetween. Each of the walls 64 has an angled slot 66. In the embodiment shown, the slots 66 are angled at approximately 40 degrees with respect to the horizontal, although any other working angles are suitable.

The movable portion 58 includes aligned sliding members 66A extending therefrom and engaging the slots 66, such that the movable portion 58 is slidably movable along an angular direction defined by the slots 66, and thus along direction A. The movable portion 58 can move between a closed

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position, as illustrated in Figs. 1 and 3A, in which the movable portion 58 abuts against the fixed portion 52 to seal the tubing 32 shut, and an opened position (shown in Fig. 3C) enough to let a disposable object to pass between the portions 52 and 58. The movable portion 58 is biased to the closed position of Fig. 1, for using an elongated helical spring 67 connected to and extending between the sliding members 66A of the movable portion 58 and around the back of the fixed portion 52. The concave shape of the back of the fixed portion 52 helps maintain the spring aligned in a plane defined by the slots 66.

It is of particular importance that the cassette 30 be installed in the appropriate orientation. In the appropriate orientation, as illustrated in Fig. 1, the tubing 32 is deployed from the top of the cassette 30. Accordingly, the tubing 32 covers the side walls of the cassette 30 in the opening 34. Accordingly, as the tubing 32 covers the cassette 30, there is no risk of contamination of the walls of the cassette.

As is clearly seen in Fig. 1, the chamfer clearance 41 is positioned downwardly. A path of movement of the movable portion 58 is illustrated at B. It is observed that the movable portion 58 passes closely to the wall defining the chamfer clearance 41. If the chamfer clearance 41 were not provided, the cassette 30 would impede the movement of the movable portion 58. Accordingly, if the cassette 30 were installed upside down, the movable portion 58 would be prevented from moving along its path. Therefore, if a user person wants to use the cassette 30 properly, the cassette 30 must be oriented properly.

Alternately, the fixed portion 52 can be replaced by a portion movable opposite of the movable portion 58, the two

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being biased together in the closed position. Such a configuration could be, for example, two sliding members symmetrical with respect to one another about a vertical axis defined at the point of contact therebetween, such as two "C"-shaped members similar in configuration to the movable member 58 shown, two rollers, etc., which are slidable away from each other upon downwardly pushing an object thereon, and are biased together for example by being interconnected by one or a plurality of springs. However, such a mechanism includes additional parts.

In order to assist the user in correctly placing the disposable object in the tubing 32, the apparatus 10 advantageously has the funnel 25 removably installed over the cassette 30, providing a downward shape around the openings 22,34, which creates a funnel effect and guides the user's hand. A handle 68 is provided to remove the lid 24/funnel 25 assembly.

Referring to Fig. 1, the apparatus 10 can further include, within the bin 12, an integrated cutting tool 70, which can be for example attached to one of the vertical walls 64, and which includes a blade located between two spaced-apart protective fingers sized such as to prevent a user's finger from reaching the blade but still allowing a portion of tubing 32 to be inserted between the fingers to be cut with the blade.

In order to prepare the apparatus 10 for use, and with reference to Fig. 1, a user person removes the lid 24 and funnel 25 assembly and inserts the cassette 30 in the correct orientation (i.e., with the chamfer clearance 41 facing downward. The user person withdraws a free end of the tubing 32 from the cassette 30, takes a leading edge of flexible tubing 32, ties it into the knot 40 and pushes the

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knot 40 through the openings 22,34 and beyond the closing mechanism. It is pointed out that the knot 40 may be made prior to the cassette 30 being installed. The movable portion 58 opens as a result of the downward pressure, whereby the knot 40 reaches the enclosure 18 below the closing mechanism 50.

Alternately, the tube end with the knot 40 could be pulled down to the bottom of the bin 12, for example by pivoting and opening the top portion 14 such as to gain access to the enclosure 18, and pulling the tube end with the knot 40 through the closing mechanism 50 and beyond to the bottom of the bin 12. The top portion 14 is then re-engaged with the bottom portion, and the lid 24/funnel 25 assembly is reinstalled on the top portion 14. Accordingly a length of empty flexible tubing 32 extends to the bottom and is now ready to receive disposable objects therein. Therefore, the film material is not pulled from the cassettes 30 as disposable objects are placed into the tube.

In use, when a disposable object needs to be packaged, the lid 24 of the apparatus 10 is lifted, thereby providing access to the opening 22. The disposable object to be packaged is placed into the opening 22 (in this case, the cassette 30 of flexible tubing 32 surrounds the object). The receiving surfaces 56,62 of the fixed and movable portions 52,58 of the closing mechanism 50 biased together in the closed position form a trough which directs the disposable object in the hand of a user person toward a contact region therebetween.

The user person pushes the disposable object in a downward direction, gradually opening the movable portion 58, as is shown in Figs. 3B and 3C. The angled receiving surface 62 of the movable portion 58 helps the downward

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force to be easily converted along the direction of the slots 66 such as to force the movable portion 58 from its closed position in contact with the fixed portion 52 (Fig. 3A) to its open position (Fig. 3C) against the force of the spring 67, through a sliding movement illustrated by direction A in Fig. 1. Since the movable portion 58 is moved by the force applied on the disposable object, it slides only enough for the disposable object to go past the closing mechanism 50, with most of the opening created by the movement of the movable portion 58 being blocked by the disposable object such as to minimize the propagation of odors through the opening 22.

Once the disposable object passes beyond the apex 60 of the movable portion 58, the user person releases the disposable object and withdraws his or her hand. The movable portion 58, under the action of the spring 67, rapidly returns to the closed position of Figs. 1 and 3A, through a sliding movement, effectively sealing the object within the flexible tubing 32. The curved profile of the fixed portion 52 below the apex 60 and, more importantly, of the movable portion 58 below the apex 60 helps push the disposable object further down, if there is resistance, as the movable portion 58 returns to the closed position to apply a downward pushing force.

It is pointed out that different configurations of the cassette are considered. For instance, clearances of different shapes can be used instead of a chamfer. The use of a chamfer shape does not substantially reduce the volume of the receptacle 38 of the cassette 30, thereby generally preserving the quantity of tubing 32 received in the cassette 30.

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In an alternative embodiment illustrated in Figs. 4, 5A and 5B, the cassette 30' is provided with a tapered clearance 41' (forming a frustoconical geometry at the outer periphery of the bottom of the cassette 30') as opposed to a chamfer clearance 41. The tapered clearance 41' is used in conjunction with a tapered flange 44' in the holder 26 of the apparatus 10, as is clearly illustrated in Fig. 4 (i.e., the flange 44' defines an interference member of frustoconical shape). Accordingly, this complimentary shape ensures that the cassette 30' is properly oriented in the holder 26, otherwise the funnel 25 could not be installed properly on the top of the bin 12. Moreover, the lid 24 and funnel 25 assembly would have problems closing with the improper orientation of the cassette 30'. It is pointed out that like reference numerals refer to like elements in Figs. 1 and 4.

For each new disposable object to be packed, the process is repeated, each time either dropping the disposable object within the already drawn length of flexible tubing 32 within the enclosure 18, or drawing out an additional length of flexible tubing 32 from the cassette 30 to accommodate another disposable object as the disposable object moves down into the tube inside the apparatus 10, until the enclosure 18 is full, containing an object-filled segment of flexible film tubing 32. In this case, the top portion 14 is pivoted away from the bottom portion. The flexible tubing 32 is then cut, for example by using the cutting tool 70 provided, and then tied to form a substantially sealed pouch which can be removed from the bin 12. The top portion 14 is pivoted back into engagement with the bottom portion to use the apparatus 10 again as described above.

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In another embodiment of the apparatus 10 using the cassette 30 of Figs. 2A and 2B, the fixed portion 52' of the closing mechanism 50 has an upper end 54' that extends upwardly in the opening 22 of the bin 12. The upper end 54' is sized such that it also extends into the opening 34 of the cassette 30 when the cassette 30 is positioned in the holder 26. If it were positioned upside down, the cassette 30 would extend above the annular flange 42, and the ring 68 would not be positionable on the bin 12.

In another embodiment illustrated by Fig. 7, the holder 26 features an interfering member 70 that has a shape that is complementary to that of the cassette 30 with the chamfer clearance 41. With the presence of the interfering member 70, the cassette 30 must properly be installed in the holder 26 to be used. As illustrated in Fig. 7, a pair of interfering members 70 may optionally be provided on both side of the holder 26.

Advantages of the apparatus 10 include the use of a wedge-type closing mechanism 50 of simple construction with few parts to seal the flexible tubing 32. The cassette configurations ensure that the cassette 30 is properly installed in the holder 26, thereby preventing contamination of the walls of the cassette (and the hands of the user person) as the properly installed cassette is mostly covered by the tubing 32 as is shown in Fig. 1. The mechanism 50 greatly reduces the complexity of the apparatus 10, makes the assembly simple, and allows for the use of a lesser quantity of flexible tubing 32 than prior-art devices. Furthermore, angling the course of the movable portion 58 permits the optimization of little horizontal clearance versus the force required to bias the movable portion 58. Finally, the shape of the individual portions of the

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mechanism prevents disposable objects from "coming back up" - that is, once a disposable object has been inserted under pressure to pull film material, it will be forced to remain in the flexible tubing by the closing mechanism 50.

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ABSTRACT

A cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition. An annular opening at an upper end of the annular receptacle is for dispensing the tubing. The annular receptacle defines a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of the central opening.

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CLAIMS:

- 1) An apparatus for packaging soiled diapers in an elongated tube of plastic flexible material, the apparatus comprising:
 - a) a storage area for receiving soiled diapers;
 - b) an entrance for introducing soiled diapers in the storage area;
 - c) a holder configured for releasably receiving a supply of the tube material such that the supply of the tube material extends through the entrance, the holder being proximal the entrance and including:
 - i) a recess including an upwardly extending side wall;
 - ii) a bottom generally horizontally extending wall, the bottom wall being generally circular and surrounding the entrance;
 - d) a tube gathering mechanism for sealing the tube when no soiled diaper is being pushed through the entrance, the tube gathering mechanism including:
 - i) a closure member including a projection extending above the bottom wall of the holder, the closure member engaging the tube and being moveable with relation to the bottom wall to gather the tube;
 - ii) the closure member being responsive to pressure by a hand of a user to progressively open and allow insertion of a soiled diaper in the storage area;
 - iii) a stationary wall portion located below the bottom wall for slidingly supporting the closure member during the movement of the closure member with respect to the bottom wall;
 - iv) a device connected to the closure member for driving the closure member to move relative the bottom wall to gather the tube;

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- e) a lid hingedly moveable between a closed position and an opened position, in the closed position the lid closing the holder, in the opened position the lid allowing access to the holder to permit installation of a new supply of tube material, the lid having a central funnel-shaped portion defining an aperture generally aligning with the entrance to the storage area, the aperture permitting insertion of a soiled diaper into the storage area.
- 2) An apparatus as defined in claim 1, wherein the holder is configured for releasably receiving a cassette for dispensing the tube material, the cassette having a central opening, the cassette dispensing the tube material from a top thereof through the entrance, the cassette including a recessed area on a lower portion thereof.
- 3) An apparatus as defined in claim 2, wherein the holder includes:
- a) a generally upwardly extending wall;
 - b) a bottom wall;
 - c) the projection configured to engage the recessed area of the cassette when the cassette is fully seated in the holder and the cassette engages the bottom wall of the holder, wherein the projection is moveable relative to the bottom wall.
- 4) An apparatus as defined in claim 3, wherein the lower portion of the cassette includes a base wall, which engages the bottom wall when the cassette is received in the holder, the recessed area being adjacent to the base wall.

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- 5) An apparatus as defined in claim 4, wherein the recessed area is defined by a wall portion extending upwardly from the base wall.
- 6) An apparatus as defined in claim 5, wherein the wall portion extends obliquely in relation to the base wall.
- 7) An apparatus as defined in anyone of claims 3 to 6, wherein the projection is moveable relative to the bottom wall to gather the tube material following the insertion of a soiled diaper in the storage area.
- 8) An apparatus as defined in anyone of claims 2 to 7, comprising the cassette loaded into the holder.

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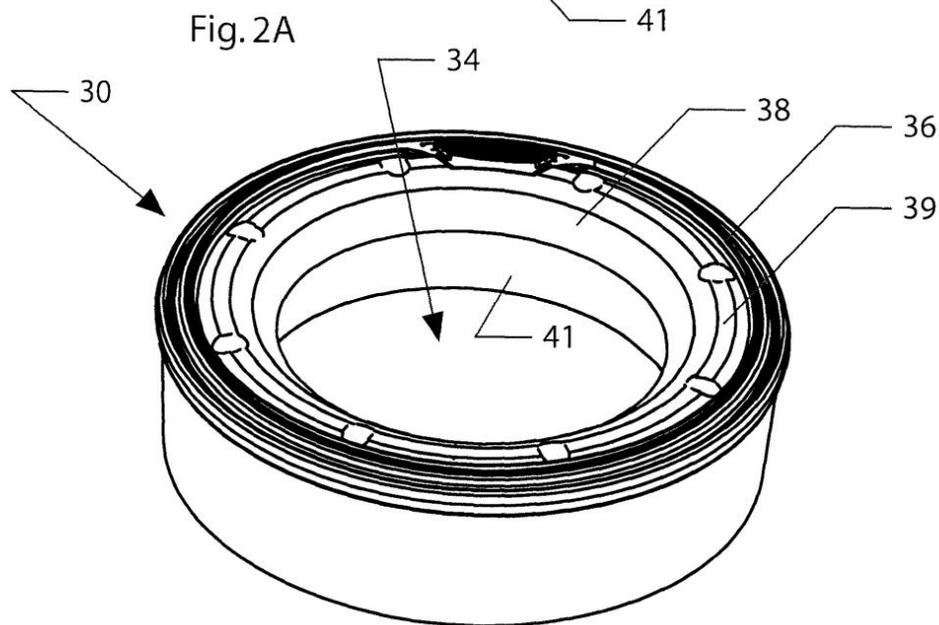
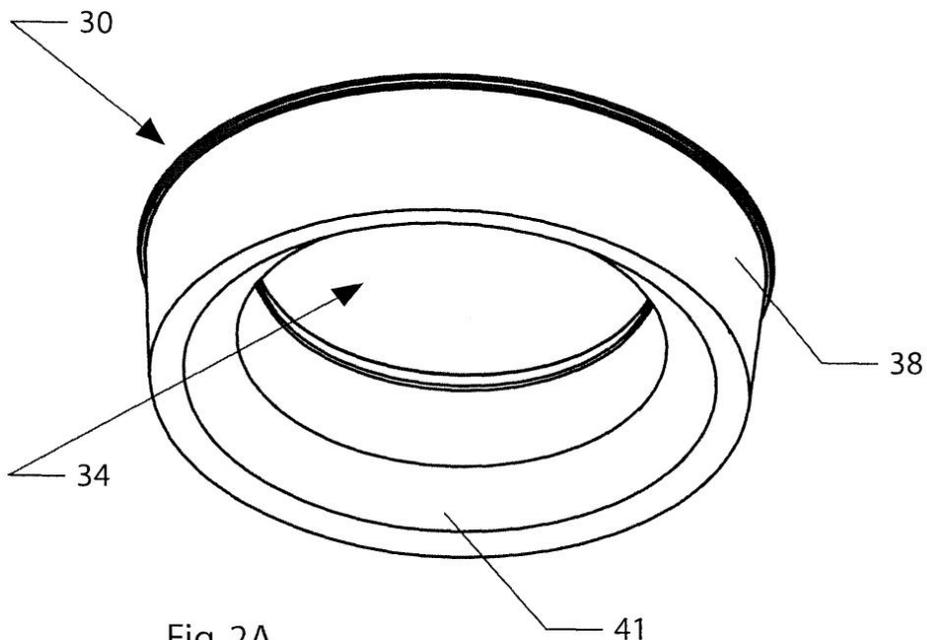


Fig. 2B

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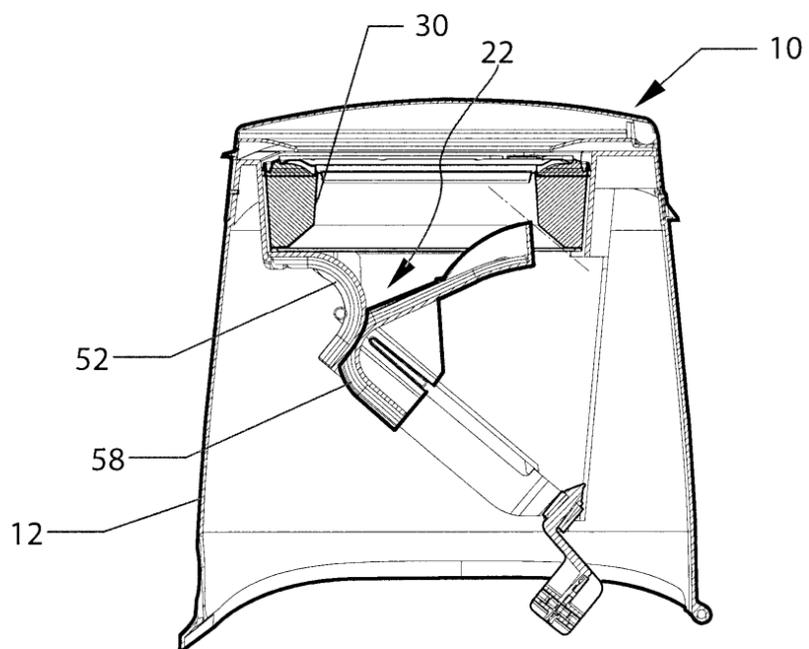


Fig.3A

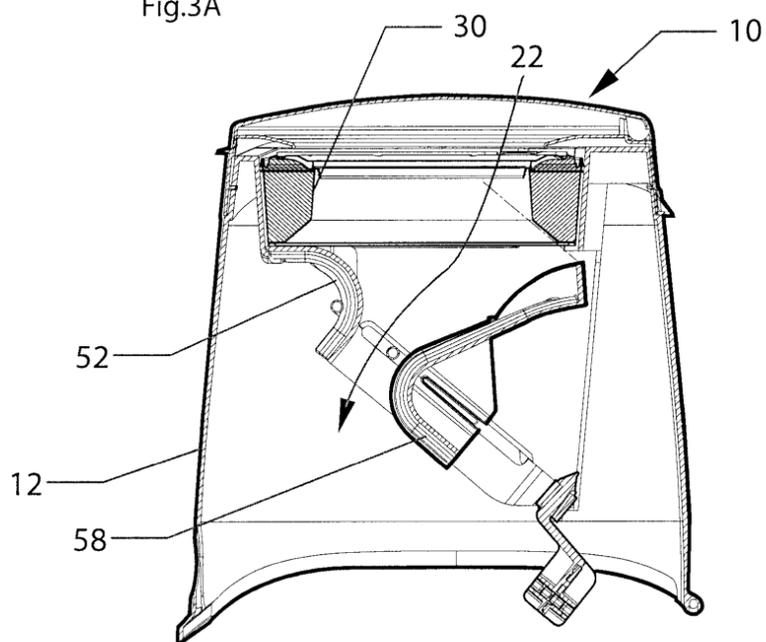


Fig.3B

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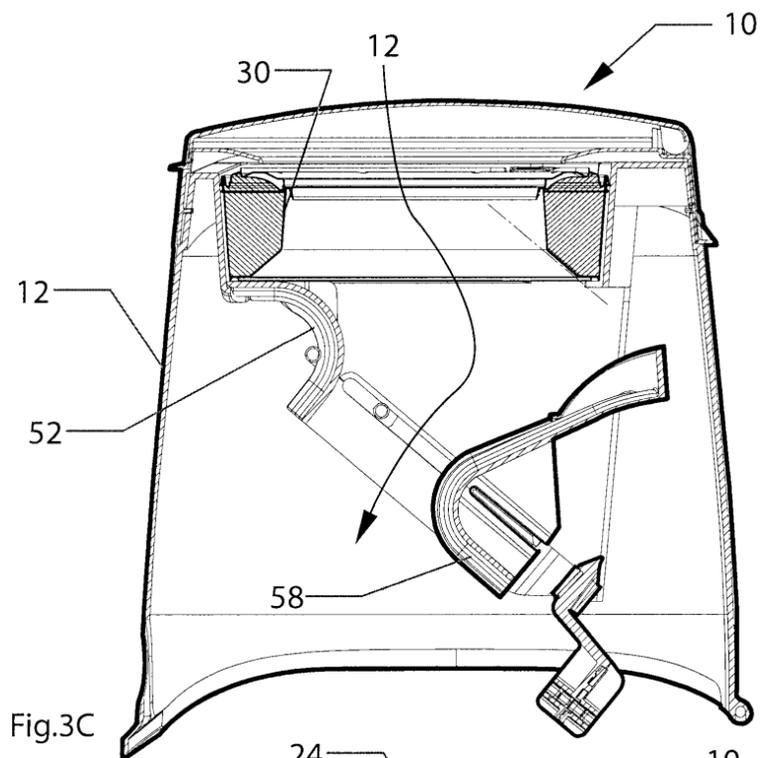


Fig.3C

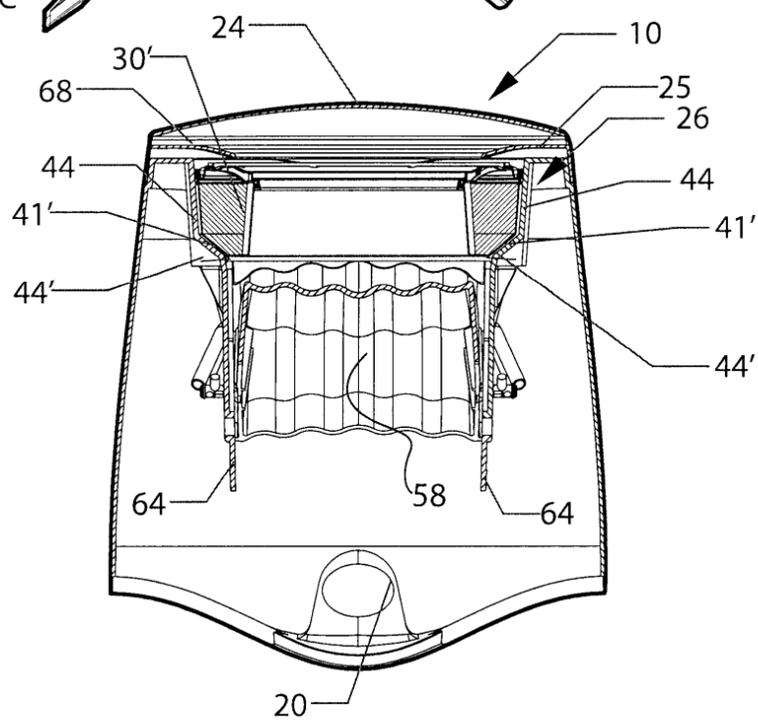
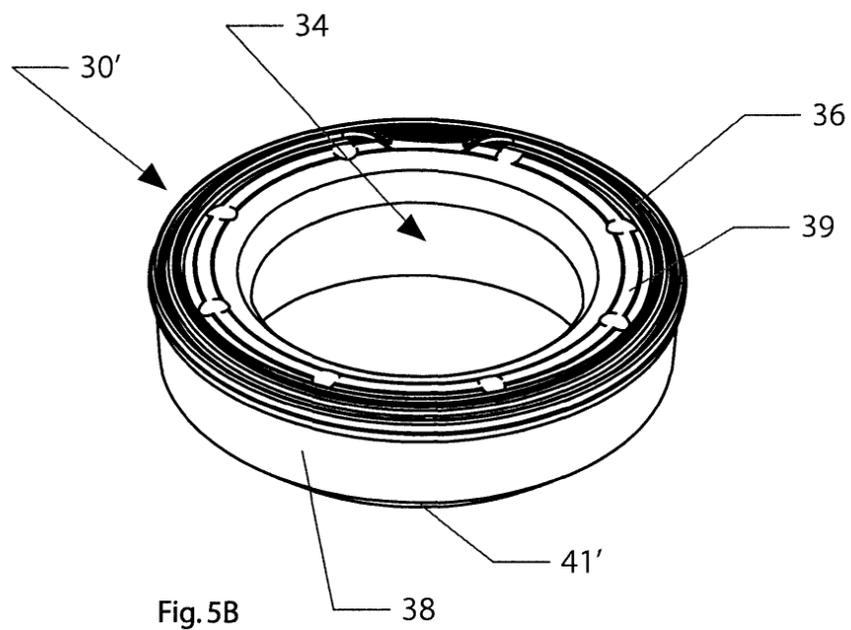
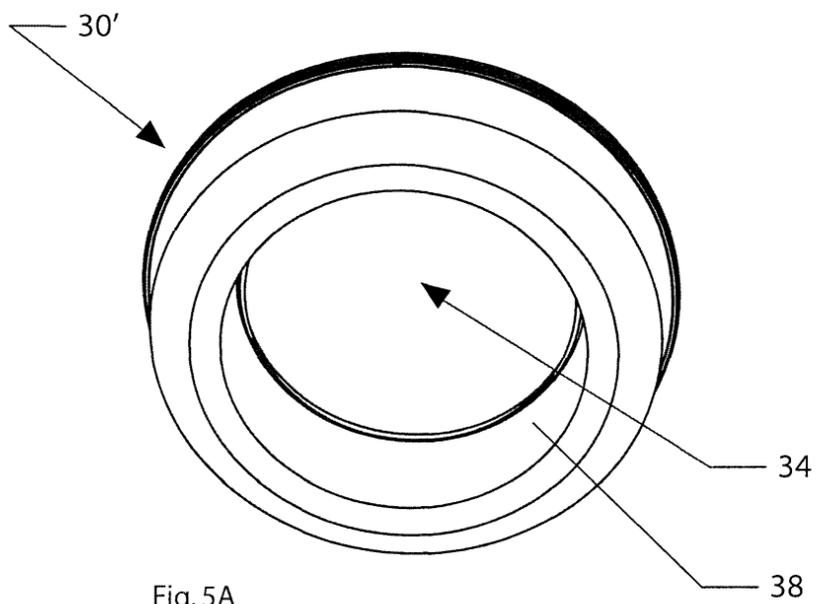


Fig.4

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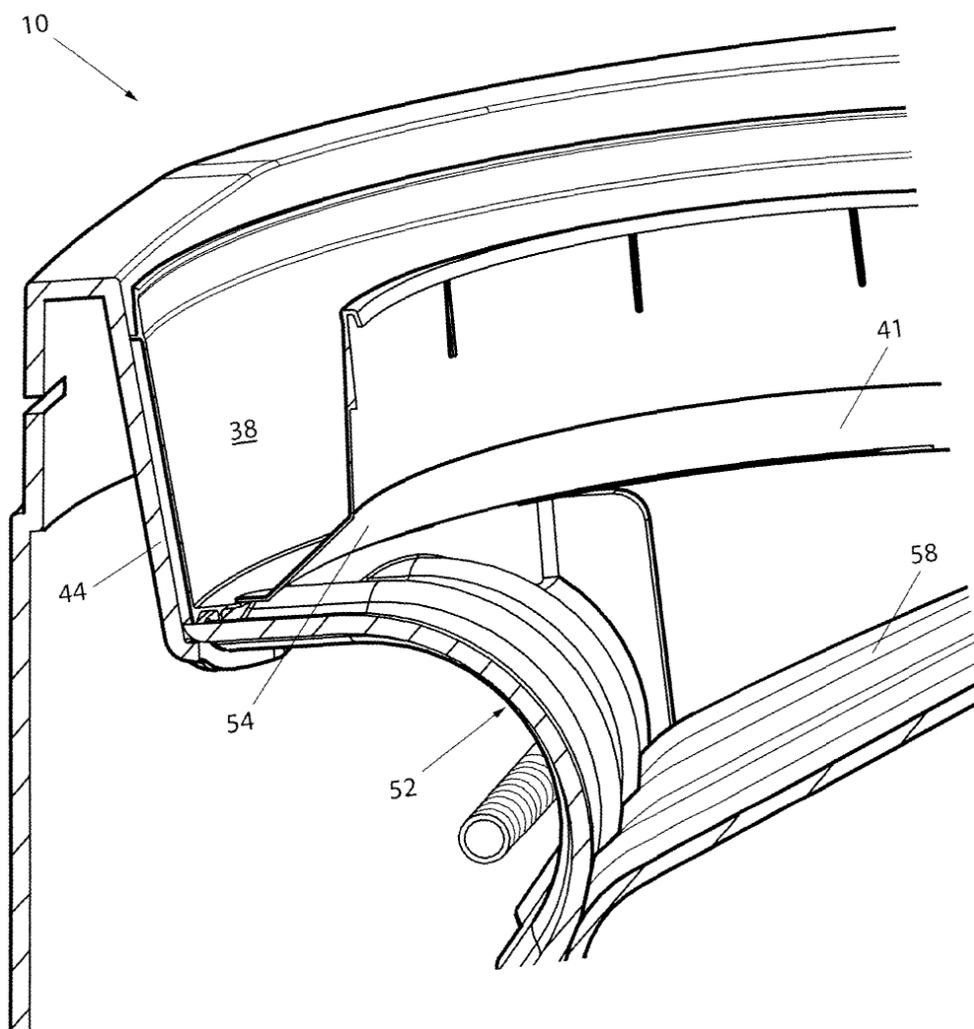


Fig. 6

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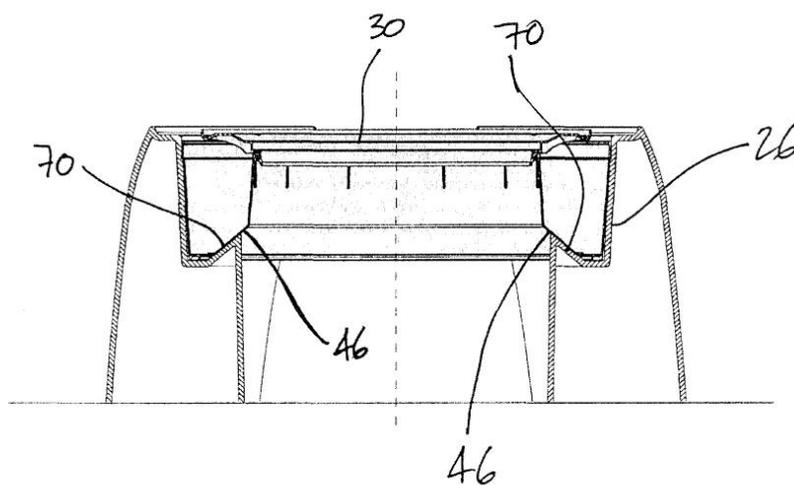


Fig. 7



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CA 2640384 C 2014/09/09

(11)(21) **2 640 384**(12) **BREVET CANADIEN
CANADIAN PATENT**(13) **C**

(22) Date de dépôt/Filing Date: 2008/10/03
(41) Mise à la disp. pub./Open to Public Insp.: 2009/04/05
(45) Date de délivrance/Issue Date: 2014/09/09
(30) Priorité/Priority: 2007/10/05 (EP07019571.4)

(51) Cl.Int./Int.Cl. *B65F 1/06* (2006.01),
B65B 67/04 (2006.01), *B65B 9/06* (2012.01),
B65F 1/10 (2006.01)
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(54) Titre : CARTOUCHE ET APPAREIL D'EMBALLAGE D'OBJETS JETABLES DANS UN TUBE DE MATIERE SOUPLE
(54) Title: CASSETTE AND APPARATUS FOR PACKING DISPOSABLE OBJECTS INTO AN ELONGATED TUBE OF
FLEXIBLE MATERIAL

(57) **Abrégé/Abstract:**

A cassette (3) for dispensing bags from an elongated tubing (32) comprising an annular receptacle (38) accommodating a length of tubing (32) in an accumulated condition. An annular opening at an upper end of the annular receptacle (38) is for dispensing the tubing (32). The annular receptacle (38) defines a central opening (34) through which a knotted end (40) of the tubing (32) passes to form a bag supported by the annular receptacle (38) with disposable objects passing through the circular central opening (34) to be received in the bag, and a clearance (41) only at a bottom of the central opening (34).

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ABSTRACT

A cassette (3) for dispensing bags from an elongated tubing (32) comprising an annular receptacle (38) accommodating a length of tubing (32) in an accumulated condition. An annular opening at an upper end of the annular receptacle (38) is for dispensing the tubing (32). The annular receptacle (38) defines a central opening (34) through which a knotted end (40) of the tubing (32) passes to form a bag supported by the annular receptacle (38) with disposable objects passing through the circular central opening (34) to be received in the bag, and a clearance (41) only at a bottom of the central opening (34).

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CASSETTE AND APPARATUS FOR PACKING DISPOSABLE OBJECTS
INTO AN ELONGATED TUBE OF FLEXIBLE MATERIAL

FIELD OF THE APPLICATION

The present application relates to an apparatus
5 for packaging disposable material or objects into a tube of
flexible plastic film material. More specifically, the
invention relates to an apparatus for use to package waste
material, for example babies' disposable diapers, or any
other kind of appropriate objects or material, into a tube
10 of flexible plastic film material and to store the so
packaged waste material in a hygienic and a substantially
odor-free manner, until it is collected.

BACKGROUND OF THE ART

Known apparatuses of the above-mentioned type
15 generally comprise a container having an open or openable
upper portion in which the waste to be disposed of may be
inserted and a bottom portion in which the disposed waste is
stored. A ring-shaped cassette is mounted in the upper
portion of the container, and contains, in a pleated form, a
20 tube of flexible plastic film material which is formed into
an elongated tube which is knotted at a bottom end and into
which the waste material may be inserted and temporarily
stored.

In use, the waste to be disposed of is inserted
25 into the tube at the upper portion of the container and the
tube and waste are then pushed through the open center of
the cassette towards the bottom portion of the container for
storage purposes. Closeable means are also provided for
closing the tube below the cassette and thus preventing bad
30 odors from escaping from the tube during storage.

In Canadian Patent No. 1,298,191, these closeable
means are disclosed as a core that can be turned by a lid
about a cylinder in order to twist the tube at regular
intervals to form successive "pouches" that are kept sealed
35 while they are stored.

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In Canadian laid-open Application No. 2,383,799, a squeezing device is mounted in the container below the cassette to pull the tube from the cassette and move it down together with the objects inserted into the container. This
5 squeezing device comprises a pair of opposite rotatable members between which the tube is inserted. The rotatable members have a plurality of opposite bars extending transversely to the tube in order to squeeze the tube, keep it closed until other objects to be disposed of are inserted
10 into the upper portion of the container, and pull it down to move the plastic film forming the tube and the objects contained therein towards the bottom portion of the container for storage purpose. Actuation of the rotatable members in unison and in opposite direction to achieve the
15 requested squeezing, closing and pulling down of the plastic film tube is preferably obtained by actuation of a lever that is part of the container.

In Canadian laid-open Application No. 2,441,837, a plunging device is provided to compress the object to be
20 disposed of, and push it into the tube and to the bottom part of the container. The plunging device includes two arms with pivoting flaps attached thereto and opposing pivotable slides.

All of these prior art devices have several
25 disadvantages. Their mechanisms have many parts and are prone to breakage. These devices are also not user-friendly and difficult to understand the operation thereof when first purchased. They are costly to fabricate and they utilize excess film from the cassettes, adding to the cost of use.
30 Some also do not effectively contain the odors of the disposed material. Some cause confusion in their installation, causing improperly oriented cassettes and contamination of the cassette walls.

SUMMARY OF THE APPLICATION

35 It is therefore an aim of the present invention to provide a novel apparatus for packing disposable objects

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into an elongated tube of flexible plastic film material that addresses issues associated with the prior art.

Therefore, in accordance with a first embodiment of the present application, there is provided a cassette for
5 dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition, an annular opening at an upper end of the annular receptacle for dispensing the tubing, the annular receptacle defining a central opening through which
10 a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of the central opening.

15 In accordance with the first embodiment, the clearance is in the shape of a chamfer.

In accordance with the first embodiment, a removable lid closes the annular opening of the annular receptacle.

20 In accordance with the first embodiment, an outer periphery of the annular receptacle tapers downwardly.

In accordance with the first embodiment, the annular opening is adjacent to an outer periphery of the annular receptacle.

25 In accordance with the first embodiment, the clearance extends on the full periphery of the central opening.

In accordance with the first embodiment of the present application, there is provided an apparatus for
30 packing at least one disposable object into an elongated tube of flexible material, comprising a bin defining an enclosure with an opening defined at a top thereof for receiving at least one disposable object to be packed; a holder within the bin proximate the opening; a closing
35 mechanism located below the holder comprising first and second portions, the second portion being biased in a closed position against the first portion and defining a receiving

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surface for receiving the at least one disposable object, the second portion being slidable from the closed position to an open position through application of a substantially vertical force against the receiving surface and being
5 slidable from the open position to the closed position under the action of biasing means, the closing mechanism in the open position defining a passage between the opening of the bin and a bottom portion of the enclosure located below the closing mechanism, the closing mechanism in the closed
10 position closing the said passage; and the cassette supported by the holder in the opening of the bin with the clearance allowing the cassette not to impede the motion of the closing mechanism from the closed position to the open position.

15 Still in accordance with the first embodiment, the holder comprises a first annular flange extending inwardly from an outer wall of the bin, a tubular wall extending generally downwardly from an inner end of the first annular flange, and a second annular wall extending inwardly from a
20 bottom end of the tubular wall, thus forming a seat for receiving the cassette.

Still in accordance with the first embodiment, the tubular wall tapers in a downward direction, and the annular body has a corresponding frustoconical outer periphery for
25 complementary engagement of the cassette in the holder.

Still in accordance with the first embodiment, the opening of the bin is surrounded by a removable lid, the lid opening/closing access to the opening of the bin, the lid being prevented from being installed properly when the
30 cassette is oriented upside down in the holder.

In accordance with a second embodiment of the present application, there is provided: a cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an
35 accumulated condition, an annular opening at an upper end of the annular receptacle for dispensing the tubing, the annular receptacle defining a central opening through which

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a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of an outer periphery
5 of the annular receptacle.

In accordance with the second embodiment, the clearance forms a frusto-conical geometry at the bottom of the annular receptacle.

In accordance with a third embodiment, there is
10 provided: an apparatus for packing at least one disposable object into an elongated tube of flexible material, comprising: a bin defining an enclosure with an opening defined at a top thereof for receiving at least one
15 disposable object to be packed; a holder within the bin proximate the opening, and an interfering member at a bottom of the holder; a closing mechanism located below the holder comprising first and second portions, the second portion being biased in a closed position against the first portion and defining a receiving surface for receiving the at least
20 one disposable object, the second portion being slidable from the closed position to an open position through application of a substantially vertical force against the receiving surface and being slidable from the open position to the closed position under the action of biasing means,
25 the closing mechanism in the open position defining a passage between the opening of the bin and a bottom portion of the enclosure located below the closing mechanism, the closing mechanism in the closed position closing the said passage; a cassette supported by the holder in the opening
30 of the bin and having an annular receptacle to accommodate a length of tubing in an accumulated condition, the annular receptacle having an upper annular opening for dispensing the tubing such that the tubing extends through a central opening of the annular receptacle and with a knotted end
35 thereof into the enclosure of the bin to receive disposable objects, whereby the closing mechanism closes the tubing, the annular body having a clearance in a bottom portion of

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an outer periphery of the annular receptacle, so as to cooperate with the interfering member for the cassette to be aligned with the top of the bin in a desired orientation; and a removable lid positioned flush on the top of the bin only when the cassette is in the desired orientation, the cover opening/closing access to the opening of the bin.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-sectional view of an apparatus according to a first embodiment of the present invention;

Fig. 2A is a bottom perspective view of a cassette to be used with the apparatus of Fig. 1;

Fig. 2B is a top perspective view of the cassette of Fig. 2A;

Fig. 3A is a cross-sectional view of the apparatus of Fig. 1, without tubing, with a closing mechanism in a closed position;

Fig. 3B is a cross-sectional view of the apparatus of Fig. 3A, with the closing mechanism displaced toward an open position;

Fig. 3C is a cross-sectional view of the apparatus of Fig. 3A, with the closing mechanism in the fully open position;

Fig. 4 is a cross-sectional view of an apparatus according to a second embodiment of the present invention;

Fig. 5A is a bottom perspective view of a cassette to be used with the apparatus of Fig. 4;

Fig. 5B is a top perspective view of the cassette of Fig. 5A;

Fig. 6 is an enlarged perspective view of an apparatus in accordance with a third embodiment of the present invention; and

Fig. 7 is a sectional view illustrating the cassette of Fig. 2A as used with an apparatus having interfering members.

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DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. 1, there is shown an apparatus 10 for packaging disposable objects in an elongated tube of flexible plastic film material. The apparatus 10 comprises a bin 12 having a top portion 14 and a bottom portion (not shown) hingedly connected to each other by a hinge member 16, with outer walls of the top portion 14 and bottom portion defining an enclosure 18 of the bin 12.

The top portion 14 and bottom portion are locked together with a mechanism such as a push button latch (not shown) received in eyelet 20, located opposite of the hinge member 16. Upon actuation of the push button, the top portion 14 and bottom portion are disconnected and can be pivoted apart about the hinge member 16 to provide access to the enclosure 18, for example to empty the bin 12.

The top portion 14 defines an opening 22 for receiving disposable objects therethrough. The bin 12 further comprises a lid 24 hingedly connected to a ring 25, for instance in the shape of a funnel (hereinafter funnel 25), although multiple shapes are considered such as a flat ring, as long as the ring forms an opening guidance. The funnel 25 is mounted to the top portion 14 such as to selectively open and close access to the opening 22 through pivoting motion of the lid 24. Although in the embodiment shown the apparatus has a generally circular opening 22, the bin 12 is not limited to circular openings and could function with openings of different shapes.

Still referring to Fig. 1, the apparatus 10 also comprises a holder 26 located within the top portion 14 proximate the opening 22 for holding a cassette 30 of flexible plastic film tubing 32. The cassette 30 has an annular body defining a central opening 34 which is generally aligned with the bin opening 22 when the cassette 30 is accommodated in the holder 26.

Referring concurrently to Figs. 1, 2A and 2B, the cassette 30 has a lid 36 and a bottom annular receptacle 38. After the lid 36 is removed, the flexible tubing 32 exits

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from an upper annular opening of the receptacle 38, adjacent an outer periphery thereof. It is pointed out that once the lid 36 is removed, there remains an upper flange 39 adjacent to the annular opening that maintains the compressed tubing 5 32 in the receptacle 38. The cassette 30 comprises a length of flexible plastic film material that is accumulated (e.g., folded). As shown in Fig. 1, a knot 40 is found at the free end of the tubing 32 to form a bag end. The knot 40 and a length of the tubing 32 extend from the cassette 30 into the enclosure 18 of the bin 12, passing through the central opening 34 of the cassette 30. To better contain odors, it is preferable that the film material of the tubing 32 be a multiple layer film having an odor barrier therein such that odors do not permeate through the film material. The 10 receptacle 38 of the cassette 30 defines a chamfer clearance 41 at a bottom of the central opening 34. The chamfer clearance 41 is provided in order to ensure that the cassette 30 is properly installed in the holder 26 when the apparatus 10 is in use, as will be described hereinafter. 20 The chamfer clearance 41 is provided on the full periphery of the cassette 30, but may also be partial (i.e., not on the full periphery of the central opening of the cassette).

Referring to Fig. 1, the holder 26 includes a top annular flange 42 extending inwardly from the top of the bin 25 12. A tubular wall 44 extends downwardly from an inner end of the top annular flange 42. The holder 26 has a horizontal flange 45 at a bottom of the wall 44, so as to define a seat supporting the cassette 30. One will also appreciate that the holder 26 may take many alternate shapes and forms. . 30

Referring to Figs. 1 and 3A-3C, the apparatus 10 further includes a closing mechanism 50 whose purpose is to provide access to the flexible tubing 32 extending therebelow and preventing odors from escaping from the flexible tubing 32. In one form of use, it permits the 35 disposable objects to push down against the bottom of the tubing 32 (at the knot 40) to draw out loose flexible tubing

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from the receptacle 38 of the cassette 30. One aspect of note is that the flexible tubing 32 passes over receptacle 38 and the closing mechanism 50, thereby isolating the receptacle 38 and the mechanism 50 from the disposable
5 objects to be packaged, reducing the need for constant cleaning of the walls defining the opening 34 and the mechanism 50. In this respect, one will appreciate that one of the preferred uses for the apparatus 10 is the disposal of baby diapers.

10 The closing mechanism 50 comprises a fixed portion 52, which comprises a generally "C"-shaped member rigidly connected to the wall 44 of the holder 26. Alternate types of connections are also possible for the fixed portion 52, including connection to an additional support member
15 connected to the holder 26 or to another part of the top portion 14. The curved fixed portion 52 defines a rounded apex 54 which projects into the opening 22, as can be seen in Fig. 1. The fixed portion 52 defines a receiving surface 56 downwardly inclined toward a movable portion 58 of the
20 closing mechanism 50.

The movable portion 58 of the closing mechanism 50 is also generally "C"-shaped in cross-section and is biased against the fixed portion 52 in a closed position shown in Figs. 1 and 3A such as to generally close the opening 22 of
25 the apparatus 10, thereby sealing the tubing 32 shut. The curved movable portion 58 defines a rounded apex 60 projecting into the opening 22, as can be seen in Fig. 1. The movable portion 58 defines a receiving surface 62 downwardly inclined toward the fixed portion 52, the two
30 receiving surfaces 56,62 forming a trough directing an object therebetween. In the closed position, contact between the two portions 52,58 is between the apex 60 of the movable portion 58 and a lower part of the fixed portion 52 located below the apex 54 thereof. These portions are wave-
35 shaped in cross-section to provide an ergonomical shape in view of hands contacting them, as illustrated in Fig. 1. Moreover, these wave-shaped portions provide efficient

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sealing of a plastic film tube 32 engaged or pinched therebetween.

The movable portion 58 is slidingly supported by a pair of spaced-apart, generally vertical walls 64 (only one of which is shown in Fig. 1) extending downwardly from the holder 26, with the opening 22 being aligned therebetween. Each of the walls 64 has an angled slot 66. In the embodiment shown, the slots 66 are angled at approximately 40 degrees with respect to the horizontal, although any other working angles are suitable.

The movable portion 58 includes aligned sliding members 66A extending therefrom and engaging the slots 66, such that the movable portion 58 is slidingly movable along an angular direction defined by the slots 66, and thus along direction A. The movable portion 58 can move between a closed position, as illustrated in Figs. 1 and 3A, in which the movable portion 58 abuts against the fixed portion 52 to seal the tubing 32 shut, and an opened position (shown in Fig. 3C) enough to let a disposable object to pass between the portions 52 and 58. The movable portion 58 is biased to the closed position of Fig. 1, for using an elongated helical spring 67 connected to and extending between the sliding members 66A of the movable portion 58 and around the back of the fixed portion 52. The concave shape of the back of the fixed portion 52 helps maintain the spring aligned in a plane defined by the slots 66.

It is of particular importance that the cassette 30 be installed in the appropriate orientation. In the appropriate orientation, as illustrated in Fig. 1, the tubing 32 is deployed from the top of the cassette 30. Accordingly, the tubing 32 covers the side walls of the cassette 30 in the opening 34. Accordingly, as the tubing 32 covers the cassette 30, there is no risk of contamination of the walls of the cassette.

As is clearly seen in Fig. 1, the chamfer clearance 41 is positioned downwardly. A path of movement of the movable portion 58 is illustrated at B. It is

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observed that the movable portion 58 passes closely to the wall defining the chamfer clearance 41. If the chamfer clearance 41 were not provided, the cassette 30 would impede the movement of the movable portion 58. Accordingly, if the cassette 30 were installed upside down, the movable portion 58 would be prevented from moving along its path. Therefore, if a user person wants to use the cassette 30 properly, the cassette 30 must be oriented properly.

Alternately, the fixed portion 52 can be replaced by a portion movable opposite of the movable portion 58, the two being biased together in the closed position. Such a configuration could be, for example, two sliding members symmetrical with respect to one another about a vertical axis defined at the point of contact therebetween, such as two "C"-shaped members similar in configuration to the movable member 58 shown, two rollers, etc., which are slidable away from each other upon downwardly pushing an object thereon, and are biased together for example by being interconnected by one or a plurality of springs. However, such a mechanism includes additional parts.

In order to assist the user in correctly placing the disposable object in the tubing 32, the apparatus 10 advantageously has the funnel 25 removably installed over the cassette 30, providing a downward shape around the openings 22,34, which creates a funnel effect and guides the user's hand. A handle 68 is provided to remove the lid 24/funnel 25 assembly.

Referring to Fig. 1, the apparatus 10 can further include, within the bin 12, an integrated cutting tool 70, which can be for example attached to one of the vertical walls 64, and which includes a blade located between two spaced-apart protective fingers sized such as to prevent a user's finger from reaching the blade but still allowing a portion of tubing 32 to be inserted between the fingers to be cut with the blade.

In order to prepare the apparatus 10 for use, and with reference to Fig. 1, a user person removes the lid 24

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and funnel 25 assembly and inserts the cassette 30 in the correct orientation (i.e., with the chamfer clearance 41 facing downward. The user person withdraws a free end of the tubing 32 from the cassette 30, takes a leading edge of flexible tubing 32, ties it into the knot 40 and pushes the knot 40 through the openings 22,34 and beyond the closing mechanism. It is pointed out that the knot 40 may be made prior to the cassette 30 being installed. The movable portion 58 opens as a result of the downward pressure, whereby the knot 40 reaches the enclosure 18 below the closing mechanism 50.

Alternately, the tube end with the knot 40 could be pulled down to the bottom of the bin 12, for example by pivoting and opening the top portion 14 such as to gain access to the enclosure 18, and pulling the tube end with the knot 40 through the closing mechanism 50 and beyond to the bottom of the bin 12. The top portion 14 is then re-engaged with the bottom portion, and the lid 24/funnel 25 assembly is reinstalled on the top portion 14. Accordingly a length of empty flexible tubing 32 extends to the bottom and is now ready to receive disposable objects therein. Therefore, the film material is not pulled from the cassettes 30 as disposable objects are placed into the tube.

In use, when a disposable object needs to be packaged, the lid 24 of the apparatus 10 is lifted, thereby providing access to the opening 22. The disposable object to be packaged is placed into the opening 22 (in this case, the cassette 30 of flexible tubing 32 surrounds the object). The receiving surfaces 56,62 of the fixed and movable portions 52,58 of the closing mechanism 50 biased together in the closed position form a trough which directs the disposable object in the hand of a user person toward a contact region therebetween.

The user person pushes the disposable object in a downward direction, gradually opening the movable portion 58, as is shown in Figs. 3B and 3C. The angled receiving surface 62 of the movable portion 58 helps the downward

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force to be easily converted along the direction of the slots 66 such as to force the movable portion 58 from its closed position in contact with the fixed portion 52 (Fig. 3A) to its open position (Fig. 3C) against the force of the spring 67, through a sliding movement illustrated by direction A in Fig. 1. Since the movable portion 58 is moved by the force applied on the disposable object, it slides only enough for the disposable object to go past the closing mechanism 50, with most of the opening created by the movement of the movable portion 58 being blocked by the disposable object such as to minimize the propagation of odors through the opening 22.

Once the disposable object passes beyond the apex 60 of the movable portion 58, the user person releases the disposable object and withdraws his or her hand. The movable portion 58, under the action of the spring 67, rapidly returns to the closed position of Figs. 1 and 3A, through a sliding movement, effectively sealing the object within the flexible tubing 32. The curved profile of the fixed portion 52 below the apex 60 and, more importantly, of the movable portion 58 below the apex 60 helps push the disposable object further down, if there is resistance, as the movable portion 58 returns to the closed position to apply a downward pushing force.

It is pointed out that different configurations of the cassette are considered. For instance, clearances of different shapes can be used instead of a chamfer. The use of a chamfer shape does not substantially reduce the volume of the receptacle 38 of the cassette 30, thereby generally preserving the quantity of tubing 32 received in the cassette 30.

In an alternative embodiment illustrated in Figs. 4, 5A and 5B, the cassette 30' is provided with a tapered clearance 41' (forming a frustoconical geometry at the outer periphery of the bottom of the cassette 30') as opposed to a chamfer clearance 41. The tapered clearance 41' is used in conjunction with a tapered flange 44' in the

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holder 26 of the apparatus 10, as is clearly illustrated in Fig. 4 (i.e., the flange 44' defines an interference member of frustoconical shape). Accordingly, this complimentary shape ensures that the cassette 30' is properly oriented in the holder 26, otherwise the funnel 25 could not be installed properly on the top of the bin 12. Moreover, the lid 24 and funnel 25 assembly would have problems closing with the improper orientation of the cassette 30'. It is pointed out that like reference numerals refer to like elements in Figs. 1 and 4.

For each new disposable object to be packed, the process is repeated, each time either dropping the disposable object within the already drawn length of flexible tubing 32 within the enclosure 18, or drawing out an additional length of flexible tubing 32 from the cassette 30 to accommodate another disposable object as the disposable object moves down into the tube inside the apparatus 10, until the enclosure 18 is full, containing an object-filled segment of flexible film tubing 32. In this case, the top portion 14 is pivoted away from the bottom portion. The flexible tubing 32 is then cut, for example by using the cutting tool 70 provided, and then tied to form a substantially sealed pouch which can be removed from the bin 12. The top portion 14 is pivoted back into engagement with the bottom portion to use the apparatus 10 again as described above.

In another embodiment of the apparatus 10 using the cassette 30 of Figs. 2A and 2B, the fixed portion 52' of the closing mechanism 50 has an upper end 54' that extends upwardly in the opening 22 of the bin 12. The upper end 54' is sized such that it also extends into the opening 34 of the cassette 30 when the cassette 30 is positioned in the holder 26. If it were positioned upside down, the cassette 30 would extend above the annular flange 42, and the ring 68 would not be positionable on the bin 12.

In another embodiment illustrated by Fig. 7, the holder 26 features an interfering member 70 that has a shape

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that is complementary to that of the cassette 30 with the chamfer clearance 41. With the presence of the interfering member 70, the cassette 30 must properly be installed in the holder 26 to be used. AS illustrated in Fig. 7, a pair of
5 interfering members 70 may optionally be provided on both side of the holder 26.

Advantages of the apparatus 10 include the use of a wedge-type closing mechanism 50 of simple construction with few parts to seal the flexible tubing 32. The cassette
10 configurations ensure that the cassette 30 is properly installed in the holder 26, thereby preventing contamination of the walls of the cassette (and the hands of the user person) as the properly installed cassette is mostly covered by the tubing 32 as is shown in Fig. 1. The mechanism 50
15 greatly reduces the complexity of the apparatus 10, makes the assembly simple, and allows for the use of a lesser quantity of flexible tubing 32 than prior-art devices. Furthermore, angling the course of the movable portion 58 permits the optimization of little horizontal clearance
20 versus the force required to bias the movable portion 58. Finally, the shape of the individual portions of the mechanism prevents disposable objects from "coming back up" - that is, once a disposable object has been inserted under pressure to pull film material, it will be forced to
25 remain in the flexible tubing by the closing mechanism 50.

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CLAIMS:

1. A cassette for packing at least one disposable object into an elongated tube of flexible material, comprising an annular receptacle to accommodate a length of the elongated tube in an accumulated condition, the annular receptacle including an annular wall delimiting a central opening of the annular receptacle, a volume receiving the elongated tube of flexible material radially outward of the annular wall, and an annular opening at an upper end of the cassette for dispensing the elongated tube such that the elongated tube extends through the central opening of the annular receptacle to receive disposable objects in an end of the elongated tube, the annular receptacle having a clearance in a bottom portion of the central opening, the clearance extending from and being formed integrally with the annular wall, the clearance being radially outward of a downward projection of the annular wall, the clearance delimiting a portion of the volume of reduced width relative to a portion of the volume above the clearance.
2. The apparatus according to claim 1, wherein the clearance in the cassette has the shape of a chamfer.
3. The apparatus according to any one of claims 1 and 2, wherein the clearance extends on the full periphery of the central opening.
4. The apparatus according to any one of claims 1 to 3, wherein the annular wall of the annular receptacle is an inner annular wall, the annular receptacle further

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comprising an outer annular wall, by which an outer periphery of the annular receptacle tapers downwardly.

5. The apparatus according to claim 4, wherein the inner annular wall and the outer annular wall are integrally formed.

6. A cassette for packing at least one disposable object into an elongated tube of flexible material, comprising an annular receptacle to accommodate a length of the elongated tube in an accumulated condition, the annular receptacle including an annular wall delimiting a central opening of the annular receptacle, a volume receiving the elongated tube of flexible material radially outward of the annular wall and an annular opening at an upper end of the annular receptacle for dispensing the tubing such that the elongated tube extends through the central opening of the annular receptacle to receive disposable objects in an end of the elongated tube, the annular receptacle having a clearance at a bottom of the central opening, the clearance being located radially outward of a downward projection of the annular wall relative to the central opening, and opening into the central opening, at least a portion of the volume of the annular receptacle being located radially outward of and side by side with at least a portion of the clearance such that at least a portion of the elongated tube of flexible material is disposed in the accumulated condition in said portion of the annular receptacle, said clearance causing a reduced width of said portion of the volume relative to the volume above the clearance.

7. The apparatus according to claim 6, wherein the clearance in the cassette has the shape of a chamfer.

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8. The apparatus according to any one of claims 6 and 7, wherein the clearance extends on the full periphery of the central opening.

9. The apparatus according to any one of claims 6 to 8, wherein the annular wall of the annular receptacle is an inner annular wall, and the annular receptacle further comprises an outer annular wall, by which an outer periphery of the annular receptacle tapers downwardly.

10. The apparatus according to claim 9, wherein the inner annular wall and the outer annular wall are integrally formed.

11. The apparatus according to any one of claims 9 and 10, wherein the clearance is located radially inward of a downward projection of the outer annular wall relative to the central opening.

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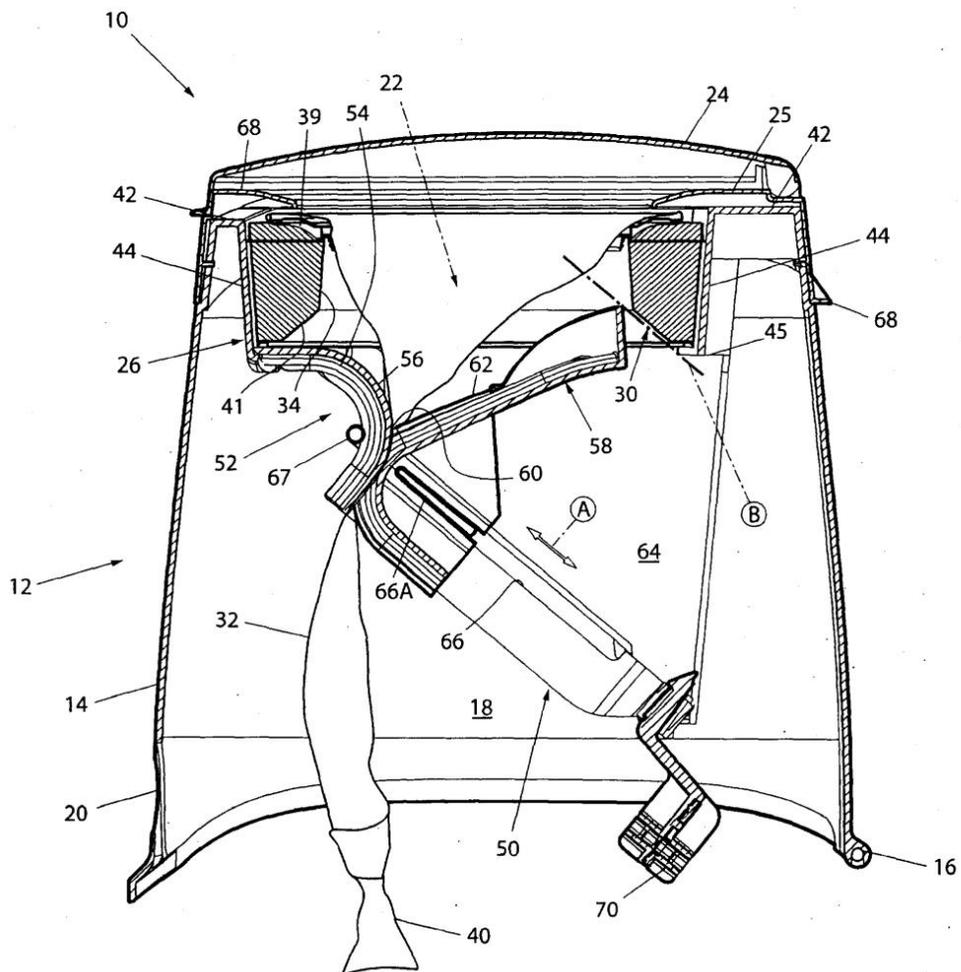


Fig. 1

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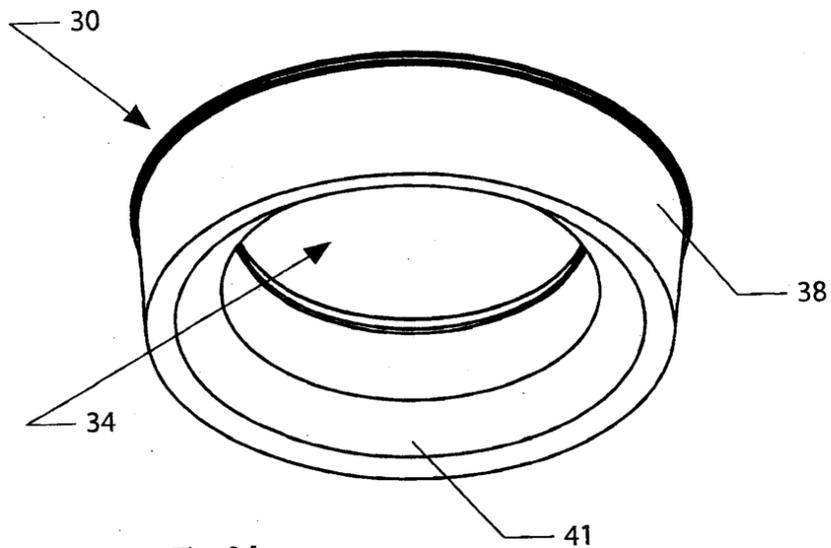


Fig. 2A

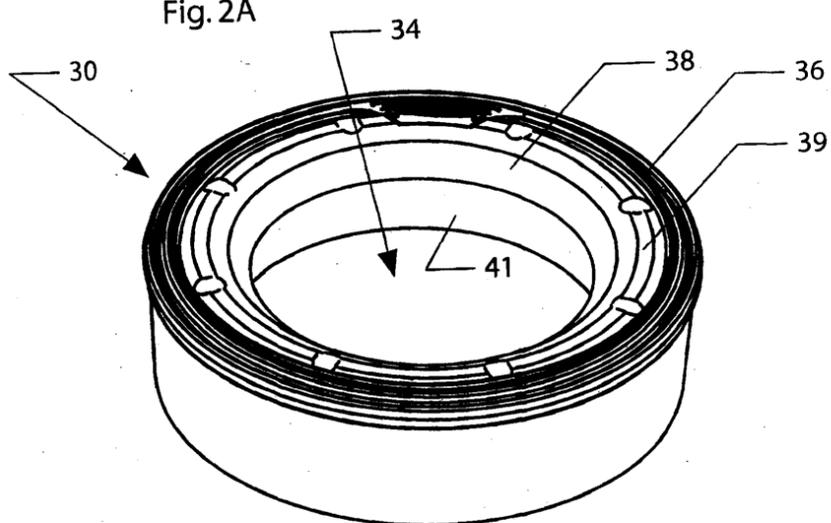


Fig. 2B

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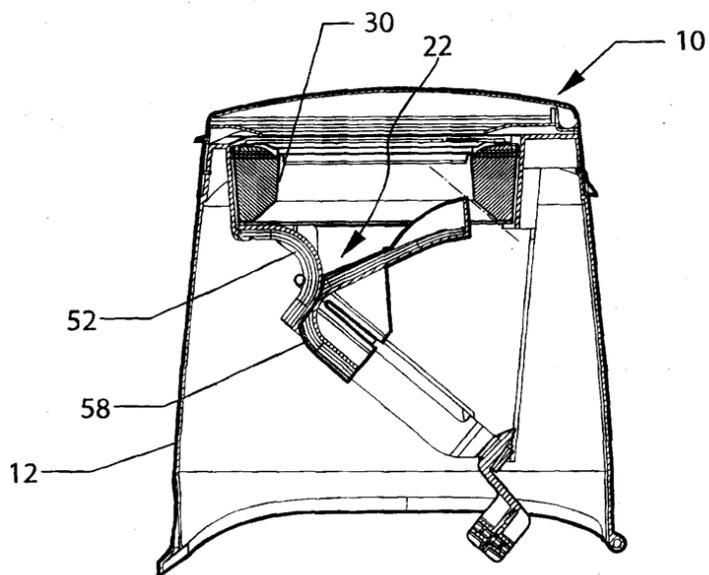


Fig.3A

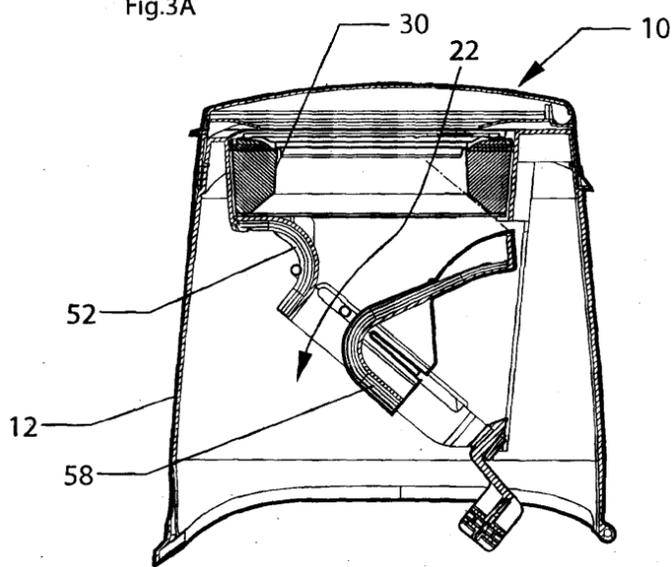


Fig.3B

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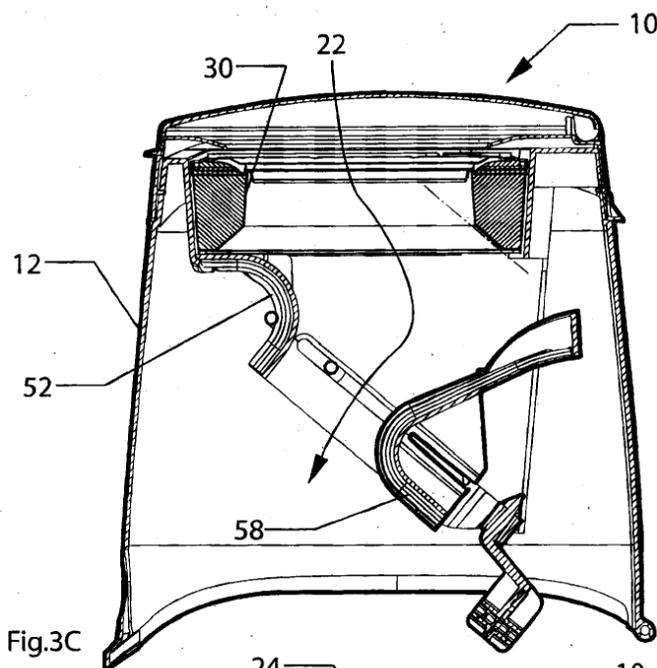


Fig.3C

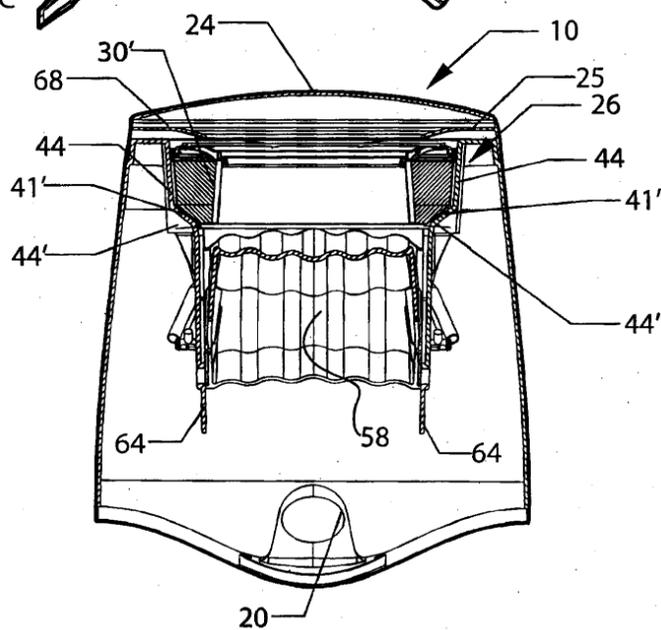
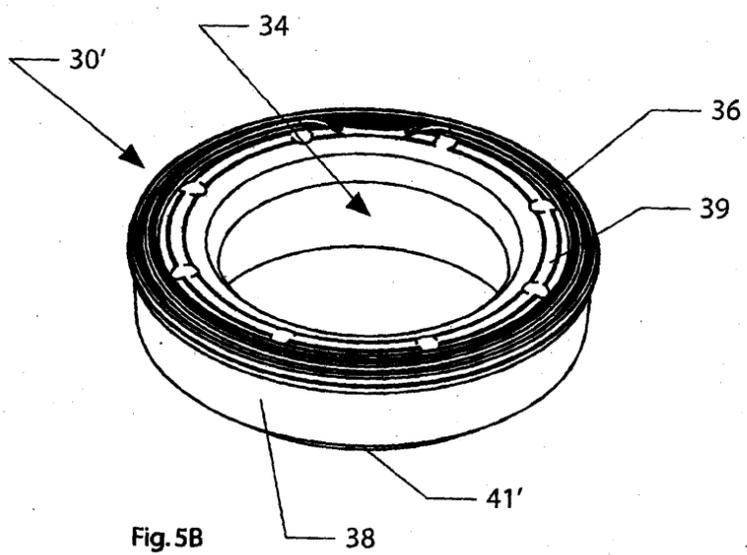
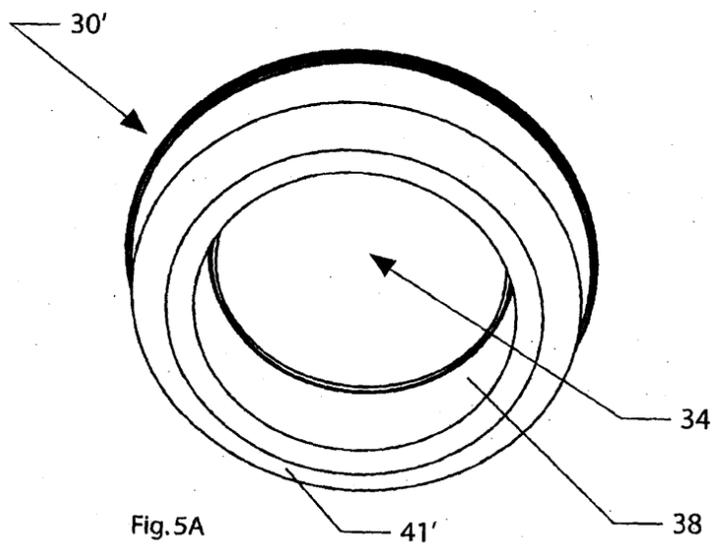


Fig.4

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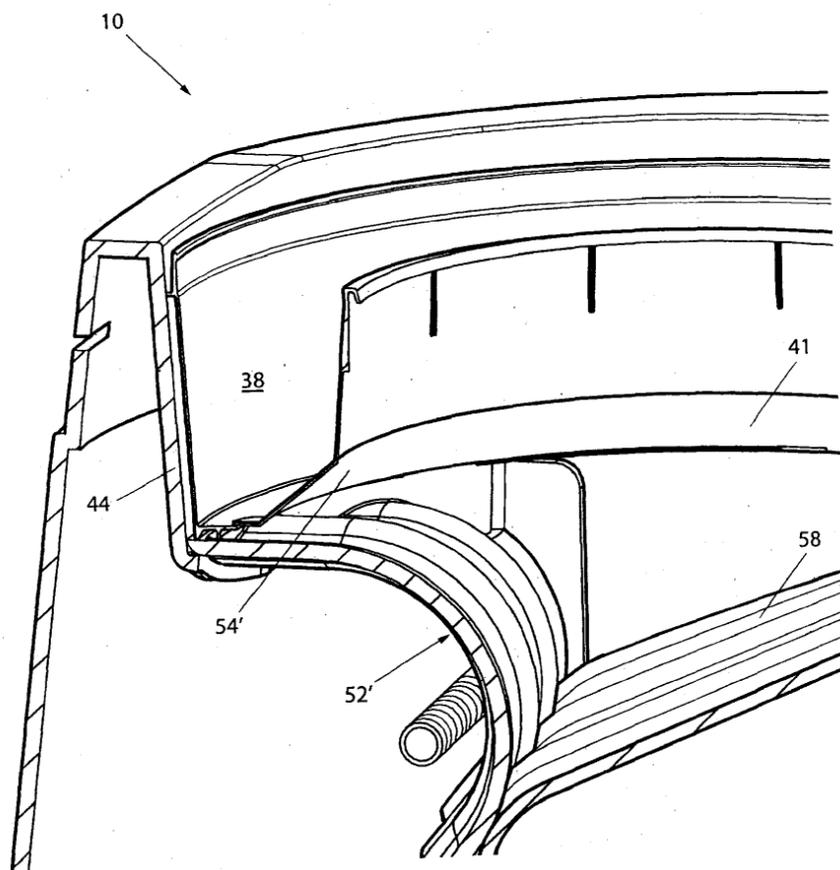


Fig.6

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Application number / numéro de demande: 264 0384

Figures: 1, 3A, 3B, 3C, 4, 6, 7

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CA 2936415 C 2017/04/04

(11)(21) **2 936 415**

(12) **BREVET CANADIEN
CANADIAN PATENT**

(13) **C**

(22) **Date de dépôt/Filing Date:** 2008/10/03

(41) **Mise à la disp. pub./Open to Public Insp.:** 2009/04/05

(45) **Date de délivrance/Issue Date:** 2017/04/04

(62) **Demande originale/Original Application:** 2 855 159

(30) **Priorité/Priority:** 2007/10/05 (EP07019571.4)

(51) **Cl.Int./Int.Cl.** **B65B 67/12** (2006.01),
B65B 5/04 (2006.01), **B65B 67/04** (2006.01)

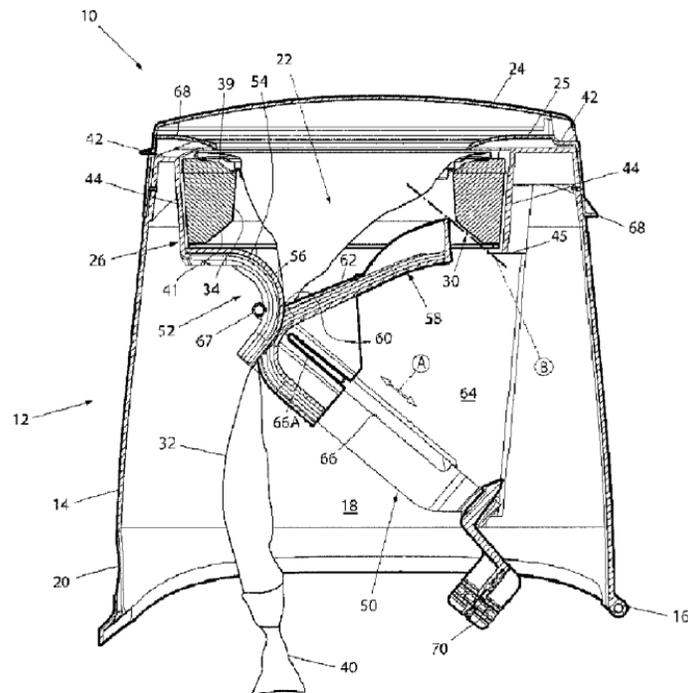
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(54) **Titre : CARTOUCHE ET APPAREIL D'EMBALLAGE D'OBJETS JETABLES DANS UN TUBE DE MATIERE SOUPLE**

(54) **Title: CASSETTE AND APPARATUS FOR PACKING DISPOSABLE OBJECTS INTO AN ELONGATED TUBE OF FLEXIBLE MATERIAL**



(57) **Abrégé/Abstract:**

An apparatus for packaging soiled diapers within an elongated tube of flexible plastic material arranged to ensure the proper orientation of a cassette dispensing the elongated tube of flexible plastic material comprises a storage area for receiving soiled

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(13) **C**

(57) Abrégé(suite)/Abstract(continued):

diapers. A holder is configured for releasably receiving the cassette, the cassette having a central opening, the cassette dispensing the tube material from a top thereof through the central opening, the cassette including a recessed area on a lower portion thereof. The holder is proximal the entrance of the apparatus and includes an upwardly extending wall, a bottom wall, and a projecting member upwardly extending above the bottom wall. The projecting member is configured to engage the recessed area of the cassette when the cassette is received in the holder in the proper orientation, wherein the projecting member is movable relative to the bottom wall.

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CASSETTE AND APPARATUS FOR PACKING DISPOSABLE OBJECTS
INTO AN ELONGATED TUBE OF FLEXIBLE MATERIAL

FIELD OF THE APPLICATION

The present application relates to an apparatus for packaging disposable material or objects into a tube of flexible plastic film material. More specifically, the invention relates to an apparatus for use to package waste material, for example babies' disposable diapers, or any other kind of appropriate objects or material, into a tube of flexible plastic film material and to store the so packaged waste material in a hygienic and a substantially odor-free manner, until it is collected.

BACKGROUND OF THE ART

Known apparatuses of the above-mentioned type generally comprise a container having an open or openable upper portion in which the waste to be disposed of may be inserted and a bottom portion in which the disposed waste is stored. A ring-shaped cassette is mounted in the upper portion of the container, and contains, in a pleated form, a tube of flexible plastic film material which is formed into an elongated tube which is knotted at a bottom end and into which the waste material may be inserted and temporarily stored.

In use, the waste to be disposed of is inserted into the tube at the upper portion of the container and the tube and waste are then pushed through the open center of the cassette towards the bottom portion of the container for storage purposes. Closeable means are also provided for closing the tube below the cassette and thus preventing bad odors from escaping from the tube during storage.

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In Canadian Patent No. 1,298,191, these closeable means are disclosed as a core that can be turned by a lid about a cylinder in order to twist the tube at regular intervals to form successive "pouches" that are kept sealed while they are stored.

In Canadian laid-open Application No. 2,383,799, a squeezing device is mounted in the container below the cassette to pull the tube from the cassette and move it down together with the objects inserted into the container. This squeezing device comprises a pair of opposite rotatable members between which the tube is inserted. The rotatable members have a plurality of opposite bars extending transversely to the tube in order to squeeze the tube, keep it closed until other objects to be disposed of are inserted into the upper portion of the container, and pull it down to move the plastic film forming the tube and the objects contained therein towards the bottom portion of the container for storage purpose. Actuation of the rotatable members in unison and in opposite direction to achieve the requested squeezing, closing and pulling down of the plastic film tube is preferably obtained by actuation of a lever that is part of the container.

In Canadian laid-open Application No. 2,441,837, a plunging device is provided to compress the object to be disposed of, and push it into the tube and to the bottom part of the container. The plunging device includes two arms with pivoting flaps attached thereto and opposing pivotable slides.

All of these prior art devices have several disadvantages. Their mechanisms have many parts and are prone to breakage. These devices are also not user-friendly and difficult to understand the operation thereof when first

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purchased. They are costly to fabricate and they utilize excess film from the cassettes, adding to the cost of use. Some also do not effectively contain the odors of the disposed material. Some cause confusion in their installation, causing improperly oriented cassettes and contamination of the cassette walls.

SUMMARY OF THE APPLICATION

It is therefore an aim of the present invention to provide a novel apparatus for packing disposable objects into an elongated tube of flexible plastic film material that addresses issues associated with the prior art.

Therefore, in accordance with a first embodiment of the present application, there is provided a cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition, an annular opening at an upper end of the annular receptacle for dispensing the tubing, the annular receptacle defining a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of the central opening.

In accordance with the first embodiment, the clearance is in the shape of a chamfer.

In accordance with the first embodiment, a removable lid closes the annular opening of the annular receptacle.

In accordance with the first embodiment, an outer periphery of the annular receptacle tapers downwardly.

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In accordance with the first embodiment, the annular opening is adjacent to an outer periphery of the annular receptacle.

In accordance with the first embodiment, the clearance extends on the full periphery of the central opening.

In accordance with the first embodiment of the present application, there is provided an apparatus for packing at least one disposable object into an elongated tube of flexible material, comprising a bin defining an enclosure with an opening defined at a top thereof for receiving at least one disposable object to be packed; a holder within the bin proximate the opening; a closing mechanism located below the holder comprising first and second portions, the second portion being biased in a closed position against the first portion and defining a receiving surface for receiving the at least one disposable object, the second portion being slidable from the closed position to an open position through application of a substantially vertical force against the receiving surface and being slidable from the open position to the closed position under the action of biasing means, the closing mechanism in the open position defining a passage between the opening of the bin and a bottom portion of the enclosure located below the closing mechanism, the closing mechanism in the closed position closing the said passage; and the cassette supported by the holder in the opening of the bin with the clearance allowing the cassette not to impede the motion of the closing mechanism from the closed position to the open position.

Still in accordance with the first embodiment, the holder comprises a first annular flange extending inwardly from an outer wall of the bin, a tubular wall extending generally downwardly from an inner end of the first annular

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flange, and a second annular wall extending inwardly from a bottom end of the tubular wall, thus forming a seat for receiving the cassette.

Still in accordance with the first embodiment, the tubular wall tapers in a downward direction, and the annular body has a corresponding frustoconical outer periphery for complementary engagement of the cassette in the holder.

Still in accordance with the first embodiment, the opening of the bin is surrounded by a removable lid, the lid opening/closing access to the opening of the bin, the lid being prevented from being installed properly when the cassette is oriented upside down in the holder.

In accordance with a second embodiment of the present application, there is provided: a cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition, an annular opening at an upper end of the annular receptacle for dispensing the tubing, the annular receptacle defining a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of an outer periphery of the annular receptacle.

In accordance with the second embodiment, the clearance forms a frusto-conical geometry at the bottom of the annular receptacle.

In accordance with a third embodiment, there is provided: an apparatus for packing at least one disposable object into an elongated tube of flexible material, comprising: a bin defining an enclosure with an opening

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defined at a top thereof for receiving at least one disposable object to be packed; a holder within the bin proximate the opening, and an interfering member at a bottom of the holder; a closing mechanism located below the holder comprising first and second portions, the second portion being biased in a closed position against the first portion and defining a receiving surface for receiving the at least one disposable object, the second portion being slidable from the closed position to an open position through application of a substantially vertical force against the receiving surface and being slidable from the open position to the closed position under the action of biasing means, the closing mechanism in the open position defining a passage between the opening of the bin and a bottom portion of the enclosure located below the closing mechanism, the closing mechanism in the closed position closing the said passage; a cassette supported by the holder in the opening of the bin and having an annular receptacle to accommodate a length of tubing in an accumulated condition, the annular receptacle having an upper annular opening for dispensing the tubing such that the tubing extends through a central opening of the annular receptacle and with a knotted end thereof into the enclosure of the bin to receive disposable objects, whereby the closing mechanism closes the tubing, the annular body having a clearance in a bottom portion of an outer periphery of the annular receptacle, so as to cooperate with the interfering member for the cassette to be aligned with the top of the bin in a desired orientation; and a removable lid positioned flush on the top of the bin only when the cassette is in the desired orientation, the cover opening/closing access to the opening of the bin.

In accordance with another aspect, the invention provides a cassette for packaging soiled diapers into an

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elongated tube of flexible material. The cassette comprises: a receptacle including a wall delimiting a central opening, the central opening extending along a generally vertical central axis; the receptacle defining a storage area circumscribing the central opening and receiving the elongated tube of flexible material outwardly of the wall; cassette including an outer boundary spaced outwardly of the wall; a cover at a top portion of the storage area, the cover engaging the wall and extending outwardly therefrom toward the outer boundary of the cassette; the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outwardly of an imaginary projection of the wall extending downwardly along the central axis; a first portion of the storage area that is located outwardly of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a receptacle including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis; the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall; the cassette including an outer boundary spaced outward of the tubular wall; a cover at a top portion of the storage area, the cassette being configured to dispense the tube of flexible material from the storage area, through the central opening while the tube overlies the cover; the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outward an imaginary projection of the tubular wall

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extending downwardly along the central axis; a first portion of the storage area that is located outward of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a receptacle including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis; the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall; the cassette including an outer boundary spaced outward of the tubular wall; a cover at a top portion of the storage area, the cover having a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent to the convex edge portion; the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outward of an imaginary projection of the tubular wall extending downwardly along the central axis; a first portion of the storage area that is located outward of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a receptacle including a tubular wall delimiting a central opening; the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall; said tubular wall having a lower end portion;

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an oblique wall connecting with said lower end portion and extending radially outwardly and downwardly therefrom, the oblique wall defining a corner with the lower end portion having an angle substantially less than 270 degrees.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a generally annular storage area receiving the elongated tube of flexible material; the storage area including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis; the cassette having a top portion and an opposite bottom portion; a cross-section of the top portion of the cassette taken in a vertical plane containing the generally vertical central axis including a first wall segment that is adjacent the central opening and which diminishes in height in a radially inward direction; a cross section of the bottom portion of the cassette taken in the vertical plane including a second wall segment adjacent the central opening and which increases in height in a radially inward direction.

In accordance with another aspect, the invention provides use of a cassette in a diaper pail comprising a storage area for holding soiled diapers, an opening for introducing soiled diapers in the storage area and a holder for a cassette proximal the opening; the cassette configured for dispensing an elongated tube in which soiled diapers are enclosed when introduced in the storage area, the cassette including a receptacle for storing the elongated tube in a folded condition, the receptacle defining a central opening and having a top and a bottom, the cassette dispensing the elongated tube from the top of the receptacle; the cassette

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being configured to: create an interference with a component of the diaper pail to prevent proper operation of the diaper pail when the receptacle is loaded in the holder upside down, with the top of the receptacle located down; avoid the interference when the receptacle is loaded in the holder with the top located; wherein the component includes a lid assembly, the cassette and the diaper pail cooperating such that the cassette interferes with the lid assembly to prevent proper operation of the lid assembly when the receptacle is loaded in the holder upside down, with the top of the receptacle located down.

In accordance with another aspect, the invention provides a diaper pail comprising: a storage area for holding soiled diapers; an opening for introducing soiled diapers in the storage area; a holder for removably receiving a cassette proximal the opening; a cassette loaded in the holder, the cassette configured for dispensing an elongated tube in which soiled diapers are enclosed when introduced in the storage area, the cassette including an annular receptacle for storing the elongated tube in a folded condition, the annular receptacle defining a central opening and having a top and a bottom, the cassette dispensing the elongated tube from the top of the of the annular receptacle through the central opening; the cassette being configured to: create an interference with a component of the diaper pail to prevent proper operation of the diaper pail when the annular receptacle is loaded in the holder upside down, with the top of the annular receptacle facing down; avoid the interference when the annular receptacle is loaded in the holder in the correct orientation with the top facing up; wherein the component includes a lid, the cassette and the diaper pail cooperating such that the cassette interferes with the lid to prevent proper operation

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of the lid when the annular receptacle is loaded in the holder upside down, with the top of the annular receptacle facing down.

In accordance with another aspect, the invention provides an apparatus for packaging soiled diapers within an elongated tube of flexible plastic material, comprising: a storage area for receiving soiled diapers; an entrance for introducing soiled diapers in the storage area; a holder configured for releasably receiving a cassette for dispensing the tube material, the cassette having a central opening, the cassette dispensing the tube material from a top thereof through the central opening, the cassette including a recessed area on a lower portion thereof, the holder being proximal the entrance and including: a generally upwardly extending wall; a bottom wall; a projecting member upwardly extending above the bottom wall, the projecting member configured to engage the recessed area of the cassette when the cassette is fully seated in the holder and the cassette engages the bottom wall of the holder, wherein the projecting member is movable relative to the bottom wall.

In accordance with another aspect, the invention provides an apparatus for packaging soiled diapers in an elongated tube of plastic flexible material, the apparatus comprising: a storage area for receiving soiled diapers; an entrance for introducing soiled diapers in the storage area; a holder configured for releasably receiving a supply of the tube material such that the supply of the tube material extends through the entrance, the holder being proximal the entrance and including: a recess including an upwardly extending side wall; a bottom generally horizontally extending wall, the bottom wall being generally circular and

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surrounding the entrance; a tube gathering mechanism for sealing the tube when no soiled diaper is being pushed through the entrance, the tube gathering mechanism including: a closure member including a projection extending above the bottom wall of the holder, the closure member engaging the tube and being moveable with relation to the bottom wall to gather the tube; the closure member being responsive to pressure by a hand of a user to progressively open and allow insertion of a soiled diaper in the storage area; a stationary wall portion located below the bottom wall for slidably supporting the closure member during the movement of the closure member with respect to the bottom wall; a device connected to the closure member for driving the moveable member to move relative the bottom wall to gather the tube; a lid hingedly moveable between a closed position and an opened position, in the closed position the lid closing the holder, in the opened position the lid allowing access to the holder to permit installation of a new supply of tube material, the lid having a central funnel-shaped portion defining an aperture generally aligning with the entrance to the storage area, the aperture permitting insertion of a soiled diaper into the storage area.

In accordance with another aspect, the invention provides a cassette for use in a diaper pail. The diaper pail comprises: a storage area for holding soiled diapers; an opening for introducing soiled diapers in the storage area; a holder for the cassette proximal the opening, including : a bottom wall; a projecting portion extending above the bottom wall, the projecting portion being radially inward from the bottom wall with relation to an axis of the opening; the cassette configured for dispensing an elongated tube of flexible material, including: a

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receptacle including: a tubular wall delimiting a central opening; a bottom located outwardly of the tubular wall, the tubular wall connecting with the bottom; a cover at a top portion of the storage area, the cover engaging the tubular wall and extending outwardly therefrom toward an outer boundary of the cassette; the receptacle defining a storage space in which the elongated tube of flexible material is stored outwardly of the tubular wall; the bottom of the receptacle configured to sit on the bottom wall of the holder when the cassette is loaded in the holder; the receptacle defining a clearance located inwardly of the bottom, the clearance configured to receive the projecting portion when the bottom of the receptacle sits on the bottom wall of the holder.

In accordance with another aspect, the invention provides an assembly of a diaper pail and cassette comprising: a storage area for holding soiled diapers; an opening for introducing soiled diapers in the storage area; a holder for the cassette proximate the opening including : a bottom wall; a projecting portion extending above the bottom wall, the projecting portion being radially inward from the bottom wall with relation to an axis of the opening; the cassette configured for dispensing an elongated tube of flexible material, including: a receptacle including: a tubular wall delimiting a central opening; a bottom located outwardly of the tubular wall, the tubular wall connecting with the bottom; a cover at a top portion of the storage area, the cover engaging the tubular wall and extending outwardly therefrom toward an outer boundary of the cassette; the receptacle defining a storage space in which the elongated tube of flexible material is stored outwardly of the tubular wall; the bottom of the receptacle supported by the bottom wall of the holder when the cassette

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is loaded in the holder; the receptacle defining a clearance located inwardly of the bottom, the clearance receiving the projecting portion when the bottom of the receptacle sits on the bottom wall of the holder.

In accordance with another aspect, the invention provides a diaper pail. The diaper pail comprises: a top portion and a bottom portion connected by a hinge, the bottom portion defining a storage area for receiving soiled diapers, the top portion including a holder; the top portion being pivotable about the hinge to open the storage area and allow removal of a soiled diapers load from the storage area; a diaper pail refill received in the holder, the diaper pail refill configured for dispensing an elongated tube in which soiled diapers are enclosed when introduced in the storage area, the diaper pail refill having an annular receptacle storing the elongated tube in a folded condition, the annular receptacle including a downwardly extending annular wall defining a central opening; a cutter mounted to the top portion, the cutter being proximate the hinge; a length of the elongated tube extending from the diaper pail refill to the storage area, the length of the elongated tube extending past the cutter to allow a user desirous to empty the storage area to sever the elongated tube with the cutter in order to separate a portion of the elongated tube containing soiled diapers from a portion that is free of soiled diapers.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-sectional view of an apparatus according to a first embodiment of the present invention;

Fig. 2A is a bottom perspective view of a cassette to be used with the apparatus of Fig. 1;

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Fig. 2B us a top perspective view of the cassette of Fig. 2A;

Fig. 3A is a cross-sectional view of the apparatus of Fig. 1, without tubing, with a closing mechanism in a closed position;

Fig. 3B is a cross-sectional view of the apparatus of Fig. 3A, with the closing mechanism displaced toward an open position;

Fig. 3C is a cross-sectional view of the apparatus of Fig. 3A, with the closing mechanism in the fully open position;

Fig. 4 is a cross-sectional view of an apparatus according to a second embodiment of the present invention;

Fig. 5A is a bottom perspective view of a cassette to be used with the apparatus of Fig. 4;

Fig. 5B is a top perspective view of the cassette of Fig. 5A;

Fig. 6 is an enlarged perspective view of an apparatus in accordance with a third embodiment of the present invention; and

Fig. 7 is a sectional view illustrating the cassette of Fig. 2A as used with an apparatus having interfering members.

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DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. 1, there is shown an apparatus 10 for packaging disposable objects in an elongated tube of flexible plastic film material. The apparatus 10 comprises a bin 12 having a top portion 14 and a bottom portion (not shown) hingedly connected to each other by a hinge member 16, with outer walls of the top portion 14 and bottom portion defining an enclosure 18 of the bin 12.

The top portion 14 and bottom portion are locked together with a mechanism such as a push button latch (not shown) received in eyelet 20, located opposite of the hinge member 16. Upon actuation of the push button, the top portion 14 and bottom portion are disconnected and can be pivoted apart about the hinge member 16 to provide access to the enclosure 18, for example to empty the bin 12.

The top portion 14 defines an opening 22 for receiving disposable objects therethrough. The bin 12 further comprises a lid 24 hingedly connected to a ring 25, for instance in the shape of a funnel (hereinafter funnel 25), although multiple shapes are considered such as a flat ring, as long as the ring forms an opening guidance. The funnel 25 is mounted to the top portion 14 such as to selectively open and close access to the opening 22 through pivoting motion of the lid 24. Although in the embodiment shown the apparatus has a generally circular opening 22, the bin 12 is not limited to circular openings and could function with openings of different shapes.

Still referring to Fig. 1, the apparatus 10 also comprises a holder 26 located within the top portion 14 proximate the opening 22 for holding a cassette 30 of flexible plastic film tubing 32. The cassette 30 has an

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annular body defining a central opening 34 which is generally aligned with the bin opening 22 when the cassette 30 is accommodated in the holder 26.

Referring concurrently to Figs. 1, 2A and 2B, the cassette 30 has a lid 36 and a bottom annular receptacle 38. After the lid 36 is removed, the flexible tubing 32 exits from an upper annular opening of the receptacle 38, adjacent an outer periphery thereof. It is pointed out that once the lid 36 is removed, there remains an upper flange 39 adjacent to the annular opening that maintains the compressed tubing 32 in the receptacle 38. The cassette 30 comprises a length of flexible plastic film material that is accumulated (e.g., folded). As shown in Fig. 1, a knot 40 is found at the free end of the tubing 32 to form a bag end. The knot 40 and a length of the tubing 32 extend from the cassette 30 into the enclosure 18 of the bin 12, passing through the central opening 34 of the cassette 30. To better contain odors, it is preferable that the film material of the tubing 32 be a multiple layer film having an odor barrier therein such that odors do not permeate through the film material. The receptacle 38 of the cassette 30 defines a chamfer clearance 41 at a bottom of the central opening 34. The chamfer clearance 41 is provided in order to ensure that the cassette 30 is properly installed in the holder 26 when the apparatus 10 is in use, as will be described hereinafter. The chamfer clearance 41 is provided on the full periphery of the cassette 30, but may also be partial (i.e., not on the full periphery of the central opening of the cassette).

Referring to Fig. 1, the holder 26 includes a top annular flange 42 extending inwardly from the top of the bin 12. A tubular wall 44 extends downwardly from an inner end of the top annular flange 42. The holder 26 has a

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horizontal flange 45 at a bottom of the wall 44, so as to define a seat supporting the cassette 30. One will also appreciate that the holder 26 may take many alternate shapes and forms. .

Referring to Figs. 1 and 3A-3C, the apparatus 10 further includes a closing mechanism 50 whose purpose is to provide access to the flexible tubing 32 extending therebelow and preventing odors from escaping from the flexible tubing 32. In one form of use, it permits the disposable objects to push down against the bottom of the tubing 32 (at the knot 40) to draw out loose flexible tubing from the receptacle 38 of the cassette 30. One aspect of note is that the flexible tubing 32 passes over receptacle 38 and the closing mechanism 50, thereby isolating the receptacle 38 and the mechanism 50 from the disposable objects to be packaged, reducing the need for constant cleaning of the walls defining the opening 34 and the mechanism 50. In this respect, one will appreciate that one of the preferred uses for the apparatus 10 is the disposal of baby diapers.

The closing mechanism 50 comprises a fixed portion 52, which comprises a generally "C"-shaped member rigidly connected to the wall 44 of the holder 26. Alternate types of connections are also possible for the fixed portion 52, including connection to an additional support member connected to the holder 26 or to another part of the top portion 14. The curved fixed portion 52 defines a rounded apex 54 which projects into the opening 22, as can be seen in Fig. 1. The fixed portion 52 defines a receiving surface 56 downwardly inclined toward a movable portion 58 of the closing mechanism 50.

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The movable portion 58 of the closing mechanism 50 is also generally "C"-shaped in cross-section and is biased against the fixed portion 52 in a closed position shown in Figs. 1 and 3A such as to generally close the opening 22 of the apparatus 10, thereby sealing the tubing 32 shut. The curved movable portion 58 defines a rounded apex 60 projecting into the opening 22, as can be seen in Fig. 1. The movable portion 58 defines a receiving surface 62 downwardly inclined toward the fixed portion 52, the two receiving surfaces 56,62 forming a trough directing an object therebetween. In the closed position, contact between the two portions 52,58 is between the apex 60 of the movable portion 58 and a lower part of the fixed portion 52 located below the apex 54 thereof. These portions are wave-shaped in cross-section to provide an ergonomical shape in view of hands contacting them, as illustrated in Fig. 1. Moreover, these wave-shaped portions provide efficient sealing of a plastic film tube 32 engaged or pinched therebetween.

The movable portion 58 is slidably supported by a pair of spaced-apart, generally vertical walls 64 (only one of which is shown in Fig. 1) extending downwardly from the holder 26, with the opening 22 being aligned therebetween. Each of the walls 64 has an angled slot 66. In the embodiment shown, the slots 66 are angled at approximately 40 degrees with respect to the horizontal, although any other working angles are suitable.

The movable portion 58 includes aligned sliding members 66A extending therefrom and engaging the slots 66, such that the movable portion 58 is slidably movable along an angular direction defined by the slots 66, and thus along direction A. The movable portion 58 can move between a closed

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position, as illustrated in Figs. 1 and 3A, in which the movable portion 58 abuts against the fixed portion 52 to seal the tubing 32 shut, and an opened position (shown in Fig. 3C) enough to let a disposable object to pass between the portions 52 and 58. The movable portion 58 is biased to the closed position of Fig. 1, for using an elongated helical spring 67 connected to and extending between the sliding members 66A of the movable portion 58 and around the back of the fixed portion 52. The concave shape of the back of the fixed portion 52 helps maintain the spring aligned in a plane defined by the slots 66.

It is of particular importance that the cassette 30 be installed in the appropriate orientation. In the appropriate orientation, as illustrated in Fig. 1, the tubing 32 is deployed from the top of the cassette 30. Accordingly, the tubing 32 covers the side walls of the cassette 30 in the opening 34. Accordingly, as the tubing 32 covers the cassette 30, there is no risk of contamination of the walls of the cassette.

As is clearly seen in Fig. 1, the chamfer clearance 41 is positioned downwardly. A path of movement of the movable portion 58 is illustrated at B. It is observed that the movable portion 58 passes closely to the wall defining the chamfer clearance 41. If the chamfer clearance 41 were not provided, the cassette 30 would impede the movement of the movable portion 58. Accordingly, if the cassette 30 were installed upside down, the movable portion 58 would be prevented from moving along its path. Therefore, if a user person wants to use the cassette 30 properly, the cassette 30 must be oriented properly.

Alternately, the fixed portion 52 can be replaced by a portion movable opposite of the movable portion 58, the two

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being biased together in the closed position. Such a configuration could be, for example, two sliding members symmetrical with respect to one another about a vertical axis defined at the point of contact therebetween, such as two "C"-shaped members similar in configuration to the movable member 58 shown, two rollers, etc., which are slidable away from each other upon downwardly pushing an object thereon, and are biased together for example by being interconnected by one or a plurality of springs. However, such a mechanism includes additional parts.

In order to assist the user in correctly placing the disposable object in the tubing 32, the apparatus 10 advantageously has the funnel 25 removably installed over the cassette 30, providing a downward shape around the openings 22,34, which creates a funnel effect and guides the user's hand. A handle 68 is provided to remove the lid 24/funnel 25 assembly.

Referring to Fig. 1, the apparatus 10 can further include, within the bin 12, an integrated cutting tool 70, which can be for example attached to one of the vertical walls 64, and which includes a blade located between two spaced-apart protective fingers sized such as to prevent a user's finger from reaching the blade but still allowing a portion of tubing 32 to be inserted between the fingers to be cut with the blade.

In order to prepare the apparatus 10 for use, and with reference to Fig. 1, a user person removes the lid 24 and funnel 25 assembly and inserts the cassette 30 in the correct orientation (i.e., with the chamfer clearance 41 facing downward. The user person withdraws a free end of the tubing 32 from the cassette 30, takes a leading edge of flexible tubing 32, ties it into the knot 40 and pushes the

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knot 40 through the openings 22,34 and beyond the closing mechanism. It is pointed out that the knot 40 may be made prior to the cassette 30 being installed. The movable portion 58 opens as a result of the downward pressure, whereby the knot 40 reaches the enclosure 18 below the closing mechanism 50.

Alternately, the tube end with the knot 40 could be pulled down to the bottom of the bin 12, for example by pivoting and opening the top portion 14 such as to gain access to the enclosure 18, and pulling the tube end with the knot 40 through the closing mechanism 50 and beyond to the bottom of the bin 12. The top portion 14 is then re-engaged with the bottom portion, and the lid 24/funnel 25 assembly is reinstalled on the top portion 14. Accordingly a length of empty flexible tubing 32 extends to the bottom and is now ready to receive disposable objects therein. Therefore, the film material is not pulled from the cassettes 30 as disposable objects are placed into the tube.

In use, when a disposable object needs to be packaged, the lid 24 of the apparatus 10 is lifted, thereby providing access to the opening 22. The disposable object to be packaged is placed into the opening 22 (in this case, the cassette 30 of flexible tubing 32 surrounds the object). The receiving surfaces 56,62 of the fixed and movable portions 52,58 of the closing mechanism 50 biased together in the closed position form a trough which directs the disposable object in the hand of a user person toward a contact region therebetween.

The user person pushes the disposable object in a downward direction, gradually opening the movable portion 58, as is shown in Figs. 3B and 3C. The angled receiving surface 62 of the movable portion 58 helps the downward

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force to be easily converted along the direction of the slots 66 such as to force the movable portion 58 from its closed position in contact with the fixed portion 52 (Fig. 3A) to its open position (Fig. 3C) against the force of the spring 67, through a sliding movement illustrated by direction A in Fig. 1. Since the movable portion 58 is moved by the force applied on the disposable object, it slides only enough for the disposable object to go past the closing mechanism 50, with most of the opening created by the movement of the movable portion 58 being blocked by the disposable object such as to minimize the propagation of odors through the opening 22.

Once the disposable object passes beyond the apex 60 of the movable portion 58, the user person releases the disposable object and withdraws his or her hand. The movable portion 58, under the action of the spring 67, rapidly returns to the closed position of Figs. 1 and 3A, through a sliding movement, effectively sealing the object within the flexible tubing 32. The curved profile of the fixed portion 52 below the apex 60 and, more importantly, of the movable portion 58 below the apex 60 helps push the disposable object further down, if there is resistance, as the movable portion 58 returns to the closed position to apply a downward pushing force.

It is pointed out that different configurations of the cassette are considered. For instance, clearances of different shapes can be used instead of a chamfer. The use of a chamfer shape does not substantially reduce the volume of the receptacle 38 of the cassette 30, thereby generally preserving the quantity of tubing 32 received in the cassette 30.

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In an alternative embodiment illustrated in Figs. 4, 5A and 5B, the cassette 30' is provided with a tapered clearance 41' (forming a frustoconical geometry at the outer periphery of the bottom of the cassette 30') as opposed to a chamfer clearance 41. The tapered clearance 41' is used in conjunction with a tapered flange 44' in the holder 26 of the apparatus 10, as is clearly illustrated in Fig. 4 (i.e., the flange 44' defines an interference member of frustoconical shape). Accordingly, this complimentary shape ensures that the cassette 30' is properly oriented in the holder 26, otherwise the funnel 25 could not be installed properly on the top of the bin 12. Moreover, the lid 24 and funnel 25 assembly would have problems closing with the improper orientation of the cassette 30'. It is pointed out that like reference numerals refer to like elements in Figs. 1 and 4.

For each new disposable object to be packed, the process is repeated, each time either dropping the disposable object within the already drawn length of flexible tubing 32 within the enclosure 18, or drawing out an additional length of flexible tubing 32 from the cassette 30 to accommodate another disposable object as the disposable object moves down into the tube inside the apparatus 10, until the enclosure 18 is full, containing an object-filled segment of flexible film tubing 32. In this case, the top portion 14 is pivoted away from the bottom portion. The flexible tubing 32 is then cut, for example by using the cutting tool 70 provided, and then tied to form a substantially sealed pouch which can be removed from the bin 12. The top portion 14 is pivoted back into engagement with the bottom portion to use the apparatus 10 again as described above.

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In another embodiment of the apparatus 10 using the cassette 30 of Figs. 2A and 2B, the fixed portion 52' of the closing mechanism 50 has an upper end 54' that extends upwardly in the opening 22 of the bin 12. The upper end 54' is sized such that it also extends into the opening 34 of the cassette 30 when the cassette 30 is positioned in the holder 26. If it were positioned upside down, the cassette 30 would extend above the annular flange 42, and the ring 68 would not be positionable on the bin 12.

In another embodiment illustrated by Fig. 7, the holder 26 features an interfering member 70 that has a shape that is complementary to that of the cassette 30 with the chamfer clearance 41. With the presence of the interfering member 70, the cassette 30 must properly be installed in the holder 26 to be used. As illustrated in Fig. 7, a pair of interfering members 70 may optionally be provided on both side of the holder 26.

Advantages of the apparatus 10 include the use of a wedge-type closing mechanism 50 of simple construction with few parts to seal the flexible tubing 32. The cassette configurations ensure that the cassette 30 is properly installed in the holder 26, thereby preventing contamination of the walls of the cassette (and the hands of the user person) as the properly installed cassette is mostly covered by the tubing 32 as is shown in Fig. 1. The mechanism 50 greatly reduces the complexity of the apparatus 10, makes the assembly simple, and allows for the use of a lesser quantity of flexible tubing 32 than prior-art devices. Furthermore, angling the course of the movable portion 58 permits the optimization of little horizontal clearance versus the force required to bias the movable portion 58. Finally, the shape of the individual portions of the

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mechanism prevents disposable objects from "coming back up" - that is, once a disposable object has been inserted under pressure to pull film material, it will be forced to remain in the flexible tubing by the closing mechanism 50.

ABSTRACT

A cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition. An annular opening at an upper end of the annular receptacle is for dispensing the tubing. The annular receptacle defines a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of the central opening.

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CLAIMS:

- 1) An apparatus for packaging soiled diapers within an elongated tube of flexible plastic material, comprising:
 - a) a storage area for receiving soiled diapers;
 - b) an entrance for introducing soiled diapers in the storage area;
 - c) a holder configured for releasably receiving a cassette for dispensing the tube material, the cassette having a central opening, the cassette dispensing the tube material from a top thereof through the central opening, the cassette including a recessed area on a lower portion thereof, the holder being proximal the entrance and including:
 - i) an upwardly extending wall;
 - ii) a bottom wall;
 - iii) a projecting member upwardly extending above the bottom wall, the projecting member configured to engage the recessed area of the cassette when the cassette is received in the holder, wherein the projecting member is movable relative to the bottom wall.
- 2) An apparatus as defined in claim 1, wherein the lower portion of the cassette includes a base wall, which faces the bottom wall when the cassette is received in the holder, the recessed area being adjacent the base wall.
- 3) An apparatus as defined in claim 2, wherein the recessed area is defined by a wall portion extending upwardly from the base wall.

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- 4) An apparatus as defined in claim 3, wherein the wall portion extends obliquely which relation to the base wall.
- 5) An apparatus as defined in anyone of claims 1 to 4, wherein the projecting member is moveable relative to the bottom wall to gather the tube material after the insertion of a soiled diaper in the storage area.
- 6) An apparatus, as defined in anyone of claims 1 to 5, comprising the cassette loaded into the holder.

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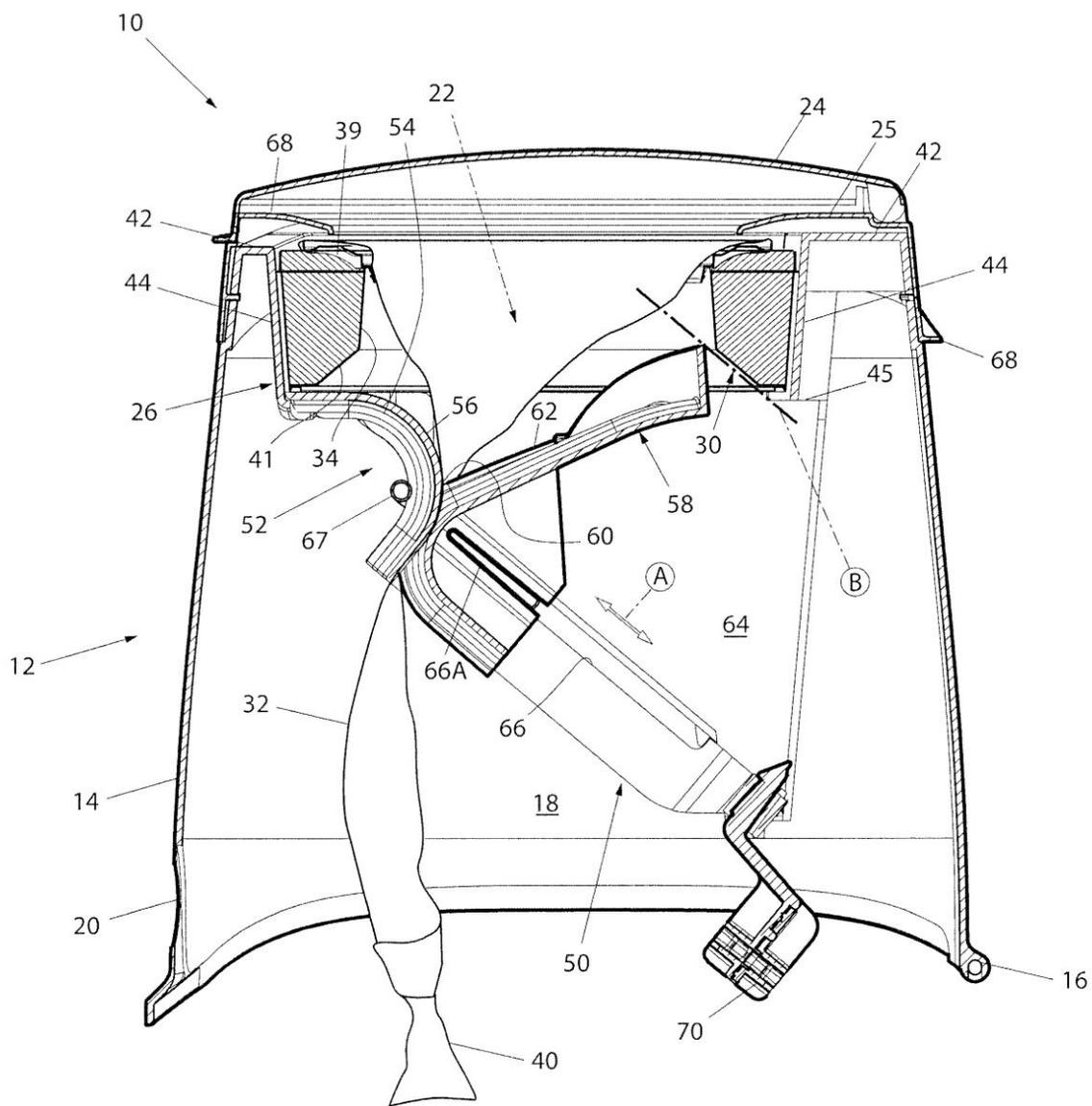
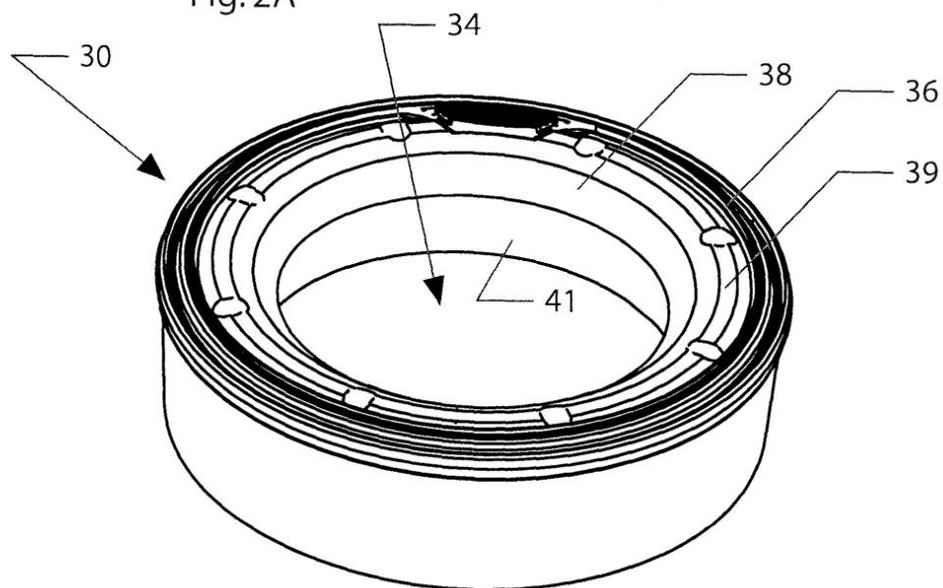
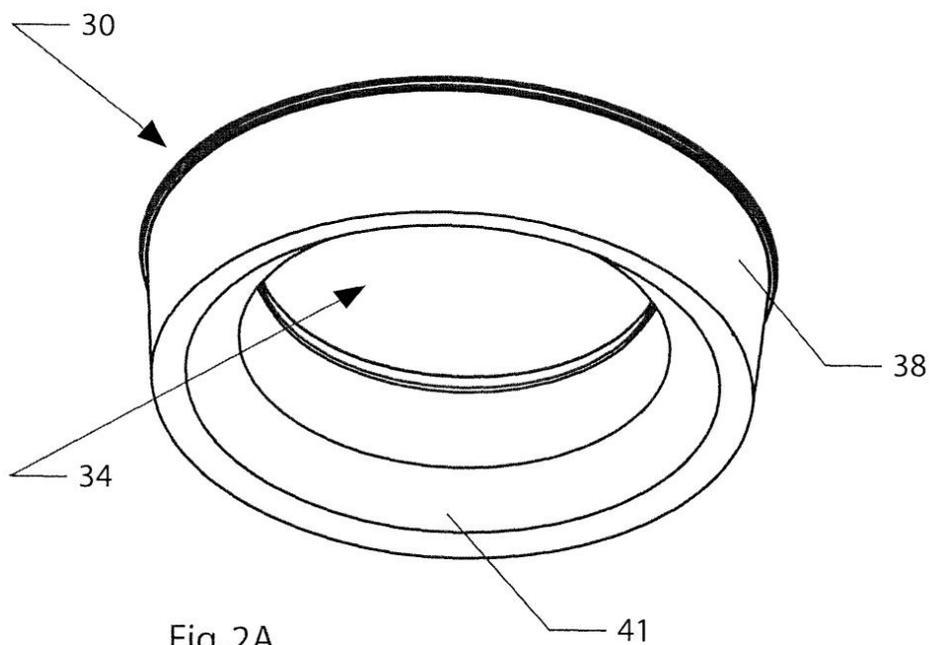


Fig. 1

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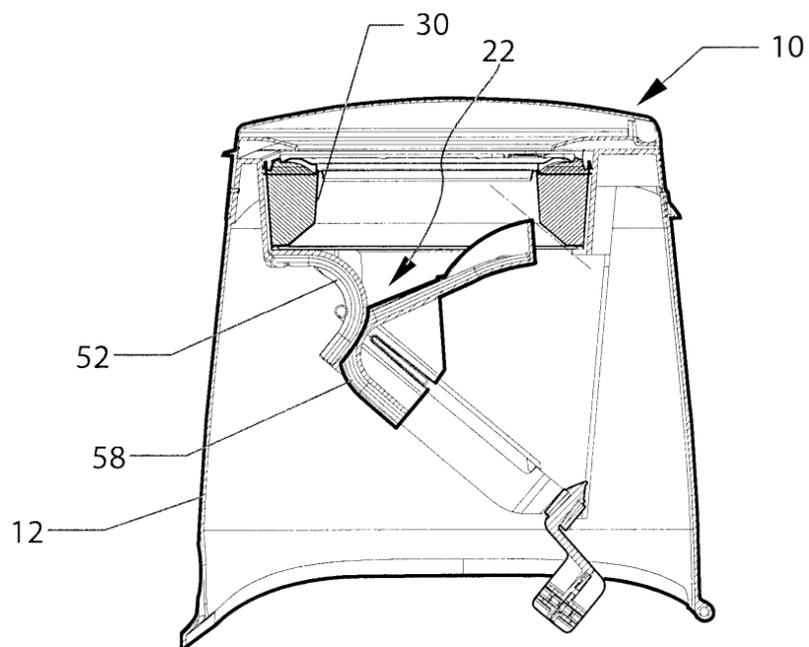


Fig.3A

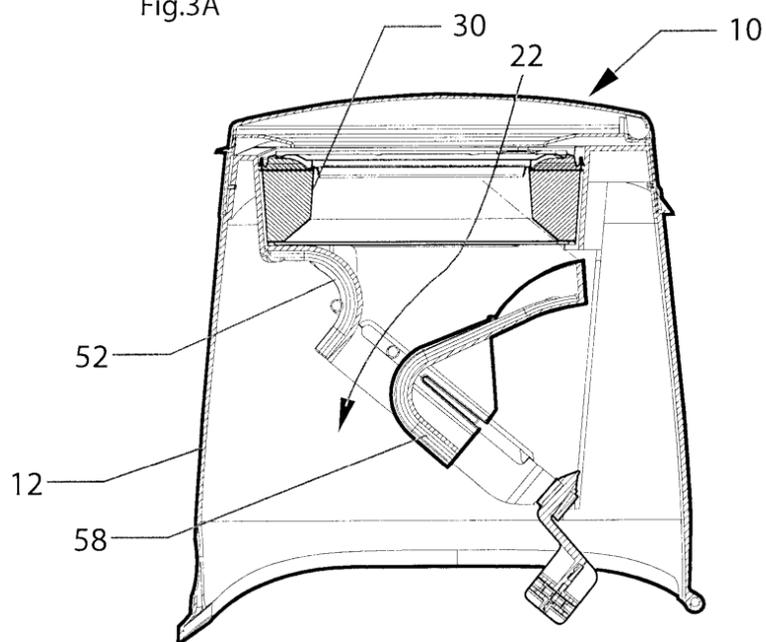


Fig.3B

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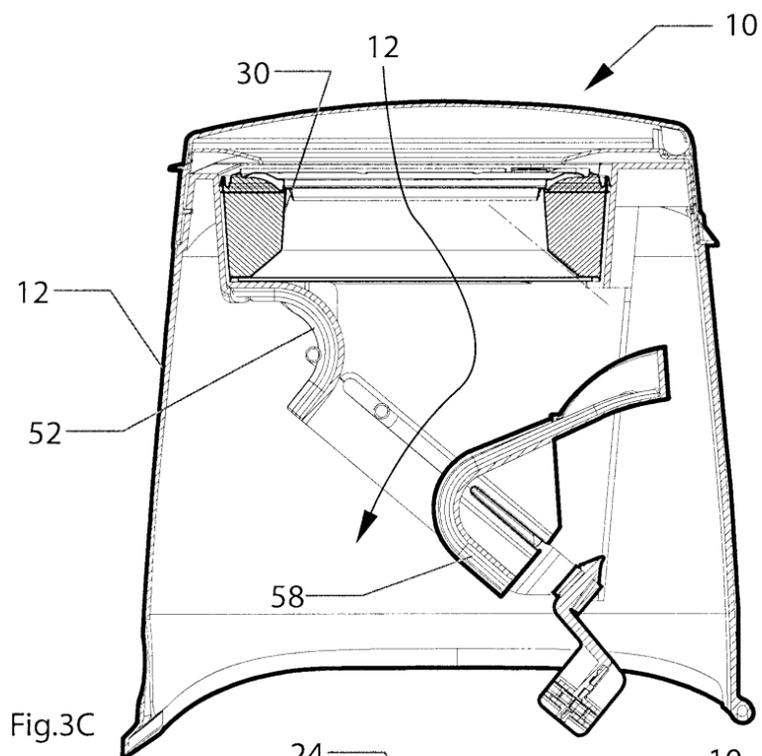


Fig.3C

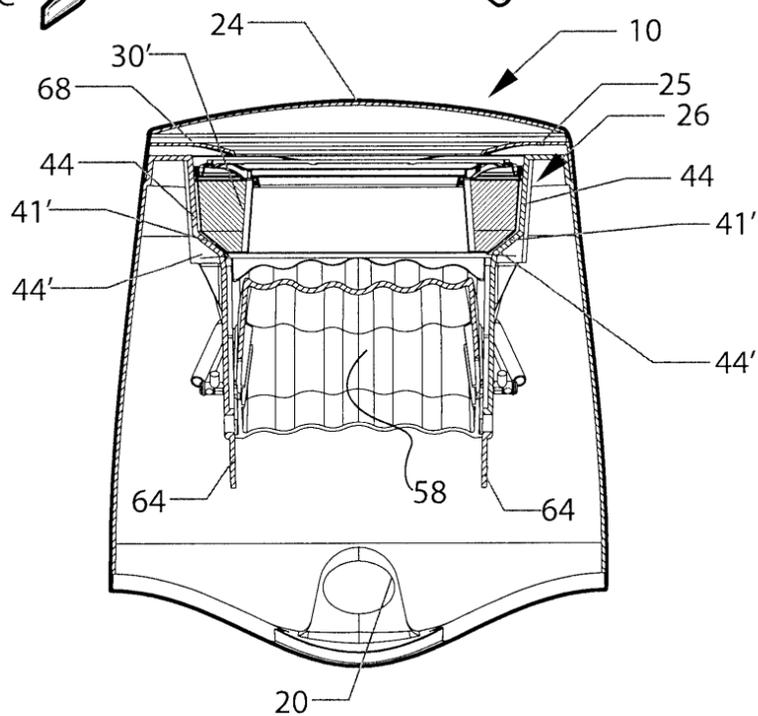
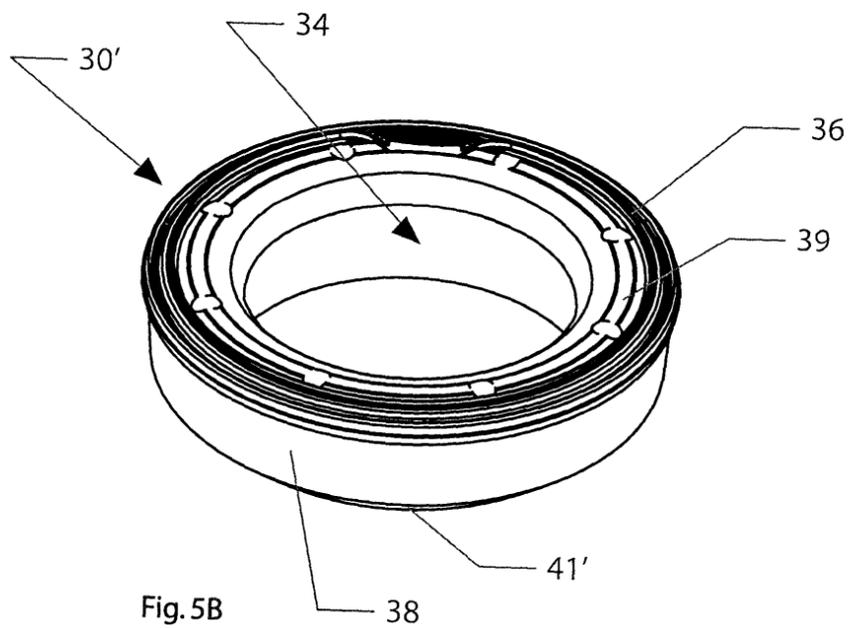
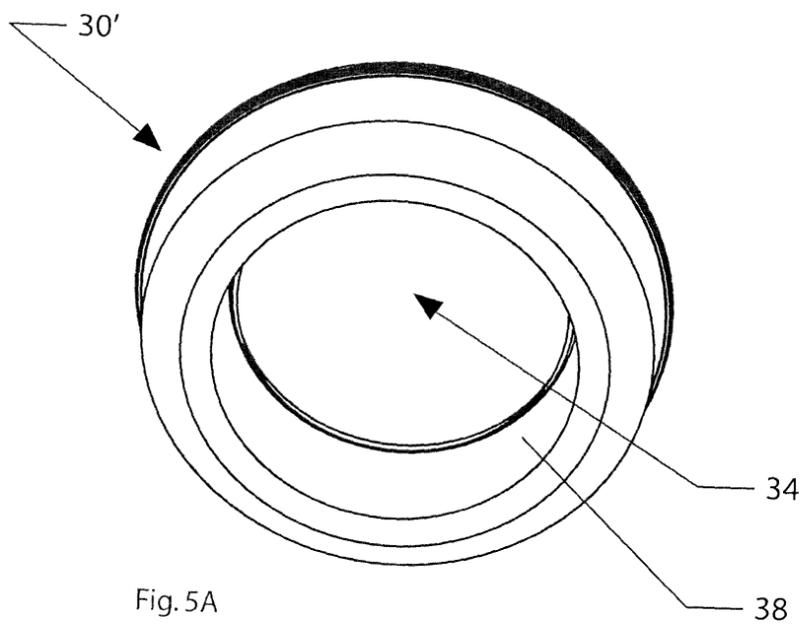


Fig.4

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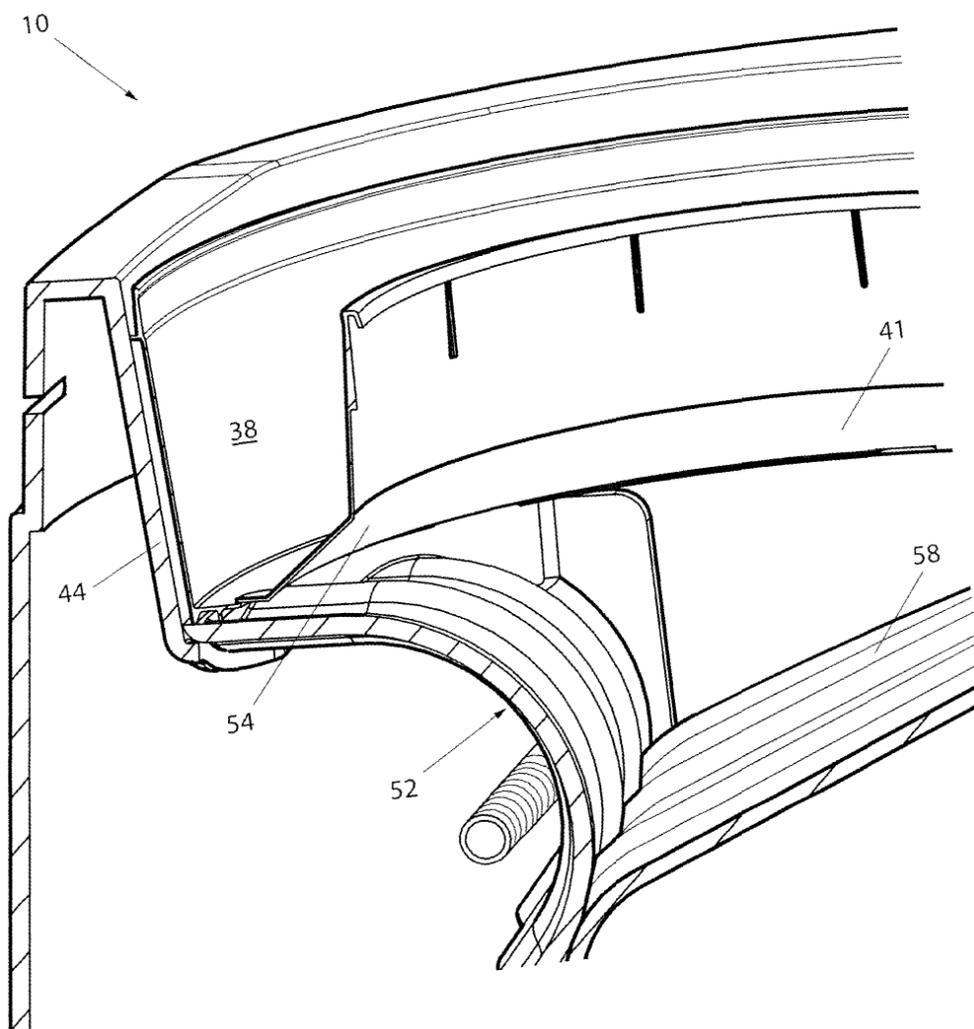


Fig. 6

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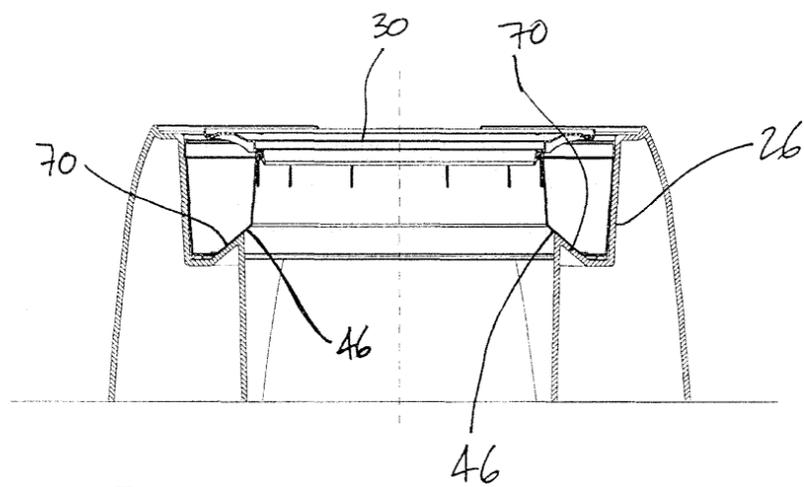


Fig. 7



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CA 2936421 C 2017/04/11

(11)(21) **2 936 421**

(12) **BREVET CANADIEN
CANADIAN PATENT**

(13) **C**

(22) Date de dépôt/Filing Date: 2008/10/03

(41) Mise à la disp. pub./Open to Public Insp.: 2009/04/05

(45) Date de délivrance/Issue Date: 2017/04/11

(62) Demande originale/Original Application: 2 855 159

(30) Priorité/Priority: 2007/10/05 (EP07019571.4)

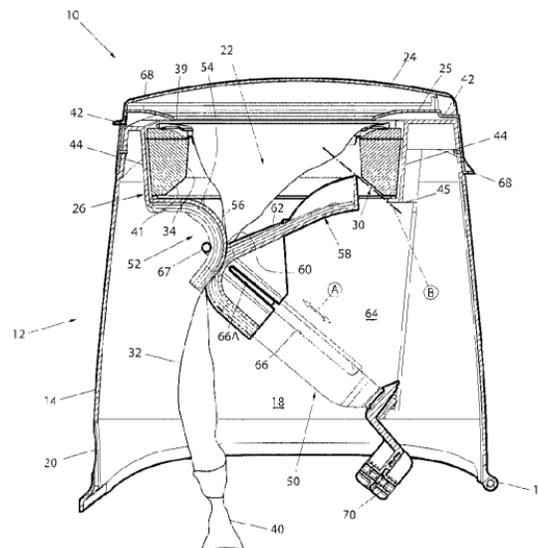
(51) Cl.Int./Int.Cl. *B65B 67/12* (2006.01),
B65B 5/04 (2006.01), *B65B 67/04* (2006.01)

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(54) Titre : CARTOUCHE ET APPAREIL D'EMBALLAGE D'OBJETS JETABLES DANS UN TUBE DE MATIERE SOUPLE
(54) Title: CASSETTE AND APPARATUS FOR PACKING DISPOSABLE OBJECTS INTO AN ELONGATED TUBE OF FLEXIBLE MATERIAL



(57) Abrégé/Abstract:

A cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition. An annular opening at an upper end of the annular receptacle is for dispensing the tubing. The annular receptacle defines a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of the central opening.

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CASSETTE AND APPARATUS FOR PACKING DISPOSABLE OBJECTS
INTO AN ELONGATED TUBE OF FLEXIBLE MATERIAL

FIELD OF THE APPLICATION

The present application relates to an apparatus for packaging disposable material or objects into a tube of flexible plastic film material. More specifically, the invention relates to an apparatus for use to package waste material, for example babies' disposable diapers, or any other kind of appropriate objects or material, into a tube of flexible plastic film material and to store the so packaged waste material in a hygienic and a substantially odor-free manner, until it is collected.

BACKGROUND OF THE ART

Known apparatuses of the above-mentioned type generally comprise a container having an open or openable upper portion in which the waste to be disposed of may be inserted and a bottom portion in which the disposed waste is stored. A ring-shaped cassette is mounted in the upper portion of the container, and contains, in a pleated form, a tube of flexible plastic film material which is formed into an elongated tube which is knotted at a bottom end and into which the waste material may be inserted and temporarily stored.

In use, the waste to be disposed of is inserted into the tube at the upper portion of the container and the tube and waste are then pushed through the open center of the cassette towards the bottom portion of the container for storage purposes. Closeable means are also provided for closing the tube below the cassette and thus preventing bad odors from escaping from the tube during storage.

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In Canadian Patent No. 1,298,191, these closeable means are disclosed as a core that can be turned by a lid about a cylinder in order to twist the tube at regular intervals to form successive "pouches" that are kept sealed while they are stored.

In Canadian laid-open Application No. 2,383,799, a squeezing device is mounted in the container below the cassette to pull the tube from the cassette and move it down together with the objects inserted into the container. This squeezing device comprises a pair of opposite rotatable members between which the tube is inserted. The rotatable members have a plurality of opposite bars extending transversely to the tube in order to squeeze the tube, keep it closed until other objects to be disposed of are inserted into the upper portion of the container, and pull it down to move the plastic film forming the tube and the objects contained therein towards the bottom portion of the container for storage purpose. Actuation of the rotatable members in unison and in opposite direction to achieve the requested squeezing, closing and pulling down of the plastic film tube is preferably obtained by actuation of a lever that is part of the container.

In Canadian laid-open Application No. 2,441,837, a plunging device is provided to compress the object to be disposed of, and push it into the tube and to the bottom part of the container. The plunging device includes two arms with pivoting flaps attached thereto and opposing pivotable slides.

All of these prior art devices have several disadvantages. Their mechanisms have many parts and are prone to breakage. These devices are also not user-friendly and difficult to understand the operation thereof when first

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purchased. They are costly to fabricate and they utilize excess film from the cassettes, adding to the cost of use. Some also do not effectively contain the odors of the disposed material. Some cause confusion in their installation, causing improperly oriented cassettes and contamination of the cassette walls.

SUMMARY OF THE APPLICATION

It is therefore an aim of the present invention to provide a novel apparatus for packing disposable objects into an elongated tube of flexible plastic film material that addresses issues associated with the prior art.

Therefore, in accordance with a first embodiment of the present application, there is provided a cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition, an annular opening at an upper end of the annular receptacle for dispensing the tubing, the annular receptacle defining a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of the central opening.

In accordance with the first embodiment, the clearance is in the shape of a chamfer.

In accordance with the first embodiment, a removable lid closes the annular opening of the annular receptacle.

In accordance with the first embodiment, an outer periphery of the annular receptacle tapers downwardly.

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In accordance with the first embodiment, the annular opening is adjacent to an outer periphery of the annular receptacle.

In accordance with the first embodiment, the clearance extends on the full periphery of the central opening.

In accordance with the first embodiment of the present application, there is provided an apparatus for packing at least one disposable object into an elongated tube of flexible material, comprising a bin defining an enclosure with an opening defined at a top thereof for receiving at least one disposable object to be packed; a holder within the bin proximate the opening; a closing mechanism located below the holder comprising first and second portions, the second portion being biased in a closed position against the first portion and defining a receiving surface for receiving the at least one disposable object, the second portion being slidable from the closed position to an open position through application of a substantially vertical force against the receiving surface and being slidable from the open position to the closed position under the action of biasing means, the closing mechanism in the open position defining a passage between the opening of the bin and a bottom portion of the enclosure located below the closing mechanism, the closing mechanism in the closed position closing the said passage; and the cassette supported by the holder in the opening of the bin with the clearance allowing the cassette not to impede the motion of the closing mechanism from the closed position to the open position.

Still in accordance with the first embodiment, the holder comprises a first annular flange extending inwardly from an outer wall of the bin, a tubular wall extending generally downwardly from an inner end of the first annular

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flange, and a second annular wall extending inwardly from a bottom end of the tubular wall, thus forming a seat for receiving the cassette.

Still in accordance with the first embodiment, the tubular wall tapers in a downward direction, and the annular body has a corresponding frustoconical outer periphery for complementary engagement of the cassette in the holder.

Still in accordance with the first embodiment, the opening of the bin is surrounded by a removable lid, the lid opening/closing access to the opening of the bin, the lid being prevented from being installed properly when the cassette is oriented upside down in the holder.

In accordance with a second embodiment of the present application, there is provided: a cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition, an annular opening at an upper end of the annular receptacle for dispensing the tubing, the annular receptacle defining a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of an outer periphery of the annular receptacle.

In accordance with the second embodiment, the clearance forms a frusto-conical geometry at the bottom of the annular receptacle.

In accordance with a third embodiment, there is provided: an apparatus for packing at least one disposable object into an elongated tube of flexible material, comprising: a bin defining an enclosure with an opening

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defined at a top thereof for receiving at least one disposable object to be packed; a holder within the bin proximate the opening, and an interfering member at a bottom of the holder; a closing mechanism located below the holder comprising first and second portions, the second portion being biased in a closed position against the first portion and defining a receiving surface for receiving the at least one disposable object, the second portion being slidable from the closed position to an open position through application of a substantially vertical force against the receiving surface and being slidable from the open position to the closed position under the action of biasing means, the closing mechanism in the open position defining a passage between the opening of the bin and a bottom portion of the enclosure located below the closing mechanism, the closing mechanism in the closed position closing the said passage; a cassette supported by the holder in the opening of the bin and having an annular receptacle to accommodate a length of tubing in an accumulated condition, the annular receptacle having an upper annular opening for dispensing the tubing such that the tubing extends through a central opening of the annular receptacle and with a knotted end thereof into the enclosure of the bin to receive disposable objects, whereby the closing mechanism closes the tubing, the annular body having a clearance in a bottom portion of an outer periphery of the annular receptacle, so as to cooperate with the interfering member for the cassette to be aligned with the top of the bin in a desired orientation; and a removable lid positioned flush on the top of the bin only when the cassette is in the desired orientation, the cover opening/closing access to the opening of the bin.

In accordance with another aspect, the invention provides a cassette for packaging soiled diapers into an

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elongated tube of flexible material. The cassette comprises: a receptacle including a wall delimiting a central opening, the central opening extending along a generally vertical central axis; the receptacle defining a storage area circumscribing the central opening and receiving the elongated tube of flexible material outwardly of the wall; cassette including an outer boundary spaced outwardly of the wall; a cover at a top portion of the storage area, the cover engaging the wall and extending outwardly therefrom toward the outer boundary of the cassette; the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outwardly of an imaginary projection of the wall extending downwardly along the central axis; a first portion of the storage area that is located outwardly of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a receptacle including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis; the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall; the cassette including an outer boundary spaced outward of the tubular wall; a cover at a top portion of the storage area, the cassette being configured to dispense the tube of flexible material from the storage area, through the central opening while the tube overlies the cover; the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outward an imaginary projection of the tubular wall

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extending downwardly along the central axis; a first portion of the storage area that is located outward of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a receptacle including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis; the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall; the cassette including an outer boundary spaced outward of the tubular wall; a cover at a top portion of the storage area, the cover having a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent to the convex edge portion; the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outward of an imaginary projection of the tubular wall extending downwardly along the central axis; a first portion of the storage area that is located outward of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a receptacle including a tubular wall delimiting a central opening; the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall; said tubular wall having a lower end portion;

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an oblique wall connecting with said lower end portion and extending radially outwardly and downwardly therefrom, the oblique wall defining a corner with the lower end portion having an angle substantially less than 270 degrees.

In accordance with another aspect, the invention provides a cassette for packing soiled diapers into an elongated tube of flexible material. The cassette comprises: a generally annular storage area receiving the elongated tube of flexible material; the storage area including a tubular wall delimiting a central opening, the central opening extending along a generally vertical central axis; the cassette having a top portion and an opposite bottom portion; a cross-section of the top portion of the cassette taken in a vertical plane containing the generally vertical central axis including a first wall segment that is adjacent the central opening and which diminishes in height in a radially inward direction; a cross section of the bottom portion of the cassette taken in the vertical plane including a second wall segment adjacent the central opening and which increases in height in a radially inward direction.

In accordance with another aspect, the invention provides use of a cassette in a diaper pail comprising a storage area for holding soiled diapers, an opening for introducing soiled diapers in the storage area and a holder for a cassette proximal the opening; the cassette configured for dispensing an elongated tube in which soiled diapers are enclosed when introduced in the storage area, the cassette including a receptacle for storing the elongated tube in a folded condition, the receptacle defining a central opening and having a top and a bottom, the cassette dispensing the elongated tube from the top of the receptacle; the cassette

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being configured to: create an interference with a component of the diaper pail to prevent proper operation of the diaper pail when the receptacle is loaded in the holder upside down, with the top of the receptacle located down; avoid the interference when the receptacle is loaded in the holder with the top located; wherein the component includes a lid assembly, the cassette and the diaper pail cooperating such that the cassette interferes with the lid assembly to prevent proper operation of the lid assembly when the receptacle is loaded in the holder upside down, with the top of the receptacle located down.

In accordance with another aspect, the invention provides a diaper pail comprising: a storage area for holding soiled diapers; an opening for introducing soiled diapers in the storage area; a holder for removably receiving a cassette proximal the opening; a cassette loaded in the holder, the cassette configured for dispensing an elongated tube in which soiled diapers are enclosed when introduced in the storage area, the cassette including an annular receptacle for storing the elongated tube in a folded condition, the annular receptacle defining a central opening and having a top and a bottom, the cassette dispensing the elongated tube from the top of the of the annular receptacle through the central opening; the cassette being configured to: create an interference with a component of the diaper pail to prevent proper operation of the diaper pail when the annular receptacle is loaded in the holder upside down, with the top of the annular receptacle facing down; avoid the interference when the annular receptacle is loaded in the holder in the correct orientation with the top facing up; wherein the component includes a lid, the cassette and the diaper pail cooperating such that the cassette interferes with the lid to prevent proper operation

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of the lid when the annular receptacle is loaded in the holder upside down, with the top of the annular receptacle facing down.

In accordance with another aspect, the invention provides an apparatus for packaging soiled diapers within an elongated tube of flexible plastic material, comprising: a storage area for receiving soiled diapers; an entrance for introducing soiled diapers in the storage area; a holder configured for releasably receiving a cassette for dispensing the tube material, the cassette having a central opening, the cassette dispensing the tube material from a top thereof through the central opening, the cassette including a recessed area on a lower portion thereof, the holder being proximal the entrance and including: a generally upwardly extending wall; a bottom wall; a projecting member upwardly extending above the bottom wall, the projecting member configured to engage the recessed area of the cassette when the cassette is fully seated in the holder and the cassette engages the bottom wall of the holder, wherein the projecting member is movable relative to the bottom wall.

In accordance with another aspect, the invention provides an apparatus for packaging soiled diapers in an elongated tube of plastic flexible material, the apparatus comprising: a storage area for receiving soiled diapers; an entrance for introducing soiled diapers in the storage area; a holder configured for releasably receiving a supply of the tube material such that the supply of the tube material extends through the entrance, the holder being proximal the entrance and including: a recess including an upwardly extending side wall; a bottom generally horizontally extending wall, the bottom wall being generally circular and

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surrounding the entrance; a tube gathering mechanism for sealing the tube when no soiled diaper is being pushed through the entrance, the tube gathering mechanism including: a closure member including a projection extending above the bottom wall of the holder, the closure member engaging the tube and being moveable with relation to the bottom wall to gather the tube; the closure member being responsive to pressure by a hand of a user to progressively open and allow insertion of a soiled diaper in the storage area; a stationary wall portion located below the bottom wall for slidably supporting the closure member during the movement of the closure member with respect to the bottom wall; a device connected to the closure member for driving the moveable member to move relative the bottom wall to gather the tube; a lid hingedly moveable between a closed position and an opened position, in the closed position the lid closing the holder, in the opened position the lid allowing access to the holder to permit installation of a new supply of tube material, the lid having a central funnel-shaped portion defining an aperture generally aligning with the entrance to the storage area, the aperture permitting insertion of a soiled diaper into the storage area.

In accordance with another aspect, the invention provides a cassette for use in a diaper pail. The diaper pail comprises: a storage area for holding soiled diapers; an opening for introducing soiled diapers in the storage area; a holder for the cassette proximal the opening, including : a bottom wall; a projecting portion extending above the bottom wall, the projecting portion being radially inward from the bottom wall with relation to an axis of the opening; the cassette configured for dispensing an elongated tube of flexible material, including: a

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receptacle including: a tubular wall delimiting a central opening; a bottom located outwardly of the tubular wall, the tubular wall connecting with the bottom; a cover at a top portion of the storage area, the cover engaging the tubular wall and extending outwardly therefrom toward an outer boundary of the cassette; the receptacle defining a storage space in which the elongated tube of flexible material is stored outwardly of the tubular wall; the bottom of the receptacle configured to sit on the bottom wall of the holder when the cassette is loaded in the holder; the receptacle defining a clearance located inwardly of the bottom, the clearance configured to receive the projecting portion when the bottom of the receptacle sits on the bottom wall of the holder.

In accordance with another aspect, the invention provides an assembly of a diaper pail and cassette comprising: a storage area for holding soiled diapers; an opening for introducing soiled diapers in the storage area; a holder for the cassette proximate the opening including : a bottom wall; a projecting portion extending above the bottom wall, the projecting portion being radially inward from the bottom wall with relation to an axis of the opening; the cassette configured for dispensing an elongated tube of flexible material, including: a receptacle including: a tubular wall delimiting a central opening; a bottom located outwardly of the tubular wall, the tubular wall connecting with the bottom; a cover at a top portion of the storage area, the cover engaging the tubular wall and extending outwardly therefrom toward an outer boundary of the cassette; the receptacle defining a storage space in which the elongated tube of flexible material is stored outwardly of the tubular wall; the bottom of the receptacle supported by the bottom wall of the holder when the cassette

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is loaded in the holder; the receptacle defining a clearance located inwardly of the bottom, the clearance receiving the projecting portion when the bottom of the receptacle sits on the bottom wall of the holder.

In accordance with another aspect, the invention provides a diaper pail. The diaper pail comprises: a top portion and a bottom portion connected by a hinge, the bottom portion defining a storage area for receiving soiled diapers, the top portion including a holder; the top portion being pivotable about the hinge to open the storage area and allow removal of a soiled diapers load from the storage area; a diaper pail refill received in the holder, the diaper pail refill configured for dispensing an elongated tube in which soiled diapers are enclosed when introduced in the storage area, the diaper pail refill having an annular receptacle storing the elongated tube in a folded condition, the annular receptacle including a downwardly extending annular wall defining a central opening; a cutter mounted to the top portion, the cutter being proximate the hinge; a length of the elongated tube extending from the diaper pail refill to the storage area, the length of the elongated tube extending past the cutter to allow a user desirous to empty the storage area to sever the elongated tube with the cutter in order to separate a portion of the elongated tube containing soiled diapers from a portion that is free of soiled diapers.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-sectional view of an apparatus according to a first embodiment of the present invention;

Fig. 2A is a bottom perspective view of a cassette to be used with the apparatus of Fig. 1;

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Fig. 2B us a top perspective view of the cassette of Fig. 2A;

Fig. 3A is a cross-sectional view of the apparatus of Fig. 1, without tubing, with a closing mechanism in a closed position;

Fig. 3B is a cross-sectional view of the apparatus of Fig. 3A, with the closing mechanism displaced toward an open position;

Fig. 3C is a cross-sectional view of the apparatus of Fig. 3A, with the closing mechanism in the fully open position;

Fig. 4 is a cross-sectional view of an apparatus according to a second embodiment of the present invention;

Fig. 5A is a bottom perspective view of a cassette to be used with the apparatus of Fig. 4;

Fig. 5B is a top perspective view of the cassette of Fig. 5A;

Fig. 6 is an enlarged perspective view of an apparatus in accordance with a third embodiment of the present invention; and

Fig. 7 is a sectional view illustrating the cassette of Fig. 2A as used with an apparatus having interfering members.

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DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. 1, there is shown an apparatus 10 for packaging disposable objects in an elongated tube of flexible plastic film material. The apparatus 10 comprises a bin 12 having a top portion 14 and a bottom portion (not shown) hingedly connected to each other by a hinge member 16, with outer walls of the top portion 14 and bottom portion defining an enclosure 18 of the bin 12.

The top portion 14 and bottom portion are locked together with a mechanism such as a push button latch (not shown) received in eyelet 20, located opposite of the hinge member 16. Upon actuation of the push button, the top portion 14 and bottom portion are disconnected and can be pivoted apart about the hinge member 16 to provide access to the enclosure 18, for example to empty the bin 12.

The top portion 14 defines an opening 22 for receiving disposable objects therethrough. The bin 12 further comprises a lid 24 hingedly connected to a ring 25, for instance in the shape of a funnel (hereinafter funnel 25), although multiple shapes are considered such as a flat ring, as long as the ring forms an opening guidance. The funnel 25 is mounted to the top portion 14 such as to selectively open and close access to the opening 22 through pivoting motion of the lid 24. Although in the embodiment shown the apparatus has a generally circular opening 22, the bin 12 is not limited to circular openings and could function with openings of different shapes.

Still referring to Fig. 1, the apparatus 10 also comprises a holder 26 located within the top portion 14 proximate the opening 22 for holding a cassette 30 of flexible plastic film tubing 32. The cassette 30 has an

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annular body defining a central opening 34 which is generally aligned with the bin opening 22 when the cassette 30 is accommodated in the holder 26.

Referring concurrently to Figs. 1, 2A and 2B, the cassette 30 has a lid 36 and a bottom annular receptacle 38. After the lid 36 is removed, the flexible tubing 32 exits from an upper annular opening of the receptacle 38, adjacent an outer periphery thereof. It is pointed out that once the lid 36 is removed, there remains an upper flange 39 adjacent to the annular opening that maintains the compressed tubing 32 in the receptacle 38. The cassette 30 comprises a length of flexible plastic film material that is accumulated (e.g., folded). As shown in Fig. 1, a knot 40 is found at the free end of the tubing 32 to form a bag end. The knot 40 and a length of the tubing 32 extend from the cassette 30 into the enclosure 18 of the bin 12, passing through the central opening 34 of the cassette 30. To better contain odors, it is preferable that the film material of the tubing 32 be a multiple layer film having an odor barrier therein such that odors do not permeate through the film material. The receptacle 38 of the cassette 30 defines a chamfer clearance 41 at a bottom of the central opening 34. The chamfer clearance 41 is provided in order to ensure that the cassette 30 is properly installed in the holder 26 when the apparatus 10 is in use, as will be described hereinafter. The chamfer clearance 41 is provided on the full periphery of the cassette 30, but may also be partial (i.e., not on the full periphery of the central opening of the cassette).

Referring to Fig. 1, the holder 26 includes a top annular flange 42 extending inwardly from the top of the bin 12. A tubular wall 44 extends downwardly from an inner end of the top annular flange 42. The holder 26 has a

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horizontal flange 45 at a bottom of the wall 44, so as to define a seat supporting the cassette 30. One will also appreciate that the holder 26 may take many alternate shapes and forms. .

Referring to Figs. 1 and 3A-3C, the apparatus 10 further includes a closing mechanism 50 whose purpose is to provide access to the flexible tubing 32 extending therebelow and preventing odors from escaping from the flexible tubing 32. In one form of use, it permits the disposable objects to push down against the bottom of the tubing 32 (at the knot 40) to draw out loose flexible tubing from the receptacle 38 of the cassette 30. One aspect of note is that the flexible tubing 32 passes over receptacle 38 and the closing mechanism 50, thereby isolating the receptacle 38 and the mechanism 50 from the disposable objects to be packaged, reducing the need for constant cleaning of the walls defining the opening 34 and the mechanism 50. In this respect, one will appreciate that one of the preferred uses for the apparatus 10 is the disposal of baby diapers.

The closing mechanism 50 comprises a fixed portion 52, which comprises a generally "C"-shaped member rigidly connected to the wall 44 of the holder 26. Alternate types of connections are also possible for the fixed portion 52, including connection to an additional support member connected to the holder 26 or to another part of the top portion 14. The curved fixed portion 52 defines a rounded apex 54 which projects into the opening 22, as can be seen in Fig. 1. The fixed portion 52 defines a receiving surface 56 downwardly inclined toward a movable portion 58 of the closing mechanism 50.

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The movable portion 58 of the closing mechanism 50 is also generally "C"-shaped in cross-section and is biased against the fixed portion 52 in a closed position shown in Figs. 1 and 3A such as to generally close the opening 22 of the apparatus 10, thereby sealing the tubing 32 shut. The curved movable portion 58 defines a rounded apex 60 projecting into the opening 22, as can be seen in Fig. 1. The movable portion 58 defines a receiving surface 62 downwardly inclined toward the fixed portion 52, the two receiving surfaces 56,62 forming a trough directing an object therebetween. In the closed position, contact between the two portions 52,58 is between the apex 60 of the movable portion 58 and a lower part of the fixed portion 52 located below the apex 54 thereof. These portions are wave-shaped in cross-section to provide an ergonomical shape in view of hands contacting them, as illustrated in Fig. 1. Moreover, these wave-shaped portions provide efficient sealing of a plastic film tube 32 engaged or pinched therebetween.

The movable portion 58 is slidably supported by a pair of spaced-apart, generally vertical walls 64 (only one of which is shown in Fig. 1) extending downwardly from the holder 26, with the opening 22 being aligned therebetween. Each of the walls 64 has an angled slot 66. In the embodiment shown, the slots 66 are angled at approximately 40 degrees with respect to the horizontal, although any other working angles are suitable.

The movable portion 58 includes aligned sliding members 66A extending therefrom and engaging the slots 66, such that the movable portion 58 is slidably movable along an angular direction defined by the slots 66, and thus along direction A. The movable portion 58 can move between a closed

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position, as illustrated in Figs. 1 and 3A, in which the movable portion 58 abuts against the fixed portion 52 to seal the tubing 32 shut, and an opened position (shown in Fig. 3C) enough to let a disposable object to pass between the portions 52 and 58. The movable portion 58 is biased to the closed position of Fig. 1, for using an elongated helical spring 67 connected to and extending between the sliding members 66A of the movable portion 58 and around the back of the fixed portion 52. The concave shape of the back of the fixed portion 52 helps maintain the spring aligned in a plane defined by the slots 66.

It is of particular importance that the cassette 30 be installed in the appropriate orientation. In the appropriate orientation, as illustrated in Fig. 1, the tubing 32 is deployed from the top of the cassette 30. Accordingly, the tubing 32 covers the side walls of the cassette 30 in the opening 34. Accordingly, as the tubing 32 covers the cassette 30, there is no risk of contamination of the walls of the cassette.

As is clearly seen in Fig. 1, the chamfer clearance 41 is positioned downwardly. A path of movement of the movable portion 58 is illustrated at B. It is observed that the movable portion 58 passes closely to the wall defining the chamfer clearance 41. If the chamfer clearance 41 were not provided, the cassette 30 would impede the movement of the movable portion 58. Accordingly, if the cassette 30 were installed upside down, the movable portion 58 would be prevented from moving along its path. Therefore, if a user person wants to use the cassette 30 properly, the cassette 30 must be oriented properly.

Alternately, the fixed portion 52 can be replaced by a portion movable opposite of the movable portion 58, the two

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being biased together in the closed position. Such a configuration could be, for example, two sliding members symmetrical with respect to one another about a vertical axis defined at the point of contact therebetween, such as two "C"-shaped members similar in configuration to the movable member 58 shown, two rollers, etc., which are slidable away from each other upon downwardly pushing an object thereon, and are biased together for example by being interconnected by one or a plurality of springs. However, such a mechanism includes additional parts.

In order to assist the user in correctly placing the disposable object in the tubing 32, the apparatus 10 advantageously has the funnel 25 removably installed over the cassette 30, providing a downward shape around the openings 22,34, which creates a funnel effect and guides the user's hand. A handle 68 is provided to remove the lid 24/funnel 25 assembly.

Referring to Fig. 1, the apparatus 10 can further include, within the bin 12, an integrated cutting tool 70, which can be for example attached to one of the vertical walls 64, and which includes a blade located between two spaced-apart protective fingers sized such as to prevent a user's finger from reaching the blade but still allowing a portion of tubing 32 to be inserted between the fingers to be cut with the blade.

In order to prepare the apparatus 10 for use, and with reference to Fig. 1, a user person removes the lid 24 and funnel 25 assembly and inserts the cassette 30 in the correct orientation (i.e., with the chamfer clearance 41 facing downward. The user person withdraws a free end of the tubing 32 from the cassette 30, takes a leading edge of flexible tubing 32, ties it into the knot 40 and pushes the

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knot 40 through the openings 22,34 and beyond the closing mechanism. It is pointed out that the knot 40 may be made prior to the cassette 30 being installed. The movable portion 58 opens as a result of the downward pressure, whereby the knot 40 reaches the enclosure 18 below the closing mechanism 50.

Alternately, the tube end with the knot 40 could be pulled down to the bottom of the bin 12, for example by pivoting and opening the top portion 14 such as to gain access to the enclosure 18, and pulling the tube end with the knot 40 through the closing mechanism 50 and beyond to the bottom of the bin 12. The top portion 14 is then re-engaged with the bottom portion, and the lid 24/funnel 25 assembly is reinstalled on the top portion 14. Accordingly a length of empty flexible tubing 32 extends to the bottom and is now ready to receive disposable objects therein. Therefore, the film material is not pulled from the cassettes 30 as disposable objects are placed into the tube.

In use, when a disposable object needs to be packaged, the lid 24 of the apparatus 10 is lifted, thereby providing access to the opening 22. The disposable object to be packaged is placed into the opening 22 (in this case, the cassette 30 of flexible tubing 32 surrounds the object). The receiving surfaces 56,62 of the fixed and movable portions 52,58 of the closing mechanism 50 biased together in the closed position form a trough which directs the disposable object in the hand of a user person toward a contact region therebetween.

The user person pushes the disposable object in a downward direction, gradually opening the movable portion 58, as is shown in Figs. 3B and 3C. The angled receiving surface 62 of the movable portion 58 helps the downward

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force to be easily converted along the direction of the slots 66 such as to force the movable portion 58 from its closed position in contact with the fixed portion 52 (Fig. 3A) to its open position (Fig. 3C) against the force of the spring 67, through a sliding movement illustrated by direction A in Fig. 1. Since the movable portion 58 is moved by the force applied on the disposable object, it slides only enough for the disposable object to go past the closing mechanism 50, with most of the opening created by the movement of the movable portion 58 being blocked by the disposable object such as to minimize the propagation of odors through the opening 22.

Once the disposable object passes beyond the apex 60 of the movable portion 58, the user person releases the disposable object and withdraws his or her hand. The movable portion 58, under the action of the spring 67, rapidly returns to the closed position of Figs. 1 and 3A, through a sliding movement, effectively sealing the object within the flexible tubing 32. The curved profile of the fixed portion 52 below the apex 60 and, more importantly, of the movable portion 58 below the apex 60 helps push the disposable object further down, if there is resistance, as the movable portion 58 returns to the closed position to apply a downward pushing force.

It is pointed out that different configurations of the cassette are considered. For instance, clearances of different shapes can be used instead of a chamfer. The use of a chamfer shape does not substantially reduce the volume of the receptacle 38 of the cassette 30, thereby generally preserving the quantity of tubing 32 received in the cassette 30.

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In an alternative embodiment illustrated in Figs. 4, 5A and 5B, the cassette 30' is provided with a tapered clearance 41' (forming a frustoconical geometry at the outer periphery of the bottom of the cassette 30') as opposed to a chamfer clearance 41. The tapered clearance 41' is used in conjunction with a tapered flange 44' in the holder 26 of the apparatus 10, as is clearly illustrated in Fig. 4 (i.e., the flange 44' defines an interference member of frustoconical shape). Accordingly, this complimentary shape ensures that the cassette 30' is properly oriented in the holder 26, otherwise the funnel 25 could not be installed properly on the top of the bin 12. Moreover, the lid 24 and funnel 25 assembly would have problems closing with the improper orientation of the cassette 30'. It is pointed out that like reference numerals refer to like elements in Figs. 1 and 4.

For each new disposable object to be packed, the process is repeated, each time either dropping the disposable object within the already drawn length of flexible tubing 32 within the enclosure 18, or drawing out an additional length of flexible tubing 32 from the cassette 30 to accommodate another disposable object as the disposable object moves down into the tube inside the apparatus 10, until the enclosure 18 is full, containing an object-filled segment of flexible film tubing 32. In this case, the top portion 14 is pivoted away from the bottom portion. The flexible tubing 32 is then cut, for example by using the cutting tool 70 provided, and then tied to form a substantially sealed pouch which can be removed from the bin 12. The top portion 14 is pivoted back into engagement with the bottom portion to use the apparatus 10 again as described above.

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In another embodiment of the apparatus 10 using the cassette 30 of Figs. 2A and 2B, the fixed portion 52' of the closing mechanism 50 has an upper end 54' that extends upwardly in the opening 22 of the bin 12. The upper end 54' is sized such that it also extends into the opening 34 of the cassette 30 when the cassette 30 is positioned in the holder 26. If it were positioned upside down, the cassette 30 would extend above the annular flange 42, and the ring 68 would not be positionable on the bin 12.

In another embodiment illustrated by Fig. 7, the holder 26 features an interfering member 70 that has a shape that is complementary to that of the cassette 30 with the chamfer clearance 41. With the presence of the interfering member 70, the cassette 30 must properly be installed in the holder 26 to be used. As illustrated in Fig. 7, a pair of interfering members 70 may optionally be provided on both side of the holder 26.

Advantages of the apparatus 10 include the use of a wedge-type closing mechanism 50 of simple construction with few parts to seal the flexible tubing 32. The cassette configurations ensure that the cassette 30 is properly installed in the holder 26, thereby preventing contamination of the walls of the cassette (and the hands of the user person) as the properly installed cassette is mostly covered by the tubing 32 as is shown in Fig. 1. The mechanism 50 greatly reduces the complexity of the apparatus 10, makes the assembly simple, and allows for the use of a lesser quantity of flexible tubing 32 than prior-art devices. Furthermore, angling the course of the movable portion 58 permits the optimization of little horizontal clearance versus the force required to bias the movable portion 58. Finally, the shape of the individual portions of the

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mechanism prevents disposable objects from "coming back up" - that is, once a disposable object has been inserted under pressure to pull film material, it will be forced to remain in the flexible tubing by the closing mechanism 50.

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ABSTRACT

A cassette for dispensing bags from an elongated tubing comprising an annular receptacle accommodating a length of tubing in an accumulated condition. An annular opening at an upper end of the annular receptacle is for dispensing the tubing. The annular receptacle defines a central opening through which a knotted end of the tubing passes to form a bag supported by the annular receptacle with disposable objects passing through the circular central opening to be received in the bag, and a clearance only at a bottom of the central opening.

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CLAIMS:

- 1) A cassette for packing soiled diapers into an elongated tube of flexible material, the cassette comprising:
 - (a) a receptacle including a tubular wall delimiting a central opening, the central opening extending along a vertical central axis;
 - (b) the receptacle defining a storage area receiving the elongated tube of flexible material outward of the tubular wall;
 - (c) the cassette including an outer boundary spaced outward of the tubular wall;
 - (d) a cover at a top portion of the storage area, the cover having a periphery including a convex edge portion and an inwardly recessed edge portion, adjacent to the convex edge portion;
 - (e) the receptacle defining a clearance in a bottom portion of the central opening, the clearance being located outward of an imaginary projection of the tubular wall extending downwardly along the central axis;
 - (f) a first portion of the storage area that is located outward of the clearance and that vertically registers with the clearance having a reduced width relative a second portion of the storage area located above the first portion and above the clearance.

- 2) A cassette as defined in claim 1, wherein the periphery of the cover is located closer to the outer boundary of the cassette, than to the tubular wall.

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- 3) A cassette as defined in claim 2, wherein the cover has an inner edge portion engaging said tubular wall.
- 4) A cassette as defined in claim 3, wherein said cover has an intermediate portion between said inner edge portion and said periphery.
- 5) A cassette as defined in anyone of claims 1 to 4, wherein the clearance has the shape of a chamfer.
- 6) A cassette as defined in anyone of claims 1 to 5, wherein the clearance extends on a full periphery of the central opening.
- 7) A cassette as defined in anyone of claims 1 to 6, wherein the tubular wall has a lower edge.
- 8) A cassette as defined in claim 7, wherein the lower edge is circular and uninterrupted.
- 9) A cassette as defined in claim 8, wherein the cassette has a bottom wall.
- 10) A cassette as defined in claim 9, wherein the bottom wall has an inner edge.
- 11) A cassette as defined in claim 10, wherein the inner edge is located outwardly of the lower edge.

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- 12) A cassette as defined in claim 11, comprising a transition wall extending from the lower edge of the tubular wall to the inner edge of the bottom wall.
- 13) A cassette as defined in claim 12, wherein the transition wall extends on a full periphery of the central opening.
- 14) A cassette as defined in claim 13, wherein a cross-section of the transition wall taken in an imaginary plane in which lies the central axis, is straight.
- 15) A cassette as defined in anyone of claims 1 to 14, wherein the tubular wall is an inner wall, the receptacle includes an outer wall defining the outer boundary of the cassette.
- 16) A cassette as defined in claim 15, wherein the outer wall and the inner wall are integrally formed.
- 17) A cassette as defined in anyone of claims 1 to 16, wherein the cassette has an outer periphery that tapers downwardly.
- 18) A cassette as defined in anyone of claims 1 to 17, wherein the elongated tube is stored in the storage area in an accumulated condition.
- 19) A cassette as defined in anyone of claims 1 to 18, wherein the inwardly recessed edge portion is concave.

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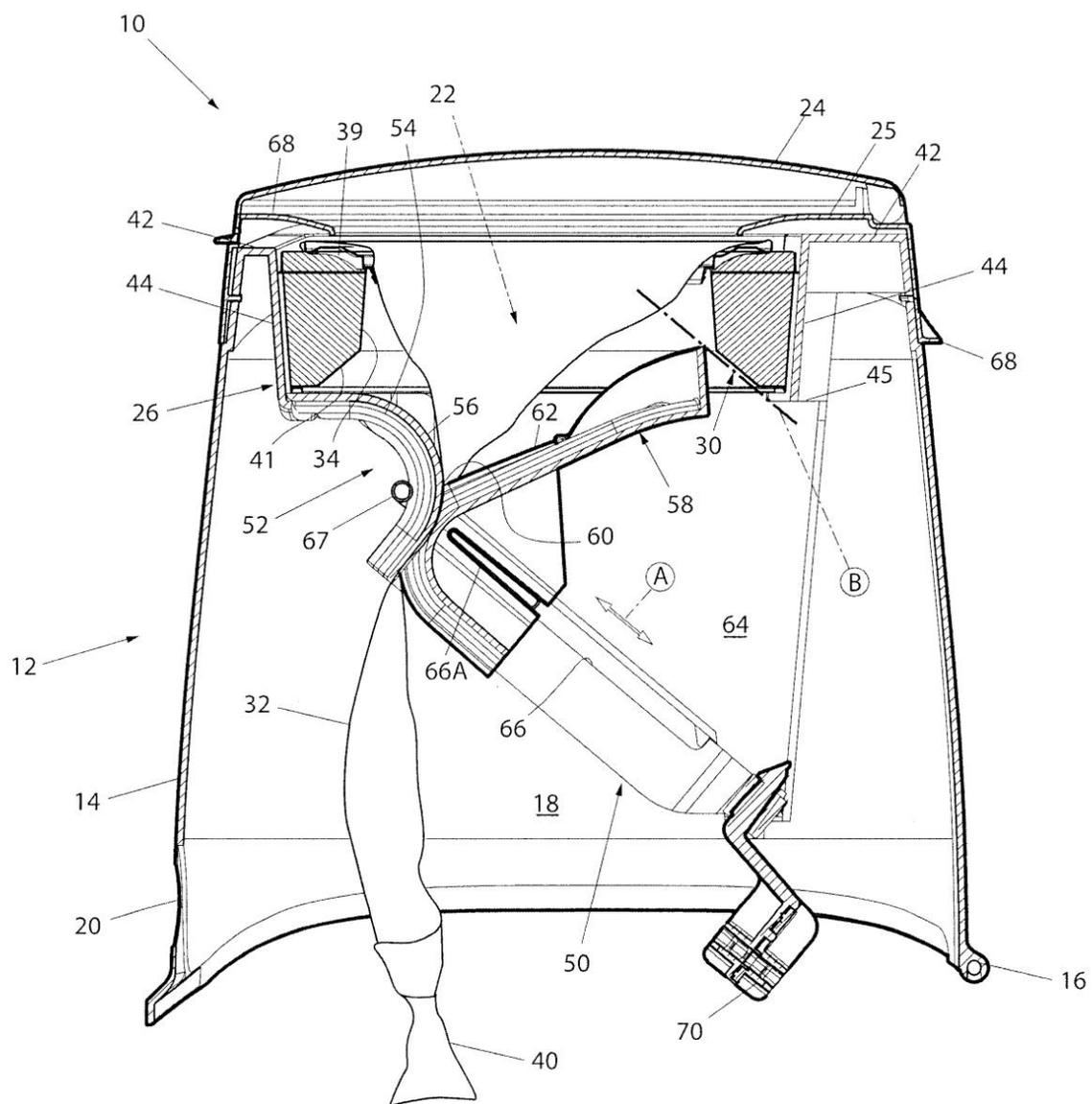


Fig. 1

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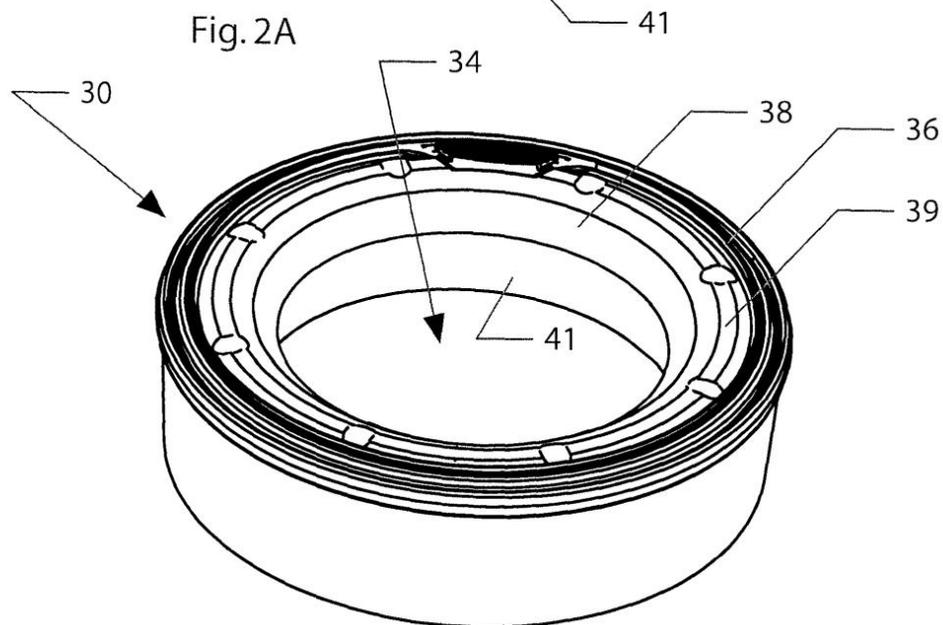
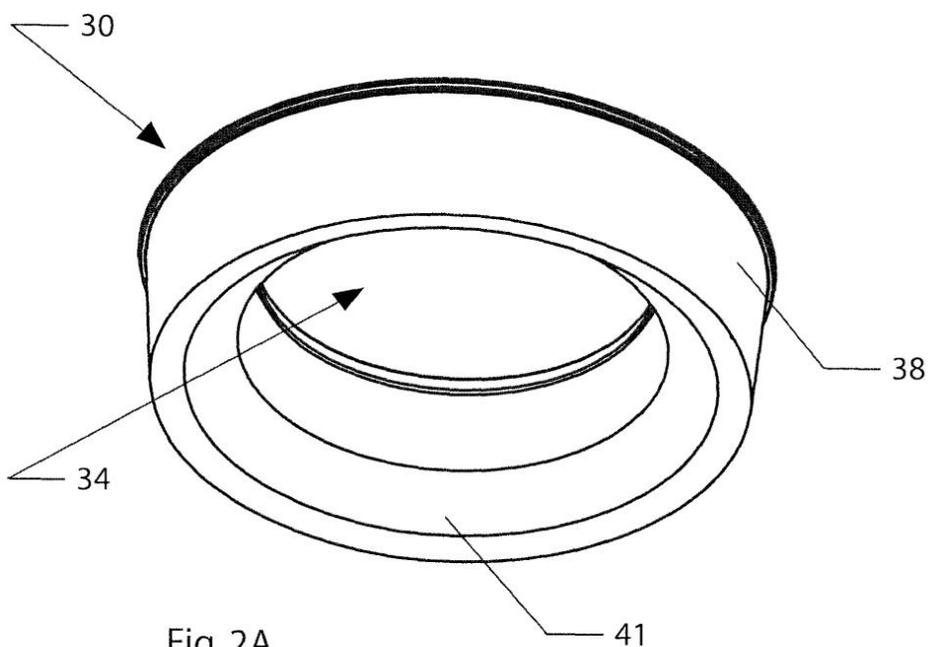


Fig. 2B

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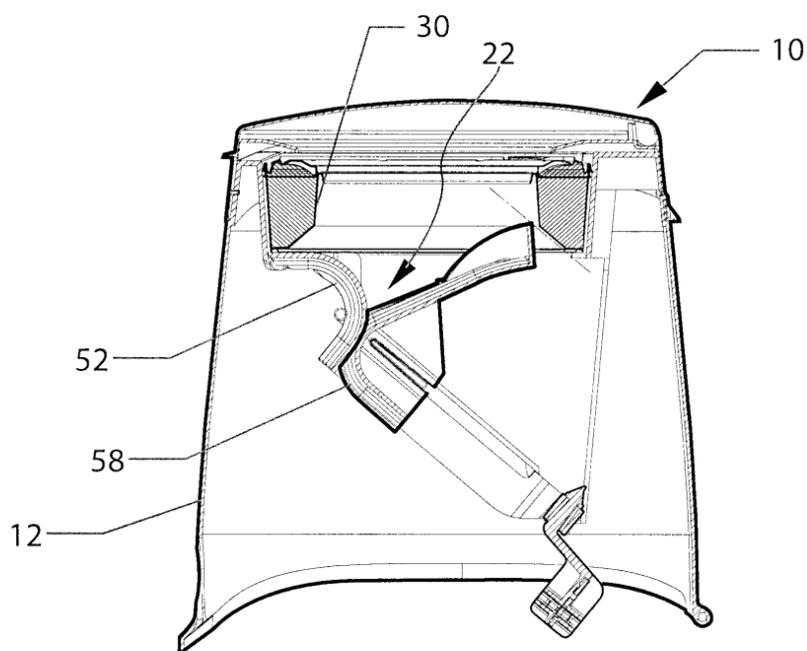


Fig.3A

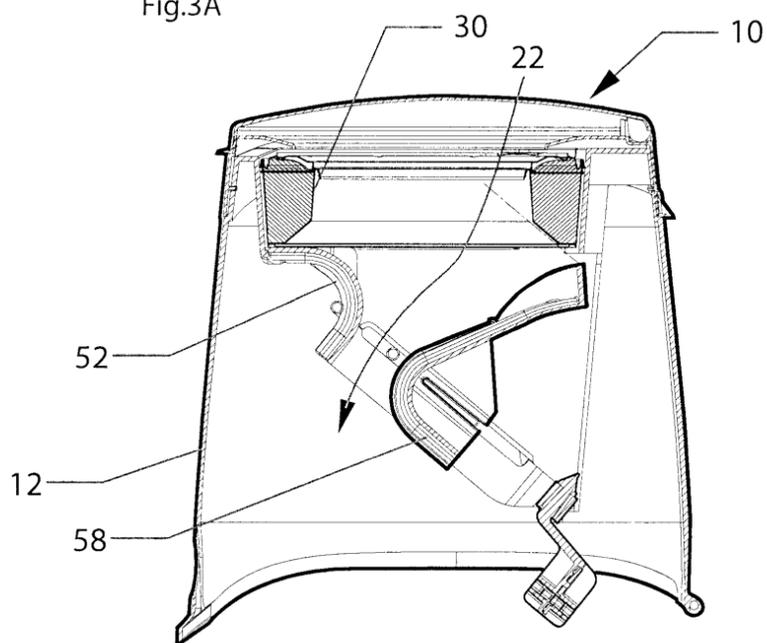


Fig.3B

CA 02936421 2016-07-15

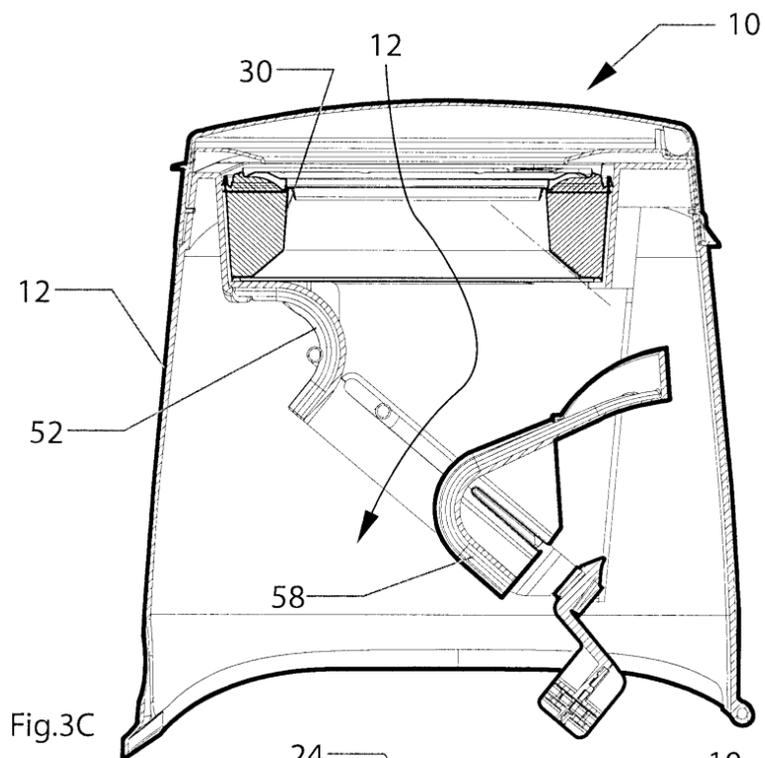


Fig.3C

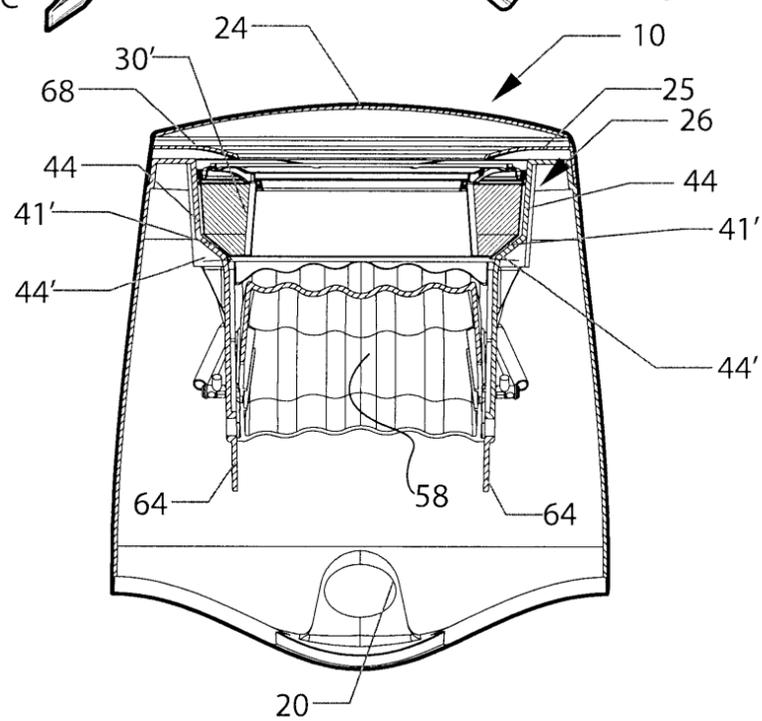
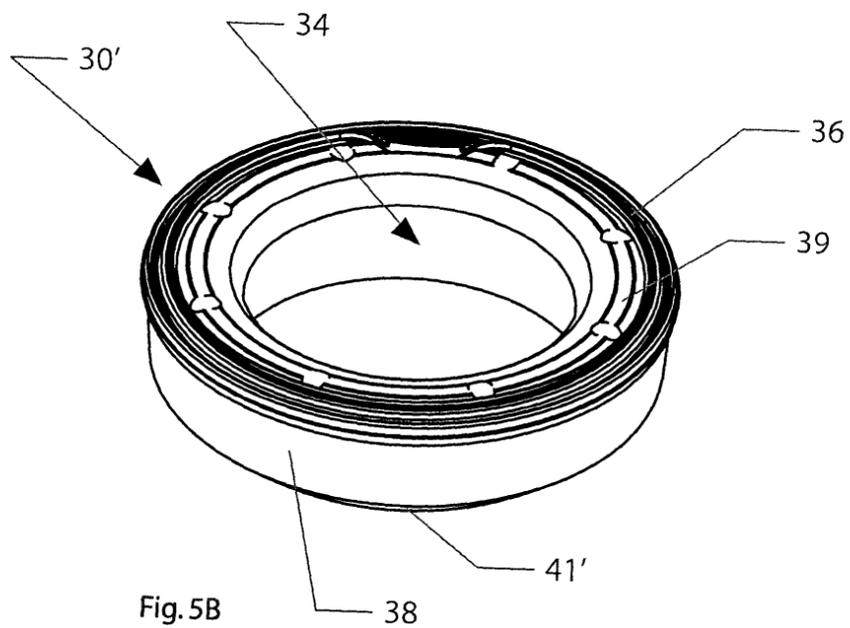
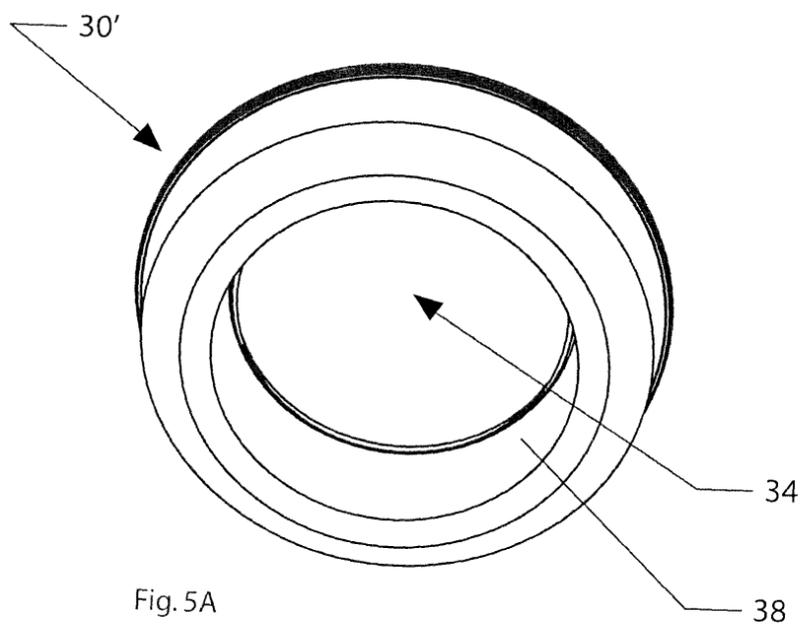


Fig.4

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CA 02936421 2016-07-15

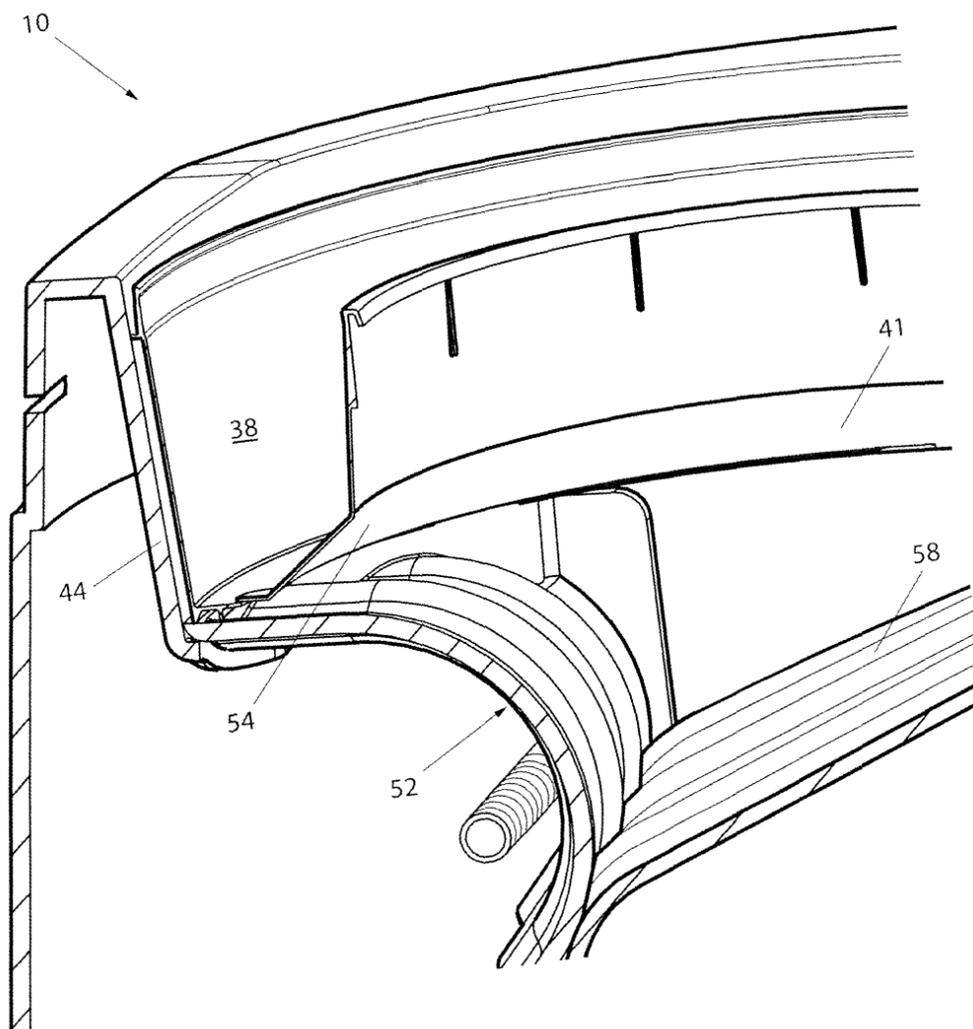


Fig. 6

CA 02936421 2016-07-15

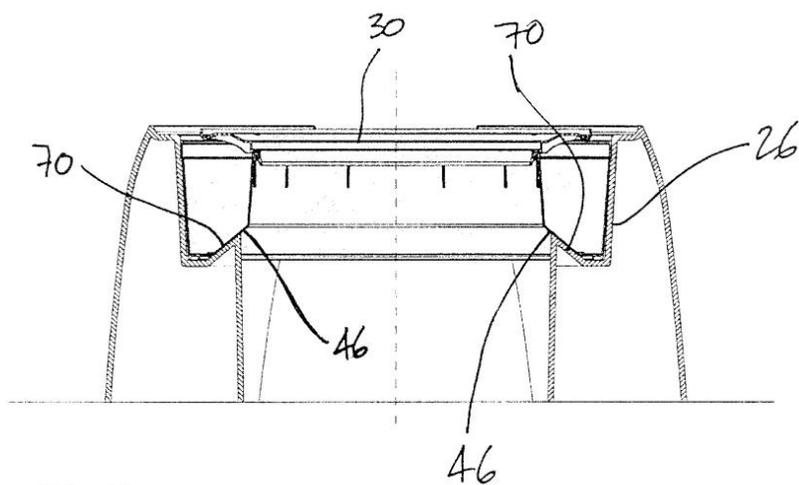


Fig. 7

FEDERAL COURT
SOLICITORS OF RECORD

DOCKET: T-151-16

STYLE OF CAUSE: ANGELCARE CANADA INC. ET AL
v MUNCHKIN, INC. ET AL

PLACE OF HEARING: HELD BY VIDEOCONFERENCE BETWEEN
OTTAWA (ONTARIO) AND MONTRÉAL (QUÉBEC)

DATE OF HEARING: JANUARY 25-29, 2021, FEBRUARY 1-5, 9-12, 16-19,
22-25, 2021, MARCH 29-31, 2021, APRIL 1, 6-9, 12,
13, 28-30, 2021

JUDGMENT AND REASONS: ROY J.

DATED: APRIL 7, 2022

AMENDED JUDGMENT: JUNE 24, 2022

APPEARANCES:

François Guay
Guillaume Lavoie Ste-Marie
Denise Felsztyna
Jeremy Want
Matthew Burt

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DEFENDANTS BY COUNTERCLAIM

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