Federal Court  Cour fédérale

Date: 20190301

Docket: T-2338-14

Citation: 2019 FC 255

Ottawa, Ontario, March 1, 2019

PRESENT: The Honourable Mr. Justice Locke

BETWEEN:

CAMSO INC.

Plaintiff/
Defendant by Counterclaim

and

SOUCY INTERNATIONAL INC.
and KIMPEX INC.

Defendants/
Plaintiffs by Counterclaim

JUDGMENT AND REASONS

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[1] This is a patent infringement action concerning a family of three patents regarding track assemblies to be installed on All-Terrain Vehicles (ATVs) to facilitate their operation on snow and other unstable or uneven surfaces.

I. Patents in Suit

[2] The patents in suit are Canadian Patent Nos. 2,388,294 (the 294 Patent), 2,825,509 (the 509 Patent), and 2,822,562 (the 562 Patent). All three patents claim priority from the same Canadian Patent Application No. 2,372,949, which was filed on February 25, 2002. The 294 Patent was filed a few months later on May 30, 2002, and published on August 25, 2003. The other patents in suit are based on divisional applications of the 294 Patent and therefore are deemed to have the same filing date and publication date as the 294 Patent. The 294 Patent issued on October 1, 2013. The 509 Patent issued on November 25, 2014. The 562 Patent issued on May 26, 2015. All three patents are set to expire on May 30, 2022.

[3] All three patents in suit have the same title ("Track Assembly for an All-Terrain Vehicle") and essentially the same disclosure. As is typical, this disclosure begins with sections entitled "Field of the Invention," "Background of the Invention," and "Objects of the Invention." Because they are brief, I reproduce these sections from the 294 Patent here in their entirety:

> FIELD OF THE INVENTION
>
> [0001] The present invention relates to all-terrain vehicles. More specifically, the present invention is concerned with track assemblies for an all-terrain vehicle.
>
> BACKGROUND OF THE INVENTION

> [0002] Traditionally, two types of all-terrain vehicles are proposed either the wheel type or the tracked type.
>
> [0003] Generally, a wheeled vehicle is more maneuverable than a tracked vehicle, but is not as efficient on uneven or soft terrain such as, for example snow.
>
> [0004] Tracked all-terrain vehicles have been proposed, which require complicated track assemblies comprising a track frame to maintain the tension of the endless track belt and prevent it from loosening. Furthermore, such vehicles have generally a large contact area with the ground, which results in a decreased maneuverability and an increased impact on the often soft terrain.
>
> [0005] Therefore, there is still room for improvements toward an all-terrain vehicle provided with track assemblies, which is maneuverable and effective upon a variety of unstable or uneven surfaces, while designed to maintain tension upon the endless track belts to keep them in their due course and prevent accidental loosening, and at the same time reducing the damages inflicted to the terrain.
>
> OBJECTS OF THE INVENTION
>
> [0006] An object of the present invention is therefore to provide improved track assemblies for an all-terrain vehicle.

[4] The three patents in suit also include a similar "Description of the Embodiment" section which describes the contemplated track assembly with reference to 11 figures.

[5] The main aim of the disclosure is to describe a relatively simple track assembly that maximizes efficient operation of an ATV on uneven or soft terrain, like snow, and minimizes the loss of maneuverability (particularly in relation to difficulty steering), and impact on soft terrain that is typically associated with track assemblies. The solution proposed in the disclosure is based on reducing the size of the track belt's contact area with the ground, both longitudinally (along the length of the track) and transversally (across its width), at least when that ground is

flat and hard. This gives the contact area with the ground (also called the contact patch) a profile closer to that of a tire.

[6] Longitudinally, the contact patch is reduced by arranging the assembly so that the bottom run of the track belt is slightly curved longitudinally so that it rises from the ground ahead of and behind the area of ground contact which bears the weight of the assembly and the ATV. Figure 1 from the patents, reproduced here, demonstrates this slight longitudinal curve:

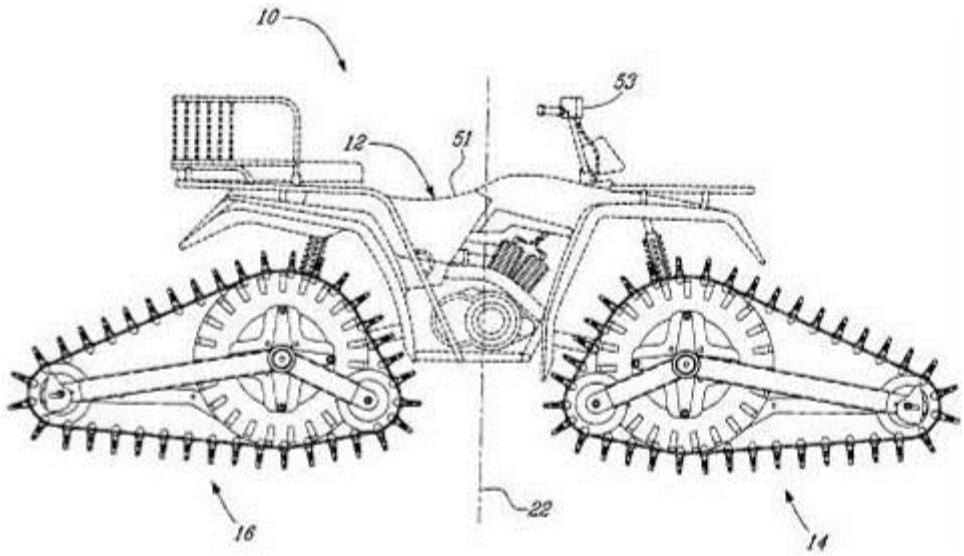


Figure 1

[7] Transversally, two complementary solutions are proposed to reduce the contact patch. First, the transverse stiffening rods that have been typically provided in track belts (both for strength and to ensure a wide area of contact for better flotation on soft terrain) are removed. Without stiffening rods, the track belt is more flexible transversally so that its edges can be out of contact with flat, hard ground when there is sufficient tension in the belt. The disclosure describes means for adjusting tension in the track belt. Omitting stiffening rods also permits the track to conform to the surface of uneven ground, such as a depression. This may improve traction.

[8] The second solution proposed to reduce the contact patch transversally concerns the outwardly-projecting traction projections which are disposed about the track belt. The disclosure describes these traction projections as having a convex profile (higher in the middle and lower on the edges). This facilitates the edges of the track being out of contact with flat, hard ground. Figures 4 and 10, shown here, provide cross-sections of the patented track assembly with this convex profile of the traction projections, respectively, with and without stiffening rods (item 71 in Figure 4) in the track belt:

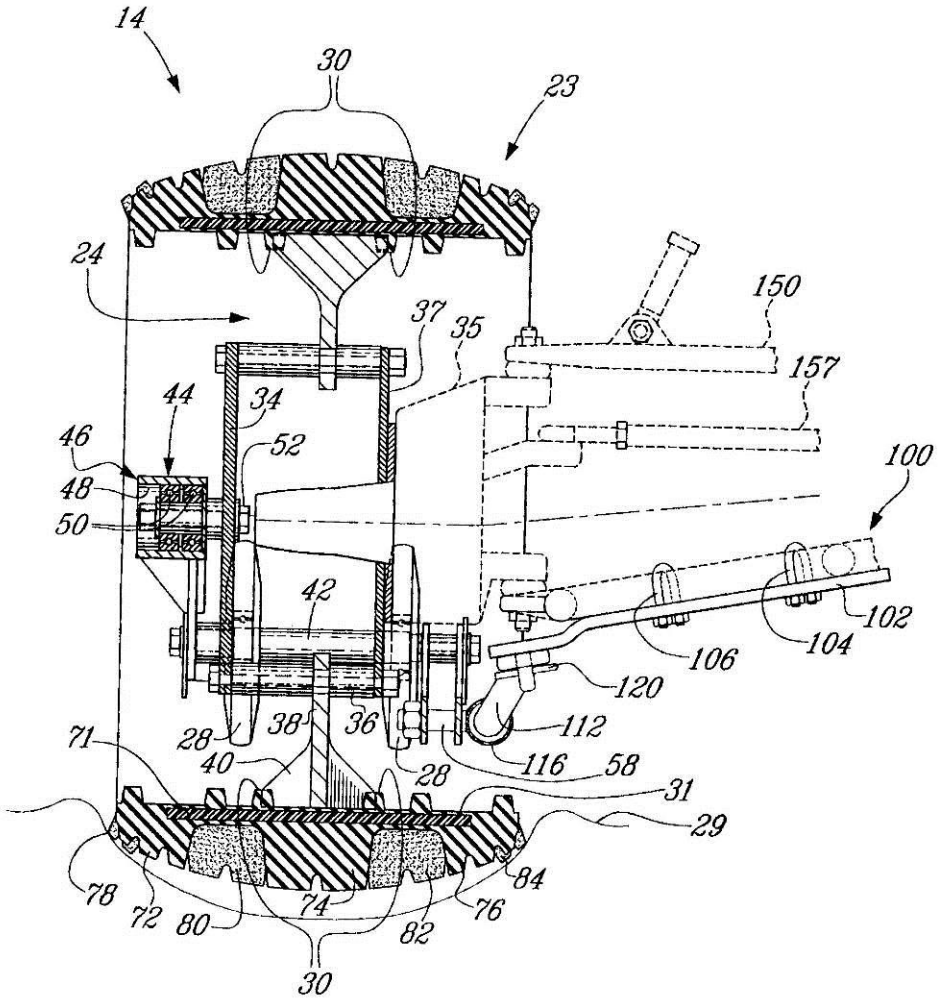


Figure 4

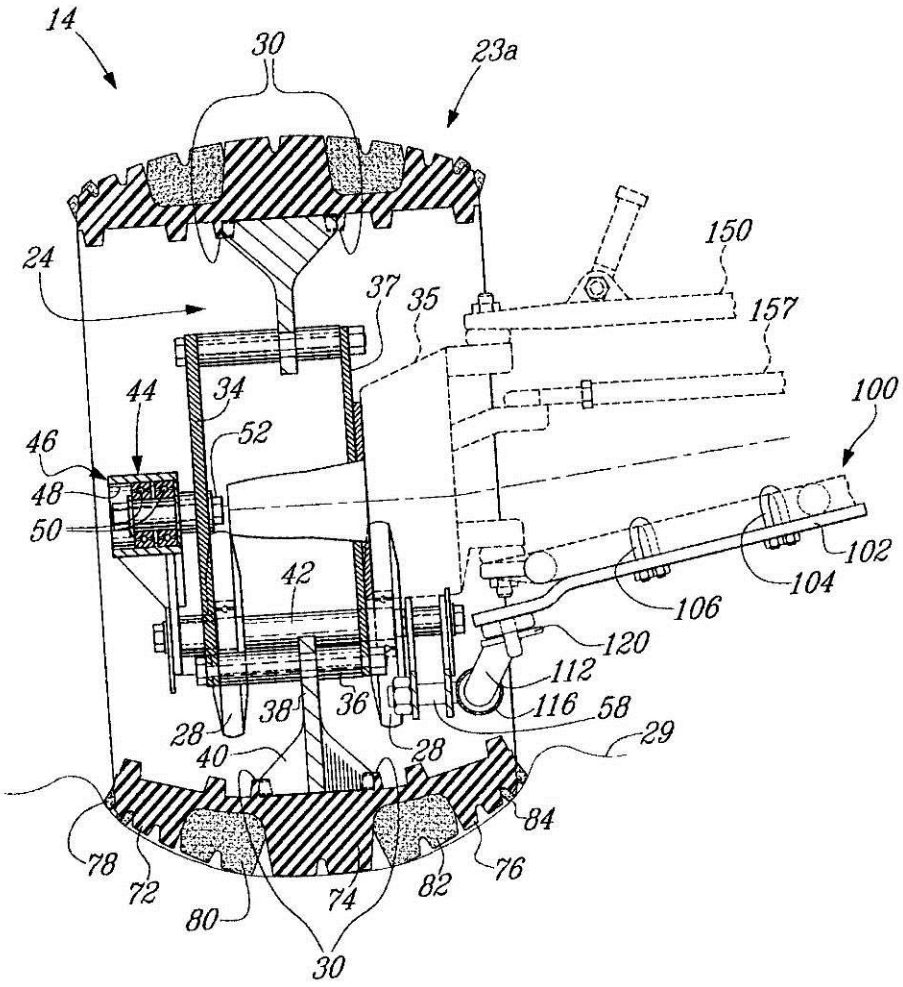


Figure 10

[9] As shown in Figure 1 above, a track assembly is disposed at each corner of the ATV in place of a conventional wheel and tire. The assembly comprises:

- a track belt,
- a drive wheel for imparting motion to the track belt,
- a pair of idlers forward and to the rear of the drive wheel for maintaining shape in the track belt, and
- a frame for maintaining proper spacing between the drive wheel and the idlers.

[10] The track belt has the outwardly-projecting traction projections disposed at regular intervals longitudinally, and corresponding inner lugs. The traction projections are designed to sink into soft ground, and to support the weight of the ATV when it is on hard ground. The inner lugs comprise drive lugs, which are engaged by the drive wheel to impart movement, and guide lugs which work with the idlers to prevent dislodgment of the track belt from the assembly.

[11] The disclosure also describes a system to prevent the assembly from rotating about the axis of the drive wheel when the drive wheel rotates. It employs a rod connecting the assembly to the fixed part of the ATV, and a rubber damping element which permits only limited movement between the assembly and the body. Without this feature, the assembly would be able to rotate and could come into contact with the body of the ATV, causing damage.

[12] The claims of the patents in suit are many. The 294, 562 and 509 Patents, as issued, comprise 357, 146 and 178 claims, respectively. Many of the claims of the 294 Patent were later cancelled in a re-examination by the Patent Office, leaving 152 confirmed. The number of claims alleged to be infringed in each of the 294, 562 and 509 Patents is 70, 76 and 100, respectively. These almost 250 claims are discussed in greater detail below.

II. Parties

[13] The plaintiff (Camso Inc.) and the defendants (Soucy International Inc. and Kimpex Inc.) are direct competitors in the field of endless track belts for ATVs and other vehicles. Together, they account for 90-95% of sales worldwide of such products.

A. *Camso Inc.*

[14] The plaintiff was incorporated as Camoplast Inc. in 1982 as a spin-off of divisions of Bombardier Inc. related to rubber (in French, "**ca**outchouc"), apparel (in French, "**mo**de") and plastic (in French, "**plast**ique"). In 2010, the plaintiff changed its name to Camoplast Solideal Inc. It was renamed Camso Inc. on July 3, 2015. The plaintiff is referred to hereinafter as Camso.

[15] In 2006, Camso made important acquisitions relating to A&D Boivin Design Inc. (A&D Boivin) and Tatou Inc., two of its then competitors. A&D Boivin was the original applicant of the patents in suit. Camso acquired assets of A&D Boivin related to its ATV track conversion system business, including the original application of the patents in suit. This acquisition included products identified as Traxion+ and Giant. Later, Camso acquired all outstanding shares of Tatou Inc., which had developed several ATV track systems bearing the same name (Tatou). These products are discussed in greater detail below.

B. *Soucy International Inc.*

[16] The defendant Soucy International Inc. (Soucy) was incorporated in 1973 as Les distributions Quimpex ltée by its owner and President Gilles Soucy to develop, design and manufacture tracks and other parts for powersport vehicles, primarily snowmobiles. The company was renamed Quimpex ltée in 1986, and was given its current name in 1995.

[17] Soucy manufactures endless track belts and other products for a wide range of applications, including snowmobiles, ATVs, industrial vehicles, military vehicles, snow blowers, and agricultural vehicles. Soucy's track belts range in weight from 1 kg to 1000 kg, and are

installed on vehicles and products ranging from a few dozen pounds to 50 tons. Among Soucy's products are the track assemblies in issue in the present case.

C. *Kimpex Inc.*

[18] The defendant Kimpex Inc. (Kimpex) is the result of a merger in 2000 of a company controlled by Mr. Soucy and another company that Mr. Soucy had reacquired after selling it to investors in 1993. That other company had been incorporated as Gilles Soucy Inc. by Mr. Soucy in 1973.

[19] Kimpex distributes parts, accessories and apparel for the powersports industry (ATVs, snowmobiles, motorcycles, marine), some of which are manufactured by Soucy, including the ATV track assemblies at issue in the present case.

III. Issues in Dispute

[20] Camso alleges infringement of many of the claims of the 294, 562 and 509 Patents. The defendants deny infringement of most of the asserted claims. They admit that claims 1, 2, 3, 9, 10, 11, 12, 43, 49, 50, 51, 52 and 101 of the 562 Patent are infringed if they are valid. The defendants argue that these claims are invalid, and further that all of the claims in issue are invalid if they are construed so as to find infringement. The grounds of invalidity asserted by the defendants are anticipation, obviousness, overbreadth, insufficiency, and section 53 of the *Patent Act*, RSC 1985, c P-4.

[21] The infringement and validity issues turn largely on the construction given to various terms used in the claims, as well as on the expected knowledge of a person skilled in the relevant art at the relevant time.

IV. Witnesses

[22] Camso introduced five fact witnesses and one expert witness. The defendants introduced three fact witnesses and two expert witnesses. The testimony of these witnesses is summarized in this section.

A. *Fact Witnesses*

[23] I found all of the fact witnesses to be generally credible and reliable, though the passage of decades since some of the events in question has limited some witnesses' ability to recall details.

(1) Camso's Fact Witnesses

(a) *Bernard Jean*

[24] Mr. Jean is a co-inventor of the Tatou ATV track system and is currently employed by Camso as a technical advisor. In the mid-1990s, Mr. Jean, with Denis Boisvert, began exploring and developing the mechanism for the Tatou system. Mr. Jean joined Camso as part of its acquisition of Tatou Inc. in 2006.

[25] Mr. Jean discussed various aspects of the Tatou system, including the thought process behind it, the track system's mechanical functions, and the differences between each version in its evolution.

(b) *Denis Boivin*

[26] Mr. Boivin is a named co-inventor of the patents at issue. He has a degree in mechanical engineering and was a registered engineer until a few years ago. He worked at Bombardier Recreational Products (BRP) for a number of years. In 1993, he started working on snowmobile suspensions in his free time. In 1995, he formed A&D Boivin with his brother, Alain Boivin. Through A&D Boivin, the brothers developed and patented different snowmobile and ATV mechanisms, including Traxion+ (which embodies the design of the patents in suit). In 2000, Mr. Boivin left BRP to dedicate himself full-time to A&D Boivin.

[27] Mr. Boivin discussed the circumstances surrounding the patented invention and the mechanisms involved in the invention.

(c) *Denis Courtemanche*

[28] Mr. Courtemanche is a retired Camso employee and a named co-inventor of the patents in suit. He began his career in 1962 at the age of 17 with BRP as a machinist, manufacturing different elements of snowmobile tracks. He moved to Camso when it was spun off from BRP. By 1986, Mr. Courtemanche was Production Manager. Shortly thereafter, he became the manager of the Camso research centre with a focus on snowmobile and power sport vehicle tracks. He retired in 2014.

[29] Mr. Courtemanche discussed the evolution of snowmobile tracks from 1962 to the early 2000s. He also spoke of the events that occurred at Camso in the 1990s involving Charles Shaw (a fact witness for the defendants) and Mr. Shaw's company Sno Conversions Industries LLC (SCI).

(d) *Julien Michaud*

[30] Mr. Michaud has been employed by Camso since 2003 and has held the position of Vice-President and General Director of Business Affairs, Construction Division since 2017. He has a degree in mechanical engineering. He was working at a company called ADS Composite in 2003 when it was purchased by Camso.

[31] Mr. Michaud discussed Camso's internal organisation and its marketing and product development strategies around the time of its acquisitions of Tatou Inc. and A&D Boivin.

(e) *Jérémie Zuchoski*

[32] Mr. Zuchoski is currently employed by Camso as the Product Line Director for the Track System Group. He obtained a degree in mechanical engineering in 2003 and began working at A&D Boivin on further developments to the Traxion+ system. He joined Camso in 2006 as part of its acquisition of A&D Boivin.

[33] Mr. Zuchoski discussed the various products developed by A&D Boivin and Camso in the years around the acquisition.

(2) The Defendants' Fact Witnesses

[34] In addition to the fact witnesses introduced by the defendants who testified in Court, the parties also agreed that they could cite as evidence parts of the transcript of the examination for discovery of Alain Boivin as a co-inventor of the patents in suit. Alain Boivin is the brother of Denis Boivin, one of Camso's fact witnesses.

(a) *Charles Shaw*

[35] Mr. Shaw was the principal of SCI which was based in California and developed and sold various ATV track conversion kits, including Sno-Traxx, Sno-Quad and Quad-Traxx in the 1990s.

[36] Mr. Shaw's testimony discussed the history of the development and marketing of SCI's ATV track conversion kits, with an emphasis on the decision to remove the stiffening rods that had been included in prototypes of the endless tracks. Because of the nature and timing of SCI's business, Mr. Shaw's testimony was important in establishing the prior art that was available at the time of the patents in suit. This testimony was therefore important in assessing the validity of the claims in issue.

[37] Mr. Shaw testified straightforwardly and with no indication of any particular interest or bias in favour of the defendants. That said, his memory was imprecise and unreliable about details from some 20 years ago. This is not surprising. As a result, I am hesitant to rely on his memory when his testimony is uncorroborated. I am also not surprised that he had few documents from his SCI business. I accept his explanation that most such documents were thrown out years ago, and the few that he located were found in stray boxes that had not been

thrown out. He had to make a couple of important corrections to his June 8, 2018 affidavit, but this may reflect the urgency of its preparation. Nevertheless, I am somewhat concerned that the errors in his affidavit and the failure to locate certain documents earlier reflect a level of apathy concerning the accuracy of his testimony.

(b) *Yves St-Pierre*

[38] Mr. St-Pierre is the Technical Director for Soucy. He has a degree in mechanical engineering and is a registered engineer. He has worked in various divisions at Soucy since shortly after completing school in 1995. Mr. St-Pierre was also the corporate representative for the defendants during examinations for discovery by Camso.

[39] Mr. St-Pierre discussed Soucy's history and the research and development of its products with a focus on the TJD Cat Track conversion kit, which was similar to Tatou and was developed around the time of the patents in suit.

(c) *France Bégin*

[40] Ms. Bégin is employed by the defendant Kimpex and has been the Product Manager of the ATV and Motorcycle Division since 2002. She joined Kimpex in 1987.

[41] Ms. Bégin discussed the development, marketing and sale of different Kimpex products, including the TJD Cat Track conversion kits.

B. *Expert Witnesses*

(1) Camso's Expert Mark Kittel

[42] Mr. Kittel is a forensic engineer with Veritech Consulting Engineering LLC. He graduated with a degree in mechanical engineering in 1998 and is a Professional Engineer in the states of Colorado and California. From 1998 to 2006, Mr. Kittel worked for Honda in Research and Development for the Power Sport Vehicle Division. While there, he worked on the development of a Utility-Task Vehicle (UTV), early designs of which contemplated endless tracks in place of the rear wheels. As a forensic engineer, Mr. Kittel assists insurance companies and courts with accident reconstruction and analyzing mechanical failures for various types of vehicles, including motorcycles and ATVs.

[43] Mr. Kittel provided his interpretation of the claims in issue in the patents in suit. He also provided his opinion on the validity of the claims in issue and on which of the defendants' products infringe the patents. Mr. Kittel provided the Court with three export reports setting out his opinions and commenting on Mr. Leblanc's opinions.

[44] Though his experience with tracked ATVs is limited compared to the other experts, I feel that it is sufficient for him to understand the patents in suit and provide helpful opinions to the Court in this case. Camso suggests that he be accepted as having expertise defined as follows:

> Mechanical engineer with expertise in the development and testing of motorcycles and ATVs/UTVs, with and without track systems, as well as forensic engineering with an emphasis on issues such as powersport vehicle dynamics.

[45] The defendants object to this definition. They argue principally that Mr. Kittel has no experience with the design and manufacture of endless tracks for tracked vehicles, or with vehicles for use in the snow, and that he has little experience even using off-road vehicles in the snow.

[46] Having considered the defendants' objection to this definition, and because there is no evidence that he has experience developing and testing motorcycles, I accept his expertise as modified here:

> Mechanical engineer with expertise in the use of motorcycles, and in the development and testing of ATVs/UTVs, with and without track systems, as well as forensic engineering with an emphasis on issues such as powersport vehicle dynamics.

[47] His testimony was generally clear and logical, and I agree with most of it, at least as regards claim construction. Also, his answers on cross-examination demonstrated a willingness to concede points where appropriate.

[48] That said, his limited experience in the field of tracked ATVs (including endless tracks themselves), as well as vehicles for use in snow, affect the weight I give to his view of the common general knowledge of the skilled person.

(2) The Defendants' Expert Pierre Pellerin

[49] Mr. Pellerin is a retired pilot who has had a longstanding hobby interest in snowmobiles. In 1980, he started collecting old snowmobiles and repairing them. He sold some, but kept many. The snowmobiles in his collection (about 120 of them) are currently on display in his private museum. He also collects old snowmobile owner's manuals, books, and magazines. Starting in

the late-1990s, he joined a number of snowmobile associations, including the "Regroupement des collectionneurs des motoneiges antiques du Québec" (a group for antique snowmobile collectors) of which he has been the president since 2013. Finally, he is the author of "Histoire de la motoneige," a book that reviews the history of snowmobiles from 1900 to 2000. An English version of the book entitled "Snowmobile History: the Vanishing Trail" was written later and examines the history of the snowmobile up to 2010. It is difficult to imagine a more passionate amateur of snowmobiles.

[50] Mr. Pellerin discussed the history and evolution of snowmobiles and snowmobile track belts. Mr. Pellerin also provided a report of his evidence.

[51] Camso objects to the treatment of Mr. Pellerin as an expert. Camso argues that his expert report contains no statement of opinion, and therefore he is simply a fact witness. Of course, if I agree with Camso that Mr. Pellerin's testimony contains no opinion, then his testimony is nevertheless admissible (subject to relevance). Camso acknowledges this but argues that this issue is important because there may be implications as to costs if Mr. Pellerin is considered a fact witness rather than an expert. Typically, reasonable expenses associated with a relevant expert witness are assessed in full in costs, whereas similar expenses for a fact witness are not.

[52] I agree that much of Mr. Pellerin's testimony appeared to be mostly factual in nature. However, there are two reasons that I conclude that he should be recognized as an expert witness.

[53] Firstly, I find that paragraph 33 of Mr. Pellerin's report states an opinion of the kind that would not be permissible from a fact witness:

> Bien que la chenille de motoneige avec tiges (ou raidisseurs) était plus commune, la chenille de motoneige souple (sur la largeur) sans tige ou raidisseur était commune et connue généralement des personnes qui œuvraient dans le milieu de la motoneige avant l'année 2000.
>
> [TRANSLATION] Although endless belts for snowmobiles with rods (or stiffeners) were more common, endless belts for snowmobiles without rods or stiffeners were common and generally known by persons working in the field of snowmobiles before 2000.

[54] More importantly, the facts about which Mr. Pellerin testified are historical in nature. Many of these facts could not be introduced by people with direct knowledge. Even if such people were available, it would greatly lengthen the trial to require their testimony rather than Mr. Pellerin's. His ability to speak to these issues despite the rule against hearsay is the result of a lifetime devoted to snowmobile history. The defendants cite the decision of the Supreme Court of Newfoundland and Labrador in *Anderson v Canada (Attorney General)*, 2015 NLTD(G) 138, 2015 CanLII 63429 [*Anderson*], and the discussion therein of the criteria for the admission of expert evidence as determined by the SCC in *R v Mohan*, [1994] 2 SCR 9 at 20:

> Admission of expert evidence depends on the application of the following criteria:
>
> (a) relevance;
>
> (b) necessity in assisting the trier of fact;
>
> (c) the absence of any exclusionary rule;
>
> (d) a properly qualified expert.

[55] There is no doubt that Mr. Pellerin's testimony was relevant and that he was eminently qualified. No applicable exclusionary rule has been asserted. That leaves only the issue of necessity. As stated in *Anderson* at paragraph 11:

> … The Supreme Court of Canada has confirmed that the "necessity" component of the admissibility test ought not to be judged by too strict a standard. Rather, the requirement is that the opinion be necessary in the sense that it provides information "which is likely to be outside the experience and knowledge of a judge or jury" (**Mohan** at page 23). Identifying and reviewing the relevant historical documents among thousands of documents produced and then organizing them contextually results in a concise and comprehensible presentation of information that is beyond the experience and knowledge of the reasonable judge or juror.

[56] This reasoning is equally applicable in the present case. I accept Mr. Pellerin's expertise as a historian in the field of snowmobiles and other vehicles for use on snow.

[57] Mr. Pellerin provided clear and informative testimony. He thoroughly explained the history of the snowmobile and easily discussed various snowmobile models, in terms of their structures and mechanisms. He was an unbiased and credible witness.

(3) The Defendants' Expert Jean-Yves Leblanc

[58] Mr. Leblanc is a mechanical engineer with 45 years of experience and is currently employed as a forensic engineer. Mr. Leblanc began his career in the mid-1970s working with industrial forestry vehicles. He spent most of the 1970s and 1980s working in this area. In 1992, Mr. Leblanc joined BRP as the Engineering Director in the Snowmobile Development Division. During his 20 years with BRP, he worked in different divisions and held a number of different positions, including positions with regard to quality control and product safety. In 2012 he joined CEP as a forensic engineer.

[59] Mr. Leblanc provided his construction of the claims in issue, his opinion on which products infringe the patents, and his opinion on the validity of the patents. Mr. Leblanc also

provided the Court with three export reports setting out his opinions on these issues, and commenting on Mr. Kittel's opinions.

[60] Mr. Leblanc clearly has sufficient expertise to be accepted as an expert. I recognize him as a mechanical engineer with expertise:

- in the development of rubber track systems for small vehicles, such as snowmobiles;
- generally for tracked systems used in various types of vehicles; and
- in product safety for motorized vehicles.

[61] Mr. Leblanc was eager to provide the Court with knowledge and instruction regarding the general track assembly and track belt structures and mechanisms. He clearly has a profound understanding of the engineering principles at play. However, he sometimes overlooked finer details in his assessment. For example, at one point he confused the front and rear track assemblies of a particular track kit. This was not an isolated incident. Such details are critical in the present case.

[62] In addition, I have concerns regarding (i) his construction of the term "ATV," and (ii) measurements that were reported in his first expert report. These concerns are detailed later in this decision, but the result is that Mr. Leblanc appeared to be too close to the defendants' counsel and not sufficiently independent.

V. Claims in Issue

[63] The claims in issue of the patents in suit are:

294 Patent: Claims 2, 3, 4, 20, 22, 23, 29, 30, 31, 47, 49, 58, 59, 63, 66, 67, 68, 73, 74, 75, 91, 92, 94, 95, 96, 100, 105, 108, 109, 115, 116, 117, 133, 134, 136, 137, 138, 142, 143, 144, 160, 162, 163, 170, 171, 175, 178, 179, 180, 185, 186, 187, 203, 204, 206, 207, 208, 212, 213, 217, 220, 221, 227, 228, 229, 245, 246, 248, 249, 250;

562 Patent: Claims 1, 2, 3, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 22, 23, 25, 26, 27, 28, 29, 32, 33, 38, 39, 40, 41, 42, 43, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 62, 63, 65, 66, 67, 68, 69, 76, 77, 78, 79, 80, 101, 102, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 120, 121, 123, 124, 125, 126, 127, 134, 135, 136, 137, 146;

509 Patent: Claims 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 15, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 30, 33, 34, 35, 36, 37, 39, 40, 42, 43, 44, 45, 47, 48, 49, 50, 51, 54, 55, 56, 57, 58, 60, 61, 63, 64, 65, 66, 68, 70, 71, 73, 74, 75, 76, 77, 78, 79, 80, 82, 83, 85, 86, 87, 88, 90, 92, 93, 95, 96, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 116, 118, 119, 120, 121, 123, 124, 126, 127, 128, 129, 130, 132, 133.

[64] For convenience, these claims are reproduced in the Appendix to these reasons.

[65] Many of the elements of the claims in issue appear in similar or identical form in several different claims. Accordingly, these claims can be grouped, thus simplifying somewhat the exercise of construction of the claims, as well as analysis of issues of validity and infringement of the claims. These groups of claims are discussed in greater detail below.

A. *The 294 Patent*

[66] Seven independent claims of the 294 Patent must be reviewed: claims 1, 28, 56, 98, 141, 168 and 210. These various independent claims have different preambles, thus defining different types of things:

Claim 1 concerns an endless track for a track assembly;

Claim 28 concerns a set of endless tracks for a track assembly;

Claim 56 concerns a track assembly;

Claims 98 and 210 concern a set of track assemblies;

Claim 141 concerns an endless track for a track assembly of a set of track assemblies;

Claim 168 defines a track assembly for a set of track assemblies.

[67] It is convenient here to reproduce claim 1:

> 1. An endless track for a track assembly to provide traction to an all-terrain vehicle (ATV), the track assembly being mountable to the ATV in place of a ground-engaging wheel, the track assembly comprising a plurality of track-contacting wheels for contacting the endless track, the plurality of track-contacting wheels including a driving wheel to impart motion to the endless track, the endless track comprising:
>
> i) an inner side for facing the plurality of track-contacting wheels; and
>
> ii) a ground-engaging outer side for engaging the ground;
>
> the endless track being free of stiffening rods extending in a transversal direction of the endless track.

[68] Though claim 1 (as well as the other independent claims of the 294 Patent) is not itself in issue (because these claims have been cancelled in re-examination), many claims dependent thereon are in issue. It is therefore necessary to construe the elements of claim 1.

[69] These elements can be identified as follows:

- Providing traction to an all-terrain vehicle (ATV);
- Mountable to the ATV in place of a ground-engaging wheel;
- A plurality of track-contacting wheels for contacting the endless track;
- A driving wheel to impart motion to the endless track;
- An inner side for facing the plurality of track-contacting wheels;
- A ground-engaging outer side for engaging the ground;
- Free of stiffening rods extending in a transversal direction.

[70] All of these claim elements are also present in the other independent claims in issue of the 294 Patent, except that claims 141, 168 and 210 do not specify that the track assembly is mountable to the ATV in place of a ground-engaging wheel. Instead, they specify that the ATV comprises a straddle seat and handlebars. Also, claims 56, 98, 168 and 210, which concern track assemblies or sets thereof, specify that the plurality of track-contacting wheels also includes an idler wheel, and that an endless track is disposed around the plurality of track-contacting wheels.

[71] The claims dependent on claim 1 which are in issue are claims 2, 3, 4, 20, 22 and 23. Because the dependency of claims 20, 22 and 23 on claim 1 is not direct, it is necessary also to consider claims 6, 14, 15, 16, 18, 19 and 21, even though they were cancelled. The table below identifies the limitations defined in each of the foregoing dependent claims (cancelled claims are shown in italics):

Claim	Dependent on Claim	Limitation
2	1	A flexibility of the endless track in the transversal direction of the endless track allows the endless track to conform to a profile of the ground
3	2	The profile of the ground includes a depression, the flexibility of the endless track in the transversal direction of the endless track allowing the endless track to conform to the depression
4	3	The endless track includes a central portion aligned with the driving wheel in the transversal direction of the endless track when the driving wheel imparts motion to the endless track, the flexibility of the endless track in the transversal direction of the endless track allowing the central portion of the endless track to contact the depression
6	*1-5*	*The ground-engaging outer side comprises a plurality of traction projections spaced apart in a longitudinal direction of the endless track*
14	*6-13*	*The inner side comprises a plurality of inner lugs distributed in the longitudinal direction of the endless track*
15	*14*	*The plurality of inner lugs is arranged into a plurality of rows of lugs spaced apart in the transversal direction of the endless track, the lugs of each row of lugs of the plurality of rows of lugs being spaced apart in the longitudinal direction of the endless track*
16	*15*	*A first one of the rows of lugs is a row of drive lugs positioned to engage the driving wheel*
18	*15-17*	*The plurality of track-contacting wheels includes an idler wheel, a first given one of the rows of lugs being a row of guide lugs to be positioned adjacent to the idler wheel*
19	*18*	*The row of guide lugs is a first row of guide lugs, a second given one of the rows of lugs being a second row of guide lugs to be positioned adjacent to the idler wheel such that the idler wheel passes between the first row of guide lugs and the second row of guide lugs*
20	19	The idler wheel is a first idler wheel, the plurality of track-contacting wheels including a second idler wheel spaced apart from the first idler wheel in the transversal direction of the endless track, a third given one of the rows of lugs and a fourth given one of the rows of lugs respectively being a third row of guide lugs and a fourth row of guide lugs to be positioned adjacent to the second idler wheel such that the second idler wheel passes between the third row of guide lugs and the

		fourth row of guide lugs
21	*1-17*	*The plurality of track-contacting wheels includes a first idler wheel and a second idler wheel spaced apart from the first idler wheel in a longitudinal direction of the track assembly, an axis of rotation of the driving wheel being located in the longitudinal direction of the track assembly between an axis of rotation of the first idler wheel and an axis of rotation of the second idler wheel*
22	21	The axis of rotation of the driving wheel is located closer to the axis of rotation of the second idler wheel than to the axis of rotation of the first idler wheel in the longitudinal direction of the track assembly
23	22	The first idler wheel is located in a front of the track assembly and the second idler wheel is located in a rear of the track assembly

[72] A number of claims dependent on claim 56 of the 294 Patent add additional limitations that are not mentioned in the previous table (claim 60 is shown in italics because it has been cancelled):

Claim	**Dependent on Claim**	**Limitation**
60	*57-59*	*A frame interconnecting the first idler wheel and the second idler wheel*
63	60-62	The frame comprises a first arm and a second arm shorter than the first arm
66	60-65	A tension adjusting mechanism mounted to the frame for adjusting a tension of the endless track
67	66	The tension adjusting mechanism is configured to adjust a position of a given one of the first idler wheel and the second idler wheel for adjusting the tension of the endless track
68	67	The given one of the first idler wheel and the second idler wheel is the first idler wheel
91	57-90	The endless track has an upper run extending over the driving wheel and from the first idler wheel to the second idler wheel and a lower run extending under the driving wheel and from the first idler wheel to the second idler wheel, the lower run of the endless track being curved in the longitudinal direction of the track assembly between the axis of

		rotation of the first idler wheel and the axis of rotation of the second idler wheel
92	57-90	The endless track has an upper run extending over the driving wheel and from the first idler wheel to the second idler wheel and a lower run extending under the driving wheel and from the first idler wheel to the second idler wheel, the track assembly being configured such that, in the longitudinal direction of the track assembly, a lowest segment of the lower run of the endless track is located where the driving wheel is located
94	91-93	The track assembly is configured to press onto the ground a limited portion of the lower run of the endless track that is located where the ground-engaging wheel would contact the ground if the ground-engaging wheel was mounted to the ATV in place of the track assembly
95	56-94	The track assembly is steerable to steer the ATV on the ground
96	56-94	The track assembly is connected to a body of the ATV via a rod used for direction

[73] All of the limitations of all of the other dependent claims in issue of the 294 Patent are identical or similar to those listed in the tables above. The table below shows a concordance of dependent claims, with each column header identifying the independent claim on which the claims in that column depend. Each row of the table represents a group of claims having such identical or similar limitations, and each such claim group that is alleged to be infringed is given an identifier that is used later in my analysis of the issues in dispute.

Claim Group	**1**	**28**	**56**	**98**	**141**	**168**	**210**
294:2	2	29	73	115	142	185	227
294:3	3	30	74	116	143	186	228
294:4	4	31	75	117	144	187	229
	6	*33*					
	14	*41*			*154*		

	15	*42*			*155*		
	16	*43*			*156*		
	18	*45*			*158*		
	19	*46*			*159*		
294:20	20	47			160		
	21	*48*	*57*	*99*	*161*	*169*	*211*
294:22	22	49	58	100	162	170	212
294:23	23		59		163	171	213
			60			*172*	
294:63			63	105		175	217
294:66			66	108		178	220
294:67			67	109		179	221
294:68			68			180	
294:91			91	133		203	245
294:92			92	134		204	246
294:94			94	136		206	248
294:95			95	137		207	249
294:96			96	138		208	250

[74] This table of concordance demonstrates that, in respect of the many dependent claims in issue of the 294 Patent, there are in fact 23 distinct claim groups that are relevant.

B. *The 562 Patent*

[75] This section provides an overview of the claims in issue of the 562 Patent in much the same manner as the preceding section concerning the 294 Patent.

[76] Eight independent claims of the 562 Patent are in issue: claims 1, 13, 43, 53, 101, 102, 111 and 146. These various independent claims have different preambles, thus defining different types of things:

Claims 1 and 43 concern a steerable endless track;

Claims 13 and 53 concern a steerable track assembly;

Claim 101 concerns a method for reducing a transverse rigidity of a steerable endless track;

Claim 102 concerns an endless track for a track assembly;

Claim 111 concerns a track assembly;

Claim 146 concerns a method for reducing a transverse rigidity of an endless track.

[77] Claim 1 of the 562 Patent reads as follows:

> 1. A steerable endless track for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, the endless track being steerable by changing an orientation of the endless track by a steering mechanism of the vehicle, the endless track comprising:
>
> (a) an outer ground-engaging surface:
>
> (b) an inner surface opposite to the outer ground-engaging surface;
>
> (c) a plurality of drive projections projecting from the inner surface and arranged longitudinally along the track; and

> (d) a plurality of traction projections projecting from the outer ground-engaging surface and arranged longitudinally along the track;
>
> the endless track being free of stiffening members extending transversally of the endless track at longitudinally spaced locations at which a drive projection registers with a traction projection.

[78] The elements of claim 1 can be identified as follows:

- For a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces;
- Steerable by changing an orientation of the endless track by a steering mechanism of the vehicle;
- An outer ground-engaging surface;
- An inner surface opposite to the outer ground-engaging surface;
- A plurality of drive projections projecting from the inner surface and arranged longitudinally along the track;
- A plurality of traction projections projecting from the outer ground-engaging surface and arranged longitudinally along the track;
- Free of stiffening members extending transversally of the endless track at longitudinally spaced locations at which a drive projection registers with a traction projection.

[79] Many of these claim elements are also present in the other independent claims in issue of the 562 Patent. However, claims 102, 111 and 146 define an ATV instead of a "reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces." These claims also define a plurality of wheels, and specify that the endless track comprises flexible material to flex around said wheels. Claims 13 and 53 also define a plurality

of wheels for supporting and driving the endless track. Claims 101 and 146 also define a plurality of track segments following in succession in a longitudinal direction of the endless track, each of which includes a drive projection projecting from the inner surface and a traction projection projecting from the outer ground-engaging surface, the respective drive projections and traction projections registering in the longitudinal direction of the endless track.

[80] All of the independent claims in issue of the 562 Patent include an element similar to the seventh in paragraph [78] above (freedom from certain stiffening members), but claims 102, 111 and 146 refer to freedom from stiffening inserts disposed within the flexible material.

[81] The claims dependent on claim 1 which are in issue are claims 2, 3, 8, 9, 10, 11 and 12. The table below identifies the limitations defined in each of the foregoing dependent claims:

Claim	**Dependent on Claim**	**Limitation**
2	1	The drive projections are equally spaced in a longitudinal direction of the endless track
3	1-2	The traction projections are equally spaced in a longitudinal direction of the endless track
8	1-7	The plurality of drive projections is a first row of drive projections, the endless track comprising a second row of drive projections projecting from the inner surface and arranged longitudinally along the endless track, the first row of drive projections and the second row of drive projections being spaced apart in a transverse direction of the endless track, a drive projection of the first row of drive projections and a drive projection of the second row of drive projections being configured to simultaneously engage a drive wheel which imparts motion to the endless track
9	1-8	The vehicle is an All-Terrain Vehicle (ATV)
10	1-9	The steering mechanism of the vehicle has handlebars
11	1-10	The vehicle includes a seat that is straddled by a driver of the vehicle

12	1-11	A pair of endless tracks

[82] A number of claims dependent on claim 13 of the 562 Patent add additional limitations that are not mentioned in the previous table:

Claim	**Dependent on Claim**	**Limitation**
14	13	The plurality of wheels includes: (a) a leading idler and a trailing idler, the leading and trailing idlers being in a spaced apart relationship, a segment of the endless track extending between the leading and trailing idlers defining a ground engaging run; (b) a drive wheel in driving engagement with the endless track for imparting movement to the endless track
15	14	The ground engaging run includes: (a) a load bearing section located between the leading idler and the trailing idler, the load bearing section transferring to the ground surface a major portion of the load carried by the track assembly; (b) a leading section extending between the leading idler and the load bearing section, the leading section being oriented such as to converge toward the ground surface when the endless track is in motion and propels the vehicle; and (c) a trailing section extending between the load bearing section and the trailing idler, the trailing section being oriented such as to diverge from the ground surface when the endless track is in motion and propels the vehicle
16	14-15	The leading idler rotates about a first axis of rotation, the trailing idler rotates about a second axis of rotation and the drive wheel rotates about a third axis of rotation, a first horizontal distance defined between the first axis of rotation and the third axis of rotation being different from a second horizontal distance defined between the second axis of rotation and the third axis of rotation
17	16	A support structure having: i) a center portion rotatably supported at the third axis of rotation; ii) a first support arm mounted to the center portion and extending along a radial direction of the drive wheel toward a leading end of the track assembly; iii) a second support arm mounted to the center portion and extending along a radial direction of the drive wheel toward a trailing end of the

		track assembly
18	17	The first support arm defines a first angle with an imaginary horizontal axis which extends through the third axis of rotation, the second support arm defines a second angle with the imaginary horizontal axis, and the first angle is different from the second angle
22	15-21	The load bearing section is located closer to one of the leading and trailing idlers than to the other of the leading and trailing idlers
23	17	One of the first and second support arms is longer than the other of the first and second support arms
25	16	The third axis of rotation is located above the first axis of rotation and the second axis of rotation
26	16	The drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, one of the leading and trailing idlers having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane
27	16	The drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, the leading idler having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the trailing idler having a periphery bound between a third upper horizontal imaginary plane and a third lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane and below the third upper horizontal imaginary plane
28	13-27	The plurality of wheels imparts a generally triangular path of travel to the endless track
29	15-27	The plurality of wheels define a track supporting and guiding arrangement that is in rolling contact with the inner surface at a plurality of positions, one of said positions being the load bearing section

[83] There are also two additional limitations in claims dependent on claim 102 that are not included in the tables in the preceding two paragraphs:

Claim	Dependent on Claim	Limitation
107	102-106	The given one of the drive projections registering in the longitudinal direction of the endless track with the given one of the traction projections is a first given one of the drive projections, a second given one of the drive projections being spaced from the first given one of the drive projections in a transverse direction of the endless track, the first given one of the drive projections and the second given one of the drive projections being configured to simultaneously engage a drive wheel as the drive wheel imparts motion to the endless track
110	102-110	A set of four endless tracks at least two of which are as defined

[84] As with the 294 Patent, all of the limitations of all of the other dependent claims in issue of the 562 Patent are identical or similar to those listed in the tables above. The table below shows a concordance of dependent claims, with each column header identifying the independent claim on which the claims in that column depend, and each row representing a group of claims having such identical or similar limitations and being assigned a claim group identifier:

Claim Group	1	13	43	53	101	102	111	146
562:2	2	32						
562:3	3	33						
562:8	8	38						
562:9	9	39	49	77				
562:10	10	40	50	78		108	135	
562:11	11	41	51	79		109	136	
562:12	12	42	52	80				
562:14		14		54			112	
562:15		15		55			113	
562:16		16		56			114	

562:17		17		57			115	
562:18		18		58			116	
562:22		22		62			120	
562:23		23		63			121	
562:25		25		65			123	
562:26		26		66			124	
562:27		27		67			125	
562:28		28		68			126	
562:29		29		69			127	
562:48			48	76		107	134	
562:110						110	137	

[85] This table of concordance demonstrates that, in respect of the many dependent claims in issue of the 562 Patent, there are in fact 21 distinct claim groups that are relevant.

[86] Before moving on from this discussion of the claims in issue of the 562 Patent, it should be noted that the 562 Patent was the subject of a request for re-examination under section 48.1 of the *Patent Act* which led to a conclusion by the Re-Examination Board that a substantial new question of obviousness was raised in respect of all of the claims in issue. No final decision was made and no further steps have been taken in relation to that re-examination because it was stayed by Order of Justice Yvan Roy dated October 6, 2016.

C. *The 509 Patent*

[87] The 509 Patent comprises five independent claims in issue: claims 1, 33, 54, 76 and 108. Claims 1, 54, 76 and 108 concern a track assembly, and claim 33 concerns a track drive and assembly.

[88] Claim 1 of the 509 Patent reads as follows:

> 1. A track assembly for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, steerable by changing an orientation of the track assembly by a steering mechanism of the vehicle, the track assembly having a leading end and a trailing end and comprising:
>
> a) an endless track having an outer ground engaging surface and an opposite inner surface; and
>
> b) a plurality of wheels for supporting and driving the endless track, the plurality of wheels including:
>
> i) a leading idler and a trailing idler, the leading and trailing idlers being in a spaced apart relationship, a segment of the endless track extending between the leading and trailing idlers defining a ground engaging run, the leading idler having a first axis of rotation, the trailing idler having a second axis of rotation; and
>
> ii) a drive wheel having a third axis of rotation, the drive wheel being in driving engagement with the endless track for imparting movement to the endless track;
>
> the ground engaging run having:
>
> i) a load bearing section located between the leading idler and the trailing idler, the load bearing section transferring to the ground surface a major portion of the load carried by the track assembly, the load bearing section having a longitudinal extent that does not exceed a diameter of the drive wheel;

> ii) a leading section extending between the leading idler and the load bearing section, the leading section being oriented such as to converge toward the ground surface when the endless track is in motion and propels the vehicle;
>
> iii) a trailing section extending between the load bearing section and the trailing idler, the trailing section being oriented such as to diverge from the ground surface when the endless track is in motion and propels the vehicle;
>
> a first horizontal distance defined between the first axis of rotation and the third axis of rotation being different from a second horizontal distance defined between the second axis of rotation and the third axis of rotation.

[89] The elements of claim 1 can be identified as follows:

- For a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces;
- Steerable by changing an orientation of the track assembly by a steering mechanism of the vehicle;
- A leading end;
- A trailing end;
- An endless track having an outer ground engaging surface and an opposite inner surface;
- A plurality of wheels for supporting and driving the endless track;
- A leading idler;
- A trailing idler;
- The leading and trailing idlers being in a spaced apart relationship;
- A segment of the endless track extending between the leading and trailing idlers defining a ground engaging run;

- The leading idler having a first axis of rotation;
- The trailing idler having a second axis of rotation;
- A drive wheel having a third axis of rotation;
- The drive wheel being in driving engagement with the endless track for imparting movement to the endless track;
- A load bearing section located between the leading idler and the trailing idler;
- The load bearing section transferring to the ground surface a major portion of the load carried by the track assembly;
- The load bearing section having a longitudinal extent that does not exceed a diameter of the drive wheel;
- A leading section extending between the leading idler and the load bearing section;
- The leading section being oriented such as to converge toward the ground surface when the endless track is in motion and propels the vehicle;
- A trailing section extending between the load bearing section and the trailing idler;
- The trailing section being oriented such as to diverge from the ground surface when the endless track is in motion and propels the vehicle;
- A first horizontal distance defined between the first axis of rotation and the third axis of rotation being different from a second horizontal distance defined between the second axis of rotation and the third axis of rotation.

[90] Many of these claim elements are also present in the other independent claims in issue of the 509 Patent. However, claims 54, 76 and 108 define an ATV instead of a "reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces." Also, claim 54 defines an intermediate section instead of a "load bearing section," and

does not specify (as does claim 1) that this section transfers to the ground "a major portion of the load carried by the track assembly."

[91] Claim 108 differs from claim 1 in many respects, some more important than others. The more important different elements in claim 108 include: (i) traction projections projecting from the ground-engaging outer surface of the endless track, and (ii) the plurality of wheels is configured to bend the bottom run of the endless track such that, when the track assembly is on hard horizontal ground, a ground-contacting area of the endless track in contact with the hard horizontal ground has an extent in the longitudinal direction of the track assembly that does not exceed a diameter of the drive wheel.

[92] The claims dependent on claim 1 which are in issue are claims 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 15, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27 and 30. The table below identifies the limitations defined in each of the foregoing dependent claims:

Claim	**Dependent on Claim**	**Limitation**
2	1	The longitudinal extent of the load bearing section is less than the diameter of the drive wheel and wherein the reduced-size vehicle is an All-Terrain Vehicle (ATV) with a seat straddled by a user and wherein the steering mechanism has handlebars
3	1-2	The longitudinal extent of the load bearing section does not exceed a radius of the drive wheel
4	1-3	The longitudinal extent of the load bearing section is less than a radius of the drive wheel
5	1-4	An imaginary vertical axis that intersects the third axis of rotation also intersects the load bearing section
7	1-6	A support structure having: i) a center portion rotatably supported at the third axis of rotation; ii) a first support arm mounted to the center portion and extending along

		a radial direction of the drive wheel toward the leading end of the track assembly; iii) a second support arm mounted to the center portion and extending along a radial direction of the drive wheel toward the trailing end of the track assembly
8	7	The first support arm defines a first angle with an imaginary horizontal axis which extends through the third axis of rotation, the second support arm defines a second angle with the imaginary horizontal axis, the first angle being different from the second angle
10	1-9	The drive wheel is in overlapping relationship with one of the leading and trailing idlers, when viewed in a plane that is normal to the third axis of rotation
11	1-9	The drive wheel is in overlapping relationship with the trailing idler, when viewed in a plane normal to the third axis of rotation
12	1-11	The load bearing section is located closer to one of the leading and trailing idlers than to the other of the leading and trailing idlers
13	7	One of the first and second support arms is longer than the other of the first and second support arms
15	1-14	The endless track is free of stiffening rods extending in a transverse direction of the endless track
17	1-16	The endless track has drive lugs projecting from the inner surface for engagement by the drive wheel
18	1-14	The endless track has a pair of opposite lateral edge portions and a central portion between the lateral edge portions, the opposite lateral edge portions being free of stiffening rods extending in a transverse direction of the endless track
20	1-14	The endless track includes a plurality of track segments, each track segment including a drive projection extending inwardly from the inner face for engaging the drive wheel, and a traction lug projecting from the outer ground engaging surface, the drive projection registering in a longitudinal direction of the endless track with the traction lug, the portion of the track segment defined between the drive projection and the traction lug being free of a stiffening rod extending transversally of the endless track
21	1-14	The endless track has a plurality of drive projections longitudinally spaced apart along the track for sequentially engaging the drive wheel such that rotation of the drive wheel imparts motion of the endless track

		to propel the vehicle, the endless track having a plurality of traction lugs projecting from the ground engaging outer face, the traction lugs being longitudinally spaced apart and registering with respective drive projections, the endless track being free of stiffening rods extending transversally of the endless track at locations of the endless track at which a drive projection registers with a traction lug.
22	1-21	The third axis is located above the first axis and the second axis
23	1-22	The drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, one of the leading and trailing idlers having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane
24	1-22	The drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, the leading idler having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the trailing idler having a periphery bound between a third upper horizontal imaginary plane and a third lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane and below the third upper horizontal imaginary plane
25	1-24	The plurality of wheels impart a generally triangular path of travel to the endless track
26	1-25	The plurality of wheels define a track supporting and guiding arrangement that is in rolling contact with the inner surface at a plurality of locations, one of said locations being the load bearing section
27	1-26	The drive wheel has an extent along the third axis of rotation that is less than a transverse dimension of the endless track
30	1-29	The load bearing section is located between a frontmost point and a rearmost point of the drive wheel in a longitudinal direction of the track assembly

[93] A number of claims dependent on claim 108 of the 509 Patent add additional limitations that are not mentioned in the previous table:

Claim	Dependent on Claim	Limitation
112	108-111	The distance between the axis of rotation of the drive wheel and the axis of rotation of the leading idler wheel in the longitudinal direction of the track assembly is greater than the distance between the axis of rotation of the drive wheel and the axis of rotation of the trailing idler wheel in the longitudinal direction of the track assembly
113	108-112	A track frame supporting the leading idler wheel and the trailing idler wheel and comprising a first arm extending downwardly and forwardly towards the leading idler wheel and a second arm extending downwardly and rearwardly towards the trailing idler wheel
114	113	The first arm is longer than the second arm
132	108-131	The steering mechanism of the ATV comprises handlebars
133	108-132	A set of track assemblies

[94] As with the other patents in suit, all of the limitations of all of the other dependent claims in issue of the 509 Patent are identical or similar to those listed in the tables above. The table below shows a concordance of dependent claims, with each column header identifying the independent claim on which the claims in that column depend, and each row representing a group of claims having such identical or similar limitations and being assigned a claim group identifier:

Claim Group	1	33	54	76	108
509:2	2	34	55	77	109
509:3	3	35	56	78	110
509:4	4	36	57	79	111
509:5	5	37	58	80	116
509:7	7	39	60	82	
509:8	8	40	61	83	

509:10	10	42	63	85	118
509:11	11	43	64	86	119
509:12	12	44	65	87	120
509:13	13	45	66	88	
509:15	15		68	90	121
509:17	17		70	92	123
509:18	18		71	93	124
509:20	20		73	95	126
509:21	21		74	96	127
509:22	22	47		101	
509:23	23	48		102	
509:24	24	49		103	128
509:25	25	50		104	129
509:26	26	51		105	
509:27	27			106	130
509:30	30		75	107	
509:112					112
509:113					113
509:114					114
509:132					132
509:133					133

[95] This table of concordance demonstrates that, in respect of the many dependent claims in issue of the 509 Patent, there are in fact 27 distinct claim groups that are relevant.

VI. Legal Principles

A. *Claim Construction*

[96] Claims construction is antecedent to consideration of both validity and infringement issues: *Whirlpool Corp v Camco Inc*, 2000 SCC 67 at para 43 [*Whirlpool*]. The same claim construction applies for all issues, including infringement and validity issues: *Whirlpool* at para 49(b).

[97] A patent is not addressed to an ordinary member of the public, but to a worker skilled in the art described as:

> a hypothetical person possessing the ordinary skill and knowledge of the particular art to which the invention relates, and a mind willing to understand a specification that is addressed to him. This hypothetical person has sometimes been equated with the "reasonable man" used as a standard in negligence cases. He is assumed to be a man who is going to try to achieve success and not one who is looking for difficulties or seeking failure.

(See *Free World Trust v Électro Santé Inc*, 2000 SCC 66 at para 44 [*Free World Trust*], quoting from Harold G. Fox, *The Canadian Law and Practice Relating to Letters Patent for Inventions*, 4th ed (Toronto: Carswell, 1969) at 184.)

[98] The skilled person to whom the patent is addressed is deemed to be unimaginative and uninventive, but at the same time is understood to have an ordinary level of competence and knowledge incidental to the field to which the patent relates and to be reasonably diligent in keeping up with advances: *AstraZeneca Canada Inc v Apotex Inc*, 2014 FC 638 at para 51, aff'd 2015 FCA 158, rev'd on other grounds 2017 SCC 36.

[99] The person skilled in the art may also be a team of people: *Pfizer Canada Inc v Pharmascience Inc*, 2013 FC 120 at para 28; *General Tire & Rubber Company v Firestone Tyre and Rubber Company Limited*, [1972] RPC 457 at 482 (UKCA) [*General Tire & Rubber*].

[100] The skilled person is considered to be equipped with the common general knowledge; that is, the subset of the prior art that is generally known by persons skilled in the relevant art at the relevant time (*Apotex Inc v Sanofi-Synthelabo Canada Inc*, 2008 SCC 61 at para 37 [*Sanofi-Synthelabo*]), and accepted as a good basis for further action (*Mylan Pharmaceuticals ULC v Eli Lilly Canada Inc*, 2016 FCA 119 at para 24 [*Mylan*]).

[101] As stated in *Catnic Components Ltd v Hill & Smith Ltd*, [1982] RPC 183 at 243 (UKHL), and quoted in *Whirlpool* at paragraph 44:

> … A patent specification should be given a purposive construction rather than a purely literal one derived from applying to it the kind of meticulous verbal analysis in which lawyers are too often tempted by their training to indulge. The question in each case is: whether persons with practical knowledge and experience of the kind of work in which the invention was intended to be used, would understand that strict compliance with a particular descriptive word or phrase appearing in a claim was intended by the patentee to be an essential requirement of the invention so that *any* variant would fall outside the monopoly claimed, even though it could have no material effect upon the way the invention worked.
>
> [Emphasis in original.]

[102] In construing the claims purposively, it is important to bear in mind that the language of the claims is prime: *Free World Trust* at para 40. The claims language will, on a purposive construction, show that some elements of the claimed invention are essential while others are non-essential. Identification of elements as essential or non-essential is made:

> …
>
> (i) on the basis of the common knowledge of the worker skilled in the art to which the patent relates;
>
> (ii) as of the date the patent is published;
>
> (iii) having regard to whether or not it was obvious to the skilled reader at the time the patent was published that a variant of a particular element would *not* make a difference to the way in which the invention works; or
>
> (iv) according to the intent of the inventor, expressed or inferred from the claims, that a particular element is essential irrespective of its practical effect;
>
> (v) without, however, resort to extrinsic evidence of the inventor's intention.
>
> [Emphasis in original.]

(See *Free World Trust* at para 31(e).)

[103] An important consideration in the present case is the principle of claim differentiation. According to this principle, there is a rebuttable presumption that claims in a patent are not redundant. It is well understood that where one claim differs from another in only a single feature it is difficult to argue that the different feature has not been made essential to the claim: *Whirlpool* at para 79. It follows from this that a dependent claim, which incorporates all of the elements of the independent claim on which it depends, will generally be construed more narrowly than the independent claim: *Halford v Seed Hawk Inc*, 2004 FC 88 at para 90 [*Halford*], aff'd 2006 FCA 275. The limitations of the dependent claim are generally not read into the independent claim: *Halford* at para 93. Moreover, the independent claim should not be construed in a manner that is inconsistent with the dependent claim: *Halford* at paras 91, 95.

[104] In construing the claims of a patent, recourse to the disclosure portion of the specification is (i) permissible to assist in understanding the terms used in the claims, (ii) unnecessary where the words are plain and unambiguous, and (iii) improper to vary the scope or ambit of the claims: *Mylan* at para 39.

[105] Terms used in the claims must be read in the context of the patent as a whole, and it is therefore unsafe in many instances to conclude that a term is plain and unambiguous without a careful review of the specification: *Whirlpool* at para 52, quoting from William L. Hayhurst, "The Art of Claiming and Reading a Claim" in Gordon F Henderson, ed, *Patent Law of Canada* (Toronto: Carswell, 1994) at 190.

[106] Because there is potential for tension between the guidance provided in the preceding two paragraphs, I reproduce here the discussion of Justice Russel Zinn in *Janssen-Ortho Inc v Canada (Health)*, 2010 FC 42 at paragraphs 115-116, 119, on this point, with which I agree:

> [115] In my view, the whole of the specification (including the disclosure and the claims) may be examined to ascertain the nature of the invention. Where the words of the claims are plain and unambiguous and capable of only one interpretation by a person skilled in the art, recourse to the disclosure is unnecessary. This is not to say that the interpreter should not examine the disclosure. In my view, one should do so, but with caution. Recourse may be had to the disclosure for the purpose of confirming the interpretation arrived at from examining the claims alone or to disclose an ambiguity in the language of the claims that was not otherwise evident. However, the patentee cannot expand the monopoly specifically expressed in the claims by borrowing phrases from the disclosure and placing them into the language of the claims.
>
> [116] I agree with Novopharm that when one looks beyond the language of the claims at issue one ought first look at the dependent claims as an aid to interpreting the independent claims, before one resorts to the disclosure.
>
> …

> [119] I do not take the Supreme Court of Canada to be saying that in every case one must examine the disclosure prior to construing the claims of the patent; rather, I take the Court in *Whirlpool* and *Free World Trust* to be raising a caution that one should not reach a firm conclusion as to the meaning of the words in the claims being construed without having tested one's initial interpretation against the words of the disclosure. When that is done, if the disclosure suggests another interpretation of the terms used in the claims, then resort to the meanings given in the disclosure is proper, subject to the proviso that the invention that is protected is what is expressed in the claims which cannot be added to by anything mentioned in the disclosure that has not found its way into the claims as drafted. As was noted by Justice Taschereau in Metalliflex Ltd. v. Rodi & Wienenberger Aktiengesellschaft, [1961] S.C.R. 117, at p. 122:
>
> > The claims, of course, must be construed with reference to the entire specifications, and the latter may therefore be considered in order to assist in apprehending and construing a claim, but the patentee may not be allowed to expand his monopoly specifically expressed in the claims "by borrowing this or that gloss from other parts of the specifications".
>
> [Emphasis in original.]

[107] As stated in *Consolboard Inc v MacMillan Bloedel (Sask) Ltd*, [1981] 1 SCR 504 at 520-21:

> We must look to the whole of the disclosure and the claims to ascertain the nature of the invention and methods of its performance, (*Noranda Mines Limited v. Minerals Separation North American Corporation* [[1950] S.C.R. 36]), being neither benevolent nor harsh, but rather seeking a construction which is reasonable and fair to both patentee and public. There is no occasion for being too astute or technical in the matter of objections to either title or specification for, as Duff C.J.C. said, giving the judgment of the Court in *Western Electric Company, Incorporated, and Northern Electric Company v. Baldwin International Radio of Canada* [[1934] S.C.R. 570], at p. 574, "where the language of the specification, upon a reasonable view of it, can be so read as to afford the inventor protection for that which he has actually in good faith invented, the court, as a rule,

> will endeavour to give effect to that construction". Sir George Jessel spoke to like effect at a much earlier date in *Hinks & Son v. Safety Lighting Company* [(1876), 4 Ch. D. 607]. He said the patent should be approached "with a judicial anxiety to support a really useful invention".

B. *Patent Validity*

[108] Once it has issued, a patent benefits from a rebuttable presumption that it is valid: subsection 43(2) of the *Patent Act*. Accordingly, a party challenging the validity of a patent bears the burden of proving its allegations.

[109] The remainder of this section is devoted to discussion of the legal principles applicable to allegations of anticipation and obviousness. Because my conclusions in respect of those allegations make it unnecessary for me to consider the other invalidity allegations, I have not discussed law applicable thereto.

(1) Anticipation

[110] Subsection 28.2(1) of the *Patent Act* addresses the requirement for novelty in a patented invention. Pursuant to paragraph 28.2(1)(b), the subject matter defined by a claim must not have been disclosed before the claim date in such a manner that it became available to the public.

[111] The claim date is as defined in section 28.1 of the *Patent Act*. It is the filing date of the patent application unless a proper claim is made to priority based on an earlier filed patent application. As indicated above, the patents in suit in the present case claim priority from a patent application that was filed on February 25, 2002. The parties agree that this priority claim is proper, and the claim date is indeed February 25, 2002 for some claims, but the priority claim

does not apply to any claims defining the absence of stiffening rods (or members or inserts) since the priority application made no mention of this feature. Therefore, the claim date for these claims is May 30, 2002 – the filing date (or deemed filing date) of all of the patents in suit.

[112] Anticipation, which is simply the lack of novelty, was discussed by the Supreme Court of Canada (SCC) in *Sanofi-Synthelabo*. The SCC explained that there are two distinct requirements for anticipation: disclosure and enablement.

[113] Addressing the issue of disclosure first, the test was discussed in *Beloit Canada Ltd v Valmet OY* (1986), 8 CPR (3d) 289 at 297, [1986] FCJ No 87 (QL) (FCA) [*Beloit*]:

> … 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.

[114] The SCC approved this statement in *Sanofi-Synthelabo*, and expanded on it at paragraph 25, stating first that:

> … the requirement of prior disclosure means that the prior patent must disclose subject matter which, if performed, would necessarily result in infringement of that patent…

and then:

> … there is no room for trial and error or experimentation by the skilled person. He is simply reading the prior patent for the purposes of understanding it.

[115] Another helpful statement in *Sanofi-Synthelabo* at paragraph 21 on the issue of anticipation is borrowed from *General Tire & Rubber* at 486:

> A signpost, however clear, upon the road to the patentee's invention will not suffice. The prior inventor must be clearly shown to have planted his flag at the precise destination before the patentee.

[116] Turning briefly to the issue of enablement, this word means that the skilled person would have been able to perform the invention. Here, the skilled person is assumed to be willing to make trial and error experiments to get the invention to work (*Sanofi-Synthelabo* at para 27), but not so many as to create an undue burden or require any inventive step (*Sanofi-Synthelabo* at para 33).

[117] In this case, it is also important to observe that evidence of anticipation based on uncorroborated testimony of a witness should be weighed with caution. The recollections of a witness concerning events sometimes decades in the past are subject to the frailties of memory even where the witness has no particular interest in the matter (*Novopharm Limited v Eli Lilly and Company*, 2010 FC 915 at para 84).

(2) Obviousness

[118] The issue of obviousness begins with section 28.3 of the *Patent Act*:

Invention must not be obvious	**Objet non évident**
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	**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) information disclosed more than one year before	**a)** qui a été faite, plus d'un an avant la date de dépôt

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 information became available to the public in Canada or elsewhere; and	de la demande, 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) 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 public in Canada or elsewhere.	**b)** qui a été faite par toute autre personne avant la date de la revendication de manière telle qu'elle est devenue accessible au public au Canada ou ailleurs.

[119] Pursuant to subsection 28.3(b), a patent claim will be invalid if, based on information that was available to the public before the claim date, its subject-matter would have been obvious to a person skilled in the art or science to which it pertains.

[120] The threshold for inventiveness (non-obviousness) has long been understood to be low. As stated in *Beloit* at 294-95:

> 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.
>
> …

> Every invention is obvious after it has been made, and to no one more so than an expert in the field. Where the expert has been hired for the purpose of testifying, his infallible hindsight is even more suspect. It is so easy, once the teaching of a patent is known, to say, "I could have done that"; before the assertion can be given any weight, one must have a satisfactory answer to the question, "Why didn't you?"

[121] Obviousness was discussed by the SCC in *Sanofi-Synthelabo*. At paragraph 67 of that decision, the Court borrowed the following approach to assessing obviousness from *Pozzoli SPA v BDMO SA*, [2007] FSR 37 (p 872), [2007] EWCA Civ 588 (UKCA) at paragraph 23:

> (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?

[122] The person skilled in the art in step 1(a) is as discussed above in respect of claim construction. Likewise, the common general knowledge in step 1(b) is as defined in the context of claim construction. The only wrinkle is that the critical date for obviousness is the claim date, whereas for claim construction it is the publication date.

[123] The inventive concept in step 2 is defined separately for each claim, and is not a generalised concept to be derived from the specification as a whole: *Ciba Specialty Chemicals Water Treatments Limited v SNF Inc*, 2017 FCA 225 at paras 72-74.

[124] The test of obviousness is not to be applied to each element of the claim discretely but rather to the combination of elements as a whole: *Procter & Gamble Pharmaceuticals Canada Inc v Canada (Minister of Health)*, 2004 FC 204 at para 95, aff'd 2004 FCA 393, leave to appeal to SCC refused.

[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: *Eli Lilly and Company v Apotex Inc*, 2009 FC 991 at para 417 [*Eli Lilly*], aff'd 2010 FCA 240, quoting Simon Thorley et al., *Terrell on the Law of Patents*, 16th ed. (London: Sweet & Maxwell, 2006) at 7-62. 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: *Eli Lilly* at para 419, quoting *Scinopharm Taiwan Ltd v Eli Lilly & Co*, [2009] EWHC 631 (Pat), [2009] All ER (D) 282 (Mar) at para 83, itself quoting *Smithkline Beecham v Apotex Europe*, [2005] FSR 23 at para 96 (Eng CA).

[126] Commercial success is a secondary factor that may be relevant to the assessment of obviousness: *Novopharm Limited v Janssen-Ortho Inc*, 2007 FCA 217 at para 25. However, this

factor is not conclusive. Commercial success cannot save an invention that is obvious: *Domtar Ltd v MacMillan Bloedel Packaging Ltd* (1978), 41 CPR (2d) 182, [1978] FCJ No 906 (QL) (FCA). Commercial success is relevant only in borderline cases: *Rothmans, Benson & Hedges Inc v Imperial Tobacco Ltd* (1993), 47 CPR (3d) 188, [1993] FCJ No 135 (QL) (FCA).

C. *Infringement*

[127] Infringement is not defined in the *Patent Act*. The exclusive rights associated with a patent are set out in section 42 of the *Patent Act*:

Grant of Patents	***Octroi des brevets***
Contents of patent	**Contenu du brevet**
42 Every patent granted under this Act shall contain the title or name of the invention, with a reference to the specification, and shall, subject to this Act, grant to the patentee and the patentee's legal representatives for the term of the patent, from the granting of the patent, the exclusive right, privilege and liberty of making, constructing and using the invention and selling it to others to be used, subject to adjudication in respect thereof before any court of competent jurisdiction. [Emphasis added.]	**42** Tout brevet accordé en vertu de la présente loi contient le titre ou le nom de l'invention avec renvoi au mémoire descriptif et accorde, sous réserve des autres dispositions de la présente loi, au breveté et à ses représentants légaux, pour la durée du brevet à compter de la date où il a été accordé, le droit, la faculté et le privilège exclusif de fabriquer, construire, exploiter et vendre à d'autres, pour qu'ils l'exploitent, l'objet de l'invention, sauf jugement en l'espèce par un tribunal compétent. [Je souligne.]

[128] Once the claims of a patent have been properly construed by determining the essential elements thereof, the issue of whether a product infringes the patent is simply a matter of determining whether all of the essential elements of the claim in question are present. There is no

infringement if an essential element is different or omitted. There may still be infringement, however, if non-essential elements are substituted or omitted: *Free World Trust* at para 31.

VII. Analysis

A. *Person Skilled in the Art*

[129] As indicated above in discussion of legal principles, the person skilled in the art (or the skilled person), is the focus for claim construction as well as for assessment of obviousness.

[130] The parties agree substantially on the amount of experience of the skilled person: about one or two years' experience for someone with a degree in mechanical engineering, or about five or six years' experience for a mechanical engineering technician.

[131] Where the parties differ substantially is in relation to the type of experience of the skilled person. Camso's expert, Mr. Kittel, referred to "experience in the development of similar track products for ATVs or powersport vehicles in general (i.e. snowmobiles)." Mr. Leblanc, one of the defendants' experts, defined the scope of the skilled person's experience somewhat more broadly. He referred to work in the field of off-road vehicles, notably those driven by endless tracks, and more particularly snowmobiles. He also called for specialization in undercarriages for vehicles designed for operating on surfaces that are soft or slippery, like snow. Mr. Kittel agreed that the skilled person would have a general understanding of the principles related to track belt design, but he disagreed that extensive snowmobile track knowledge or experience was necessary since the patents in suit are concerned with reducing steering effort, which is not an issue on unsteered snowmobile tracks.

[132] An important aspect of the invention described in the patents in suit is the flexibility of the endless track, both longitudinally and transversally, which permits it to adopt a shape that has the effect of reducing the size of the contact patch with the ground, and hence reduce steering effort. In addition, the disclosure of the patents in suit provides no information on how the endless track is to be manufactured, other than including certain traction projections and corresponding inner lugs, and the choice of including or omitting transverse stiffening rods. A reader of the patents in suit, in order to make the invention described therein, would have to be able to manufacture the track. That said, the invention of the patents in suit does not concern the chemistry of the endless track, but rather a few simple physical features, none of which is novel.

[133] In my view, the skilled person to whom the patents in suit are directed would have experience with ATVs and tracked vehicles. The skilled person would also have experience with endless tracks, sufficient to be able to manufacture a conventional endless track for a track assembly for an ATV. The skilled person having the required experience may be a team. I agree with Mr. Kittel that extensive snowmobile track knowledge or experience would not be necessary because the central aim of the patents in suit (reduced steering effort) is not an issue in snowmobiles. I also note that several witnesses at trial worked in the development of track assemblies for ATVs without having extensive knowledge or experience with snowmobile tracks: Messrs. Shaw, Jean and Boivin.

B. *Common General Knowledge*

[134] As indicated above, the common general knowledge is the knowledge that the skilled person is equipped with for the purposes of claim construction and assessment of obviousness.

[135] A distinction between the common general knowledge for the purposes of claim construction and for the purposes of assessing obviousness is the critical date. For claim construction, it is the date of publication (in this case, August 25, 2003). For obviousness, the critical date is the claim date (in this case, February 25, 2002, or May 30, 2002 for claims defining an absence of stiffening rods/members/inserts).

[136] Before entering into a discussion of the common general knowledge, it is necessary to observe that the market for track assemblies for ATVs was in its infancy at the relevant time. There were few products on the market, and they were rudimentary by comparison to what was available just a few years later.

[137] ATVs were first introduced to the market in the late 1960s and early 1970s, essentially as 3-wheeled motorcycles with fat tires. These were called All-Terrain Cycles (ATCs). In the mid-1980s, the market moved to a more stable 4-wheel design in which only the rear wheels were driven. These vehicles, which are still called ATVs, retained the straddle driver seat and handlebar steering that was characteristic of ATCs and the motorcycles from which they evolved. Four-wheel drive ATVs were introduced to the market shortly thereafter. A new type of ATV was introduced in the late 1990s and early 2000s which permitted people to ride side-by-side and to use a steering wheel instead of handlebars, much like a car. These were mainly for work-related uses rather than leisure, and later came to be called Utility Task Vehicles (UTVs).

[138] The ATCs, ATVs and UTVs described in the previous paragraph were equipped with conventional wheels and tires. They were not designed to operate in deep snow. The Court was given a detailed history of the development over more than 100 years of vehicles for travelling over snow. The prevalent vehicles for this purpose in the decades leading up to the claim date

were snowmobiles. BRP's predecessor introduced a snowmobile to the commercial market in 1959 with legendary success. It had the same essential components for driving on snow as we see today: two skis at the front for steering and an endless track of vulcanized rubber driven by the engine and kept in position by a track assembly. Embedded in the endless track was a cotton fabric and transverse steel rods to provide the required strength and stiffness.

[139] Other manufacturers joined the snowmobile market after BRP, many also incorporating transverse steel rods. On the other hand, some manufacturers used rubber tracks that were not reinforced with rods. Rubber Drive and Goodyear are examples of suppliers of such tracks. With the increasing power of snowmobiles around the 1970s, and the consequent demands for stronger endless tracks, manufacturers moved away from rodless tracks except for smaller, low-powered snowmobiles designed for children. This remained the case at the claim date. However, it does not appear that omitting rods from endless tracks was lost as an option to the skilled person. Firstly, rodless tracks continued to be used for various applications other than children's snowmobiles: *e.g.* snow blowers, industrial applications. The skilled person, having experience with endless tracks, would be aware of these other applications. Secondly, the evidence was that Camso was able to supply rodless tracks without difficulty to Mr. Shaw's company, Valley Cycle, in 1995, as well as to Mr. Boivin's company, A&D Boivin, in 2002 during development of the patented kit.

[140] Moreover, Canadian Patent Application No. 2,319,934, filed by the defendant Soucy and published on March 18, 2002, described an endless track made of rubber in which stiffeners "may be or not embedded in the rubber material." This indicates that including or omitting stiffeners was an option known to the skilled person. Mr. Kittel opined that the passage does not

clearly refer to omitting stiffeners entirely, and that it could instead mean that stiffeners would be included but not embedded in the rubber material. In my view, this application was referring to omitting stiffeners entirely. In addition to the abovementioned evidence that omitting stiffening rods was known to the skilled person, I note that a similar option of omitting stiffeners within an endless track is also contemplated in Japanese Patent Publications Nos. JP-1996-310456 and JP-1992-31980, as well as Canadian Patent Application No. 2,397,581 and US Patent No. 4,613,006. (Moss Patent)

[141] There were known advantages to using stiffening rods: to assist with weight distribution and flotation on soft surfaces like snow, improved strength, and durability of the endless track. But there were also known disadvantages to the use of stiffening rods: cost, challenges of attaching rigid rods to soft rubber, noise, weight, risk of breakage (See US Patent No. 3,480,339, col. 1, line 62 to col. 2, line 7).

[142] I return now to ATVs, and specifically to tracked assembly kits for ATVs. Obviously, such tracked assemblies could only be applied to driven wheels. Accordingly, early kits installed on 2-wheel drive ATVs added tracked assemblies at the rear axle only. The front wheels would be replaced by skis. Four-wheel track kits came with 4-wheel drive ATVs. Though the design constraints for front track assemblies were somewhat different because they had to be steerable, these additional constraints did not require inventive ingenuity to be overcome.

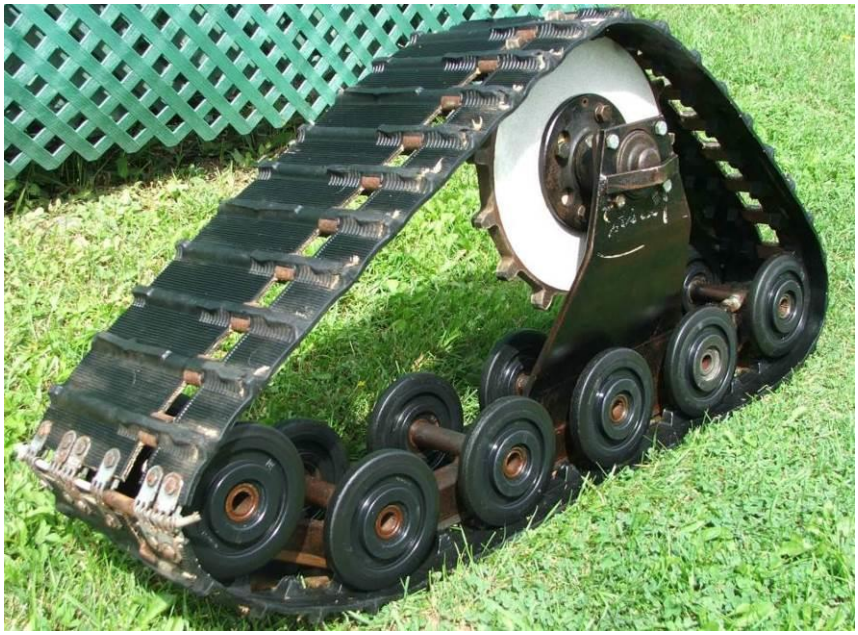
[143] The best known and best-selling tracked assembly kits for ATVs in the 2002/2003 period were developed by Tatou Inc. (and its predecessors). The quick evolution of these products in the years around the 2002 claim dates demonstrates how young the industry was at the time.

[144] A first prototype was developed in the winter of 1995-1996 by Denis Boisvert (shown in the photo here of the prototype) and Bernard Jean (who was a fact witness at trial):

D. Boisvert on tracked ATV prototype

[145] This prototype used tracks supplied by Camso and designed for BRP snowmobiles. The endless tracks were cut, trimmed and re-joined to fit the assembly. The endless tracks were driven by an “external” drive. That is to say that the drive wheel (which is attached to the ATV in place of the original wheel and tire) had outward projections at regular intervals which engaged corresponding holes in the endless track, also at regular intervals. Stiffening rods were present in these tracks in order to strengthen them against the stresses caused by the external drive.

[146] By the following winter (1996-1997), Messrs. Boisvert and Jean had developed their first product for sale (shown here):



Track kit (the Bastarache Kit)

[147] At trial, this kit was referred to by the name of its first purchaser, René Bastarache. As with the prototype, the Bastarache Kit used tracks (with rods) that had been designed for snowmobiles and which were cut, trimmed and re-joined to fit the assembly. Eight such kits were sold.

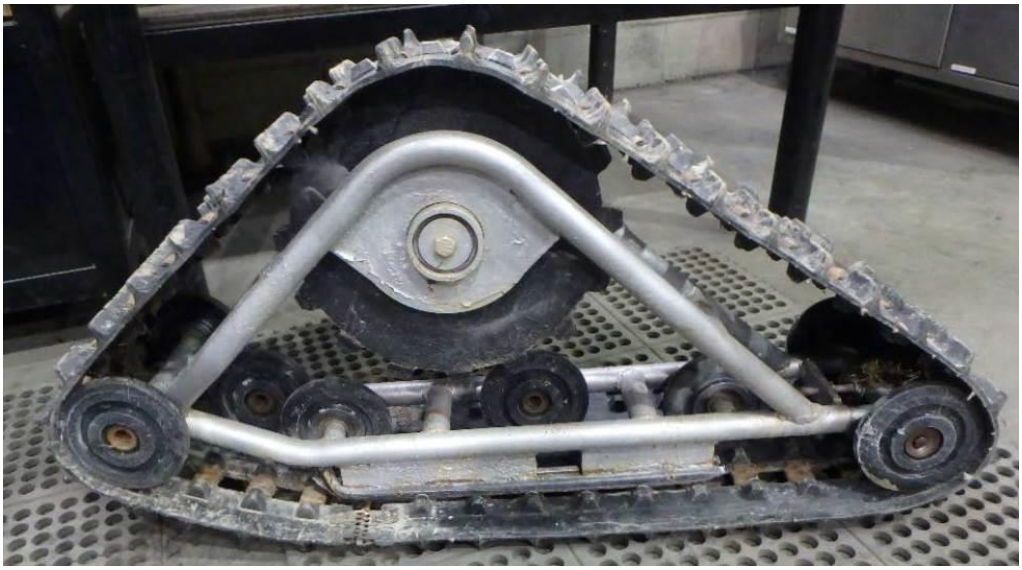
[148] For the winter of 1997-1998, Mr. Boisvert, doing business as Tractions VTT Boisvert, was selling a new generation of the kit, again using tracks (with rods) that were designed for snowmobiles and adapted for size. This kit is shown here:

ATV with track kit (winter 1997-1998)

[149] This is the first generation in which the design of the front and rear assemblies is clearly different. Four such kits were sold.

[150] The next generation was more successful. It was sold during the winters of 1998-1999, 1999-2000 and 2000-2001, and was referred to at trial as Tatou 1. Its front and rear assemblies are shown here:

Tatou 1 track kit (front)



Tatou 1 track kit (rear)

[151] The use of tracks with rods that were designed for snowmobiles and adapted for size continued with this generation. However, the Tatou 1 introduced a design change of relevance to the present case: a slight longitudinal curve in the front assembly adjacent to the bottom run of the track. This is visible as a kink in the bottom arm of the frame, and it results in an endless track that is not flat on the bottom like its predecessors. This change was introduced to reduce the size of the contact patch with the ground, to reduce steering effort, especially on hard surfaces. Thirty-five of these Tatou 1 kits were sold.

[152] Tatou Inc. was incorporated in January 2001 by Mr. Boisvert and two others. For the winters of 2001-2002 and 2002-2003, they had developed yet another generation of their kit. This one was referred to at trial as Tatou 2 and its front and rear assemblies are shown here:

Tatou 2 track kit (front)

Tatou 2 track kit (rear)

[153] Here, for the first time, Tatou used tracks that were manufactured specifically for the kit. The external drive and the stiffening rods remained, but there was no longer a need to cut, trim and rejoin the endless tracks. The Tatou 2 incorporated the slight curve in the bottom run of the front assembly to reduce the contact patch longitudinally, as in the Tatou 1. However, it also

introduced a tapered transverse profile of the traction projections of the endless track. The profile was such that the traction projections were higher near the center of track and lower near the edges. This profile is shown in the image here:

Profile of traction projections (Tatou 2)

[154] The result was that, on a hard surface, the contact patch was reduced transversally. This, along with the longitudinal reduction in the contact patch, further reduced the required steering effort, at least on hard surfaces. Six hundred Tatou 2 kits were sold in 2001; and 1,200 more in 2002.

[155] The Court heard evidence of later generations of Tatou but these post-date the claim date (February 25, 2002, for claims that do not exclude stiffening rods) and therefore cannot be considered common general knowledge, at least for the purposes of assessing obviousness.

[156] I accept the defendants' assertion that the Tatou 1 and Tatou 2 kits were part of the common general knowledge of the skilled person on February 25, 2002. Based on the evidence, I am satisfied that these were well-known products in the field. Mr. Leblanc testified that track

assemblies for ATVs were even referred to generically as “Tatou” at the time, regardless of the identity of the manufacturer.

[157] Mr. Kittel testified that he was not aware of Tatou in the early 2000s when he was working on tracked assemblies for ATVs, though he was generally aware of the existence of aftermarket systems to attach tracks to ATVs. Camso argues that Tatou was not common general knowledge because merely some, but not all, skilled persons would have been aware of these products. Firstly, I do not accept that the law requires that all persons practising in a field be aware of something for it to be common general knowledge. The skilled person whose knowledge defines the common general knowledge is not an actual person, but rather a hypothetical person. This person represents the ordinary level of skill and knowledge in the field.

[158] In addition, I note that Tatou was intended for use on snow, whereas Mr. Kittel’s experience was with regard to products that were not. For this reason, I am not prepared to draw an inference that Tatou was not part of the common general knowledge from Mr. Kittel’s ignorance of it. Moreover, Mr. Kittel’s own expert report identifies earlier versions of Tatou (the 1995-1996 prototype and the product sold in 1997-1998) apparently as part of the common general knowledge. I agree with the defendants’ argument that it is curious that Mr. Kittel would acknowledge that these earlier versions (of which zero and four, respectively, were sold) were part of the common general knowledge without also acknowledging that later, much better-selling products were as well.

[159] Yet another indication that Tatou was part of the common general knowledge is that another group (TJD, working with the defendant Kimpex) recognized Tatou’s dominant position

in the market at the end of 2001, and decided to develop a competing product (Cat Track) which was similar in design.

[160] Paragraphs 2 to 4 of the disclosure of the patents in suit (which are reproduced in paragraph [3] above) provide another good indication of the common general knowledge. Paragraphs 2 and 3 refer to the existence of tracked-type ATVs which are more efficient on uneven or soft terrain, like snow. Paragraph 4 notes the existence of tracked ATVs which "require complicated track assemblies comprising a track frame to maintain the tension of the endless track belt and prevent it from loosening," and which generally have "a large contact area with the ground, which results in a decreased maneuverability and an increased impact on the often soft terrain."

[161] Mr. Leblanc was of the view that paragraph 4 of the disclosure refers specifically to Tatou. I accept that Tatou would have been among the assemblies contemplated in that paragraph.

[162] It is clear from the variations in the different generations of the Tatou that the number and position of idlers and inner lugs was a design choice that was known to the skilled person and part of the common general knowledge.

[163] Another design choice that was part of the common general knowledge was whether to use an external drive system (as in Tatou, in which the drive wheel has outward projections that engage holes in the endless track) or an internal drive system (in which the endless track has inwardly projecting drive lugs instead of holes, and the drive wheel engages these drive lugs with

teeth that are lateral instead of outward). The following image from Mr. Kittel's first report shows an example of an internal drive system:

Internal drive system

[164] Finally, it was also common general knowledge that a track assembly to be secured to an ATV would require an anti-rotation system to prevent it from rotating about the axis of the drive wheel and coming into contact with the body of the ATV. Some such anti-rotation systems are biased, meaning that the assembly is urged to a particular rotational position. Other anti-rotation systems are unbiased, meaning that limits are imposed on the rotational movement of the assembly, but it is not urged to a particular position.

C. *Construction of Claims*

[165] Many of the terms used in the claims in issue appear in more than one of the patents in suit. While I understand that the claims of each of the patents in suit should be construed without reference to the other patents in suit, I have found no difference in the meaning of any term between one patent and another.

[166] There is no dispute on the construction of most of the terms used in the claims in issue. However, a few remain in dispute. Accordingly, I will first address the disputed claim elements. Once that is done, I will address the construction of the various claim groups identified above in the Claims in Issue section.

(1) Disputed Claim Elements

(a) *Driving wheel, drive wheel*

[167] All of the independent claims in issue of the 294 Patent define a plurality of track-contacting wheels including a driving wheel "to impart motion to the endless track." The 562 and 509 Patents use the term "drive wheel" instead.

[168] In the 562 Patent, this term does not appear in any of the independent claims in issue except claim 102. That claim defines a plurality of wheels including "a drive wheel for imparting motion to the endless track." The term is also introduced in some dependent claims: in claim groups 562:14 ("a drive wheel in driving engagement with the endless track for imparting movement to the endless track") and 562:48 ("to simultaneously engage a drive wheel as the drive wheel imparts motion to the endless track").

[169] Most of the independent claims in issue of the 509 Patent (*i.e.* claims 1, 33, 54 and 76) define a plurality of wheels for supporting and driving the endless track including a drive wheel for imparting motion to the endless track. The last independent claim in issue of the 509 Patent (*i.e.* claim 108) defines a plurality of wheels including a drive wheel being rotatable to impart motion or movement to the endless track.

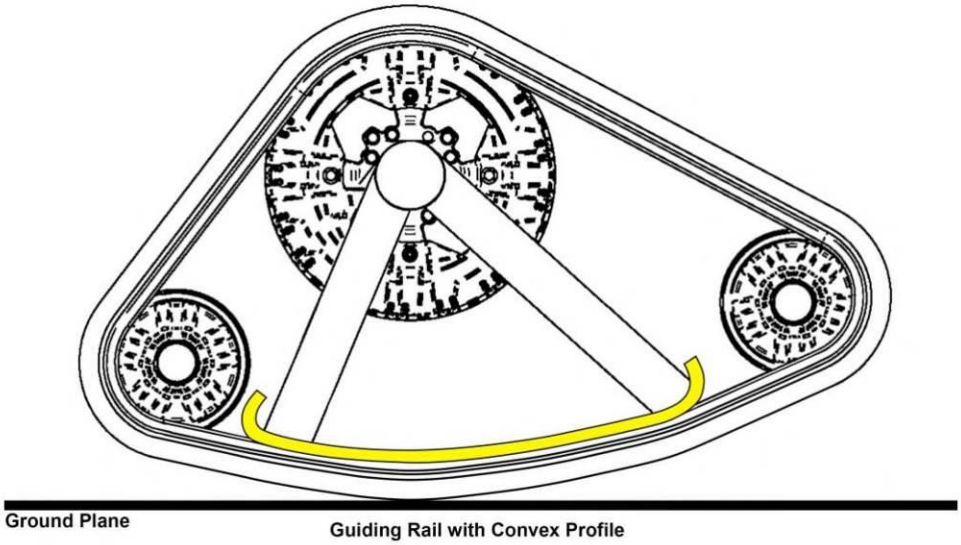
[170] All instances of “driving wheel” or “drive wheel” in the claims in issue define their function as imparting motion to the endless track.

[171] The parties agree that the terms “driving wheel” and “drive wheel” have the same meaning. The essence of the dispute between the parties regarding these terms is as follows. The defendants argue that an implicit characteristic of the driving/drive wheel is that it rests on the ground and bears the weight of the track assembly and the ATV, as described in the disclosure. For its part, Camso argues that the only function defined in the claims in issue for the driving/drive wheel is imparting motion to the endless track, and therefore no characteristic of weight-bearing should be read into the claims.

[172] The defendants support their argument with reference to the testimony of their expert, Mr. Leblanc. He felt that the term “driving wheel” should be read with reference to the disclosure because it is not a term that is familiar to the skilled person. In addition to noting that the only embodiment disclosed for the driving wheel is one that bears weight, he also referred to the objective of the invention to reduce the contact patch to assist with steering.

[173] I agree that reducing the contact patch to assist with steering is indeed an objective of the invention. However, based on the claims in issue, this objective can be achieved by other means. These means include (i) the longitudinal curve in the bottom run of the endless track, and (ii) the omission of stiffening rods/members/inserts. It is true that the longitudinal curve in the bottom run of the endless track in the disclosure is achieved by means of the large weight-bearing drive wheel. However, I see no suggestion in the disclosure that this is the only means contemplated to achieve this.

[174] In fact, paragraph 67 of the disclosure suggests that the driving wheel need not bear weight. This paragraph indicates that the goal of a reduced contact patch could be achieved by another arrangement of the assembly without departing from the spirit and nature of the invention. An example provided is a guiding rail having a convex profile and a transversally convex profile of traction projections. With regard to the guiding rail, Mr. Kittel provided the following sketch as a suggestion of what was meant in the patent:



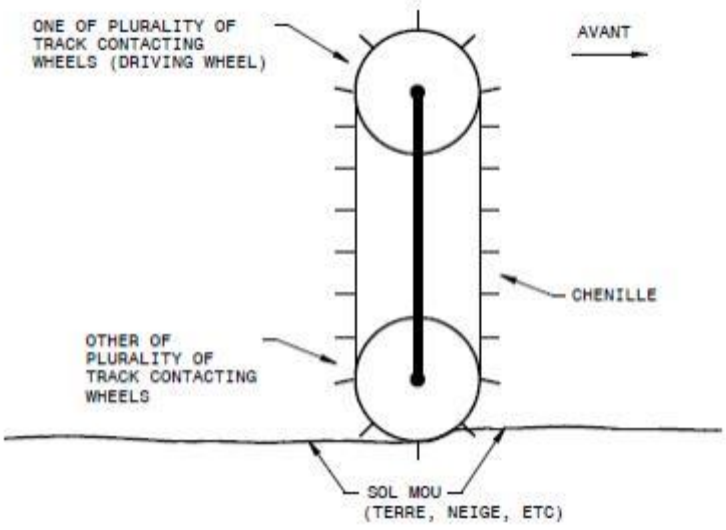
Sketch demonstrating guiding rail with convex profile on a ground plane

[175] Mr. Leblanc responded that this arrangement would not be practical because there would be too much weight on the guiding rail; the friction caused by the endless track rubbing on the guiding rail would create too much heat and lead to premature wear. That may be, but it does not alter the fact that the disclosure suggests an arrangement in which the driving wheel does not bear weight.

[176] Mr. Leblanc also noted that if the terms “driving wheel” and “drive wheel” are construed as Camso suggests, then many of the claims in issue will encompass the prior art Tatou 1 and

Tatou 2 products described earlier. Mr. Leblanc concludes that this could not have been the inventors' intention since the disclosure alludes to the existence of the Tatou products and its objective is to solve certain disadvantages thereof. It may be that the claims as construed are invalid in view of prior art referred to in the disclosure, but this is insufficient reason to read in a limitation to a term that is not otherwise present.

[177] Mr. Leblanc also noted that the patented arrangement contemplates a plurality of wheels, which encompasses an arrangement with only two wheels. Mr. Leblanc opined that the only practical arrangement with two wheels would have to have the driving wheel bearing the weight of the vehicle. He explained that the alternative of the non-driving wheel (the idler) bearing the weight and the driving wheel off the ground would be impractical because it would involve the complexity of a track assembly without offering any advantages over a conventional wheel and tire. Mr. Leblanc used the sketch here to illustrate this point:



Sketch demonstrating track assembly on soft terrain where driving wheel does not bear weight

("avant" = front; "chenille" = track assembly)

[178] I accept that, in the two-wheel arrangement discussed by Mr. Leblanc, the driving wheel would indeed have to be bearing the weight of the vehicle. However, it does not follow from this that the driving wheel (or drive wheel) must bear the weight in all of the contemplated arrangements, some of which may have many more wheels. There is no suggestion in the disclosure that the preferred embodiment in which the driving/drive wheel bears the weight of the vehicle is the only arrangement contemplated. Of course, the disclosure need not describe in detail every embodiment that is contemplated in the disclosure.

[179] Another basis for Mr. Leblanc's view that the driving wheel must bear the weight of the vehicle is paragraph 72 of the disclosure, which states that the patented arrangement "only weakly reduces the speed of the vehicle." He asserts that the speed of the vehicle is dictated by the diameter of the driving wheel. If the patented arrangement only weakly reduces the speed of the vehicle, then the driving wheel must be almost the same diameter as the original wheel and tire. As I understand it, the idea is that such a driving wheel must be on the ground bearing weight because its size would not permit otherwise. I am not convinced by this argument.

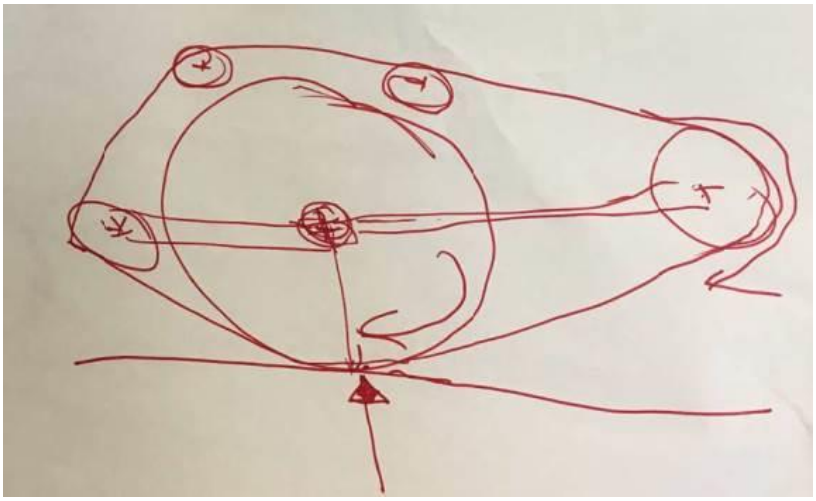
[180] I am more swayed by reading various dependent claims in the patents in suit. For example, claim 93 of the 294 Patent reads as follows:

> 93. The track assembly claimed in any one of claims 91 and 92, wherein the driving wheel engages the upper run of the endless track and the lower run of the endless track.

[181] Based on the principle of claim differentiation, there is a rebuttable presumption that the limitation added in this claim is not an implicit element of the driving wheel defined in the claims on which claim 93 depends. This suggests that the term "driving wheel" does not imply engagement with the upper and lower runs of the endless track. This in turn suggests that the

driving wheel need not be in contact with the lower run and therefore need not be in contact with the ground bearing the weight of the vehicle. The defendants have not convinced me that the presumption imposed by the principle of claim differentiation should be rebutted. In fact, the foregoing analysis is consistent with my discussion above of the disclosure.

[182] The defendants argue that the variation implied by claim 93 could mean simply that the driving wheel need not engage the upper run of the endless track. Mr. Leblanc drew this sketch showing idlers located above the driving wheel to illustrate what might be contemplated:



Sketch demonstrating a variation of the track assembly where the driving wheel does not engage the upper run of the endless track

[183] I note that claim 93 refers to engagement with both the upper and lower runs of the endless track. While the arrangement illustrated in this sketch may have been contemplated in the claims on which claim 93 depends, I see no reason to conclude that an arrangement in which idlers are located below the driving wheel, thus bearing the weight of the vehicle and keeping the driving wheel off the ground, would not likewise have been contemplated.

[184] The 562 Patent also has dependent claims that suggest that the drive wheel defined in the claims on which they depend does not implicitly bear weight. Claims 19 and 29 of the 562 Patent read as follows:

> 19. A steerable track assembly as defined in any one of claims 14 to 18, wherein the drive wheel is in rolling contact with the ground engaging run.
>
> …
>
> 29. A steerable track assembly as defined in any one of claims 15 to 27, wherein the plurality of wheels define a track supporting and guiding arrangement that is in rolling contact with the inner surface at a plurality of positions, one of said positions being the load bearing section.

[185] Both of these claims imply that other claims do not require that the drive wheel be in rolling contact with the endless track at or near the ground. It follows that the term "drive wheel" does not imply weight bearing.

[186] An even stronger suggestion that the drive wheel does not necessarily contact the ground and bear weight is found in claims 26 and 27 of the 562 Patent, which are reproduced earlier in discussion of the claims in issue. These claims specify that the lower plane of the drive wheel is below the upper plane of one or both of the idlers. However, the defendants' interpretation in which the drive wheel bears the weight of the vehicle would mean that the lower plane of the drive wheel is already at the ground level and hence below not just the upper plane of the idlers, but also the lower plane of the idlers. If I were to adopt the defendants' construction, not only would claims 26 and 27 be redundant, but they would introduce an ambiguity by adding a limitation that is actually broader than the scope of claims on which they depend.

[187] Several claims of the 509 Patent likewise suggest that the drive wheel therein need not carry weight. For example, claim 9 is similar to claims 19 and 29 of the 562 Patent:

> 9. A track assembly as defined in any one of claims 1 to 8, wherein the drive wheel is in rolling contact with the inner surface of the ground engaging run.

[188] This indicates that the term "drive wheel" does not imply rolling contact with the ground engaging run of the endless track, and hence does not imply weight bearing.

[189] Also, claims 23 and 24 of the 509 Patent add the same limitations as do claims 26 and 27 of the 562 Patent. Therefore, the comment in paragraph [186] applies equally to the 509 Patent.

[190] In addition, many other claims of the 509 Patent would be redundant if the drive wheel were construed to be weight bearing. For example, claim 5 specifies that the axis of the drive wheel is directly above the load bearing section of the ground engaging run, and claim 30 specifies that the load bearing section is located between the front and the rear of the drive wheel. These limitations would already be present with the drive wheel as defined by the defendants. Also, the limitations of claims 1 to 4 concerning the longitudinal extent of the load bearing section would likewise be present with the drive wheel as defined by the defendants.

[191] In my view, the claims in issue state explicitly that the function of the driving/drive wheel is to impart motion to the endless track. No other function is expressed, and in my view, no other function is implied. I do not agree that there is ambiguity in the term "driving wheel" sufficient to have reference to the embodiment described in the disclosure to limit its scope.

[192] It is curious to me that Mr. Leblanc found the term "driving wheel" in the 294 Patent to be ambiguous and requiring reference to the disclosure, but he found the term "drive wheel" in

the 562 and 509 Patents to be clear. This is especially curious in view of the fact that the conclusion he reached on construction of the two terms was the same. Camso cited several examples of the term “drive wheel” being used to describe a wheel that imparts motion to an endless track but does not bear weight: Canadian Patent No. 1,268,803 published in 1990; US Patent No. 5,370,198 published in 1994; Canadian Patent No. 2,345,819 published in 2001; Canadian Patent No. 2,800,044 published in 2014. This last patent was issued to the defendant Soucy. I acknowledge that this patent is very recent, but the Court heard no evidence that the meaning of “drive wheel” had evolved.

[193] The defendants also argue that an arrangement in which the drive wheel is off the ground is inherently unstable. A track assembly with a longitudinal curve in its bottom run to reduce its contact patch requires an anti-rotation system to maintain the proper orientation of the assembly if the drive wheel is not on the ground. This much I accept. The defendants further argue that the system described in the disclosure, and mentioned in paragraph [11] above, is not such an anti-rotation system, and therefore the patented invention will not work properly if the drive wheel is not on the ground. I must confess that I do not understand the distinction that the defendants attempt to draw between the rubber damping element described in the patents in suit and the anti-rotation system that is required when the drive wheel is off the ground. In my view, contrary to the defendants’ position, the disclosure does indeed describe the required anti-rotation system which ensures that the leading and trailing sections of the bottom run of the endless track stay out of contact with the ground, thus ensuring that the contact patch remains small.

[194] But even if no anti-rotation system were described in the disclosure, I would not conclude that the driving/drive wheel must bear weight. This would place far more importance on the anti-

rotation system than is justified in the context of the patents in suit. Firstly, as indicated above, the need for an anti-rotation system was part of the common general knowledge. The skilled person knew such a system would be needed and did not need inventive ingenuity to design one. Secondly, none of the claims in issue concerns any kind of anti-rotation system (the next section addresses construction of the term "rod used for direction" which Camso asserts concerns an anti-rotation system).

[195] Another point asserted by the defendants in support of the argument that the driving/drive wheel must bear the weight of the ATV is that the frame described in the disclosure to fix the relative positions of the idlers and the drive wheel would not be adequate for supporting weight. That frame would have to undergo a major redesign to support the weight of the ATV. I agree. However, such a redesign would not require any inventiveness. For example, the frames of the Tatou 1 and Tatou 2 kits, which both bear weight, were known to the skilled person.

[196] Another argument by the defendants to support their construction of the terms "driving wheel" and "drive wheel" is based on evidence that the claims of the patents in suit were substantially amended during prosecution of the underlying patent applications, and that this was done with a view to covering the defendants' products and preparing for litigation. This evidence was introduced at trial under reserve of Camso's objection that it was not admissible.

[197] I find it unnecessary to consider either the history of claims that were pending in these patent applications, or Camso's motivation in amending them. No such evidence can be relevant to construction of the claims. As regards amendments to claims made during prosecution of the patent applications, the SCC has been clear that such evidence is not relevant to claim construction: *Free World Trust* at paras 61-67. As regards Camso's motivation to draft claims

that cover the defendants' products, the defendants might argue that this has resulted in claims that are invalid, but it is likewise irrelevant to claim construction. A patent applicant is perfectly entitled, and indeed is well-advised, to draft patent claims with an eye on competitors' products. The limitation is that the applicant must respect all of the requirements for valid claims.

(b) *Rod used for direction*

[198] Claim group 294:96 in the 294 Patent specifies that the track assembly is connected to a body of the ATV via a rod used for direction. This term appears nowhere else in the claims in issue.

[199] There seems to be no dispute that this term is sufficiently ambiguous to justify recourse to the disclosure to construe it. Upon review of the disclosure, Mr. Kittel opined that the rod used for direction could be either of two elements: (i) conventional rod 157, which is for steering the front assembly (sometimes called a tie rod); or (ii) rod 112, which is the rod referred to in paragraph [11] above as part of the anti-rotation system. So, the issue is whether "direction" in this term refers to steering or anti-rotation.

[200] Mr. Kittel concluded that the rod used for direction refers to the anti-rotation system rather than steering. The principal reason he gave for this conclusion was that the alternative, the conventional rod 157 used for steering, is not part of the patented track assembly and is not even in contact with the track assembly.

[201] I disagree. I prefer the defendants' assertion that the rod used for direction is conventional rod 157. I am convinced mainly by the fact that the disclosure refers explicitly to the conventional rod 157 as being "used for direction." I would need something clear to not

follow such an indication of what is meant by "rod used for direction." In my opinion, the fact that this rod is not part of or in contact with the track assembly is not sufficient. I agree that there remains some ambiguity about defining the track assembly and the ATV being connected "via a rod used for direction," but conventional rod 157 is indeed connected, albeit indirectly, to both the body of the ATV and the track assembly.

[202] The main practical effect of this construction of claim group 294:96 is that it can encompass only front (steered) track assemblies.

(c) *Load bearing section, intermediate section, ground-contacting area*

[203] The term "load bearing section" appears in independent claims 1, 33 and 76 of the 509 Patent. Independent claim 54 of the 509 Patent uses the term "intermediate section" instead. Independent claim 108 of the 509 Patent uses the term "ground-contacting area." None of these terms is used in the 294 Patent, but the term "load bearing section" appears in claim group 562:15 of the 562 Patent.

[204] Though the exact wording defining the load bearing section varies, all of the claims that use this term specify that (i) it is located between the leading idler and the trailing idler, and (ii) it transfers to the ground surface a major portion of the load carried by the track assembly. In addition, claims 1, 33 and 76 of the 509 Patent specify that the longitudinal extent of the load bearing section does not exceed the diameter of the drive wheel.

[205] The "intermediate section" in claim 54 of the 509 Patent is defined as (i) being located between the leading idler and the trailing idler, and (ii) having a longitudinal extent not exceeding a diameter of the drive wheel. This is similar to the load bearing section as defined in

claims 1, 33 and 76 of the 509 Patent except that it need not transfer to the ground surface a major portion of the load carried by the track assembly.

[206] The "ground-contacting area" in claim 108 of the 509 Patent is defined as (i) being in contact with hard horizontal ground and (ii) having a longitudinal extent not exceeding a diameter of the drive wheel. Like the intermediate section, this term need not transfer to the ground surface a major portion of the load carried by the track assembly.

[207] Clearly, the longitudinal extent of the load bearing surface depends on the hardness of the ground. In deep snow, much of the length of the track assembly would be in contact with the ground bearing some weight. The parties appear to be agreed that the longitudinal extent of the load bearing surface is to be determined based on hard horizontal ground, even for claims other than claim 108 of the 509 Patent which specifically mentions such a surface.

[208] Some of Mr. Leblanc's testimony suggested that he believed there could be more than one load bearing section. All of the claims that include a load bearing section or an intermediate section define it as being one of three sections into which the ground engaging run of the endless track is divided. The other sections are the leading section and the trailing section. Therefore, there is only one load bearing section (or intermediate section) in the ground engaging run, and it is located between the leading and trailing sections.

[209] As regards the other requirements of the load bearing section, there does not seem to be any difficulty construing the "longitudinal extent" of the load bearing section or the "diameter of the drive wheel." Regarding "a major portion of the load," I find that this refers to the majority (or more than half) of the load carried by the track assembly.

[210] The “intermediate section” is not defined in terms of the load carried by the track assembly. Mr. Leblanc recognized this, so he defined the limits of the intermediate section by the locations at which the endless track makes contact, and then loses contact, with the drive wheel. In response to a question from the Court, he seemed to acknowledge that there is no support in the disclosure for a construction of “intermediate section” on this basis. In my view, this term is intended to be construed broadly. It encompasses any section of the ground-engaging run between the front and rear idlers that is located behind the leading section and forward of the trailing section, and which is no longer, longitudinally, than the diameter of the drive wheel.

[211] The “ground-contacting area” is defined in terms of the longitudinal extent being no more than the diameter of the drive wheel. Like the intermediate section, it has no requirement to bear the load. However, the reference to ground contact indicates that it is limited to the extent that it is in contact with the ground. There can be portions of the ground-engaging run that are in contact with the ground but do not bear substantial weight.

(d) *Stiffening rods, stiffening members, stiffening inserts*

[212] All of the claims in issue of the 294 Patent specify an absence of “stiffening rods extending in a transversal direction of the endless track.”

[213] All of the claims in issue of the 562 Patent include a similar limitation except that the word “rods” is replaced by “members” (independent claims 1, 13, 43, 53 and 101) or “inserts” (independent claims 102, 111 and 146). Moreover, the absence of such elements is limited to certain locations on the endless track where a drive projection (or lug) registers with a traction projection:

- “longitudinally spaced locations at which a drive projection registers with a traction projection” (independent claims 1 and 13);
- “areas of the endless track where a drive lug registers in a longitudinal direction of the endless track with a traction projection” (independent claims 43 and 53);
- “a portion of each track segment between the drive projection and the traction projection” (independent claims 101 and 146);
- “areas of the endless track where a given one of the drive projections registers in the longitudinal direction of the endless track with a given one of the traction projection” (independent claims 102 and 111).

[214] The independent claims of the 509 Patent do not include stiffening rods (or members or inserts). However, claim groups 509:15, 509:18, 509:20, 509:21 define the absence of stiffening rods extending in a transverse direction of the endless track. Claim group 509:18 specifies that the absence of such elements is limited to the lateral edge portions of the endless track. Claim group 509:21 specifies that the absence of such elements is limited to locations of the endless track at which a drive projection registers with a traction lug.

[215] The only aspect of the foregoing about which the parties disagree is Mr. Kittel’s construction of “inserts.” He stated that this word refers to a stiffener that “could be inserted into the trackbelt post-production rather than being molded into the trackbelt as is typically done.” Mr. Leblanc criticized this construction on the basis that the skilled person knew that it is impossible to insert anything into the rubber of an endless track belt once it has been vulcanized as part of the production process. Mr. Kittel explained that it was known to add stiffeners to

endless tracks after production, but Mr. Leblanc retorted that such stiffeners were on the outside of the belt and were not inserts.

[216] In my view, this debate was less about a real dispute on claim construction, and more about an argument about Mr. Kittel's understanding of the practicalities of endless track production. Accordingly, I need not resolve any dispute on claim construction here.

[217] I understand a "rod" to be a slender, rigid bar. A "member," because of its function of stiffening and its transverse length, must also be slender and rigid. The same is true of "insert," though that word implies an element that it inside the endless track belt (which is not a requirement for a rod or a member).

[218] While some of the claims exclude transverse stiffeners entirely, others limit the exclusion to certain locations. For this latter group of claims, stiffeners could still be present, though not (i) where drive projections (or lugs) register (are co-located) with traction projections (or lugs), or (ii) at the lateral edge portions of the endless track.

[219] Of course, the exclusion of stiffeners from the endless track is to permit it to bend transversally, which can have two benefits: (i) reducing the contact patch transversally, at least on hard, flat ground, thus reducing the required steering effort, and (ii) permitting the endless track to conform to a profile of the ground for improved traction on uneven surfaces.

(e) *ATV*

[220] This is another element about which there is no disagreement on construction. The parties agree that an ATV is a small vehicle for off-road use. Based on the August 2003 date for

construction of the claims, the parties agree that "ATV" as used in the patents in suit includes the 4-wheeled straddle seat vehicles with handlebars that are currently known as ATVs, but also includes ATCs (the 3-wheeled vehicles that preceded ATVs) and UTVs (the side-by-side vehicles with a steering wheel that were developed in the late 1990s and early 2000s).

[221] Many of the claims in issue define an ATV. Many other claims in issue define instead "a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces." This is clearly intended to be a broader term than "ATV" since many dependent claims narrow it by specifying that the vehicle is an ATV. In other claims, ATV or the broader term are narrowed by requiring that the steering mechanism have handlebars and/or that the vehicle include a seat that is straddled by a driver.

[222] I have chosen to discuss this element in this section relating to disputed claim elements because Mr. Leblanc's expert reports suggest a meaning different from the construction he had in his testimony at trial, and different from the position now taken by the defendants. I am not concerned that he or the defendants appear to have changed their view. I am generally pleased when one party alters its position to align with that of its opponent.

[223] The reason for my concern is that Mr. Leblanc's apparent change in position was not acknowledged or explained. In his first expert report, he was comfortable referring to a definition of ATV that excluded UTVs. It appears that this definition was based on modern use in which "UTV" is understood to be distinct from "ATV." Without stating so explicitly, he strongly suggested that he agreed with this definition for the purposes of claim construction. Neither of his subsequent expert reports indicated otherwise. It was only at trial that his real position

became clear. No explanation was provided for this inconsistency. He simply indicated that he agreed that, at the date for claim construction, the term "ATV" encompassed UTVs.

[224] The problem is that, in the absence of an acknowledgement that Mr. Leblanc's opinion did in fact change, he risks leaving the impression that he always had this opinion, and that his reference to a narrower definition of "ATV" in his expert reports was an attempt to mislead Camso and the Court as to his understanding of "ATV."

[225] In the end, I do not believe there has been any bad faith here. But I think the evolution in Mr. Leblanc's opinion reflects a modification in the defendants' counsel's position that was adopted by Mr. Leblanc. Such adjustments can result from the close relations between experts and counsel during trial. I infer from this that Mr. Leblanc's opinion was affected, at least to some extent, by the interests of the defendants. This negatively affects my view of Mr. Leblanc's independence.

(2) Claim Construction of the 294 Patent

[226] Having now considered construction of the claim elements that are in dispute, I turn to construction of the claims in issue, including elements thereof that are not in dispute, beginning with the 294 Patent.

(a) *Independent Claims*

[227] Claim 1 of the 294 Patent is reproduced again here for convenience:

> 1. An endless track for a track assembly to provide traction to an all-terrain vehicle (ATV), the track assembly being mountable to the ATV in place of a ground-engaging wheel, the track assembly comprising a plurality of track-contacting wheels for

> contacting the endless track, the plurality of track-contacting wheels including a driving wheel to impart motion to the endless track, the endless track comprising:
>
> i) an inner side for facing the plurality of track-contacting wheels; and
>
> ii) a ground-engaging outer side for engaging the ground;
>
> the endless track being free of stiffening rods extending in a transversal direction of the endless track.

[228] The "**endless track**" is the track belt, and the "**track assembly**" is the group of components that it surrounds and which support it.

[229] As indicated above, the parties are agreed that "**ATV**" encompasses various kinds of vehicles for off road use, including UTVs. A "**ground-engaging wheel**" is a conventional wheel and tire arrangement that is replaced by a track assembly.

[230] The "**plurality of track-contacting wheels for contacting the endless track**" is a self-explanatory part of the track assembly. It may be two or more wheels. It includes a driving wheel, as construed earlier. Though no other track-contacting wheels are identified in claim 1, some dependent claims of the 294 Patent (*e.g.* claim 18) define one or more "**idler wheels**." Since dependent claims are intended to define a subset of the embodiments encompassed by the claims on which they depend, it follows that claim 1 also encompasses an assembly comprising one or more idler wheels.

[231] The endless track is defined to have an "**inner side**" facing the track-contacting wheels of the track assembly, and an "**outer side**" for engaging (contacting) the ground.

[232] The other independent claims in issue of the 294 Patent contain no additional elements that require discussion on the issue of construction.

(b) *Claim Groups 294:2, 294:3 and 294:4*

[233] I now turn to construction of the various dependent claim groups identified in the table provided at paragraph [73] above.

[234] Claim group 294:2 defines the transversal flexibility of the endless track as allowing it "**to conform to a profile of the ground**." Because this claim group refers to the flexibility of the endless track in a transverse direction, it appears to allude to the absence of stiffening rods. Aside from that, claim group 294:2 adds little limitation. Claim group 294:3 specifies that the profile of the ground includes a "**depression**." This excludes other types of profile of the ground such as a bump. Claim group 294:4 specifies that a central portion of the endless track, transversally aligned with the driving wheel, may "**contact the depression**." This claim group adds specificity to the degree of conformity to the ground profile that is contemplated.

(c) *Claim Group 294:20*

[235] Claim 20 is dependent on claim 19, which is dependent on claim 18, which itself is dependent on any one of claims 15 to 17, all of which are dependent on claim 14. Claim 14 is dependent on any one of claims 6 to 13, and claim 6 is dependent on any one of claims 1 to 5. Accordingly, the additional limitations of claims 6, 14, 15 (and/or 16), 18 and 19 must be construed in order to construe claim 20. The same idea applies to the other claims of claim group 294:20.

[236] Claim 6 introduces a plurality of "**traction projections**" distributed longitudinally on the outer side of the endless track. These give the endless track belt the ability to grip the ground in order to propel the vehicle to which the track assembly is attached. Claim 14 introduces a plurality of "**inner lugs**" distributed longitudinally on the inner side of the endless track. These are simply protrusions. No indication is given at this stage as to their purpose or their number. Claim 15 specifies that the inner lugs are arranged into "**a plurality of rows of lugs spaced apart in the transversal direction of the endless track**" and the lugs of each row being "**spaced apart in the longitudinal direction of the endless track**." This introduces an indication of the arrangement of the inner lugs, but not their purpose. Claim 16 specifies that one of the rows of lugs acts as "**drive lugs**" to engage the driving wheel. This indicates the purpose of some of the lugs: to facilitate the driving wheel to impart motion to the endless track. Claim 18, as alluded to above, defines one of the track-contacting wheels as an "idler wheel" adjacent to which a row of lugs identified as "**guide lugs**" is positioned. Guide lugs serve to guide the endless track in its motion about the track assembly. An idler wheel is a wheel that does not transmit power (as does the driving wheel). Claim 19 defines first and second rows of guide lugs between which the idler wheel passes.

[237] Finally, claim group 294:20 defines a second idler wheel which is spaced apart transversally from the first, and which passes between third and fourth rows of guide lugs.

(d) *Claim Groups 294:22 and 294:23*

[238] Claim 22 is dependent on claim 21. Claim 21 defines two idler wheels, but unlike in claim 20, they are spaced apart longitudinally. Claim 21 also specifies that the "**axis of rotation**" of the driving wheel is located longitudinally between the axes of rotation of the two idlers. This

places one of the idler wheels forward of the driving wheel and the other idler wheel to the rear of the driving wheel. The other claims of claim group 294:22 depend on claims that correspond to claim 21.

[239] Claim group 294:22 specifies that "**the axis of rotation of the driving wheel is located closer to the axis of rotation of the second idler wheel than to the axis of rotation of the first idler wheel in the longitudinal direction of the track assembly**." This places one of the idler wheels closer than the other to the driving wheel, though without indicating which one is closer.

[240] Claim group 294:23 is dependent on claim group 294:22 and specifies that "**the first idler wheel is located in a front of the track assembly and the second idler wheel is located in a rear of the track assembly**." This locates the first and second idlers, respectively, at the front and rear of the track assembly. The front and rear of the track assembly are determined based on the normal direction of movement of the ATV to which it is to be attached. Claim group 294:23 effectively defines the idler wheel at the rear of the track assembly to be closer to the driving wheel than is the idler wheel at the front.

(e) *Claim Group 294:63*

[241] Claim 63 is dependent on claim 60. Claim 60 is dependent on any one of claims 57 to 59, and all of these are dependent (directly or indirectly) on independent claim 56. Claim 56 defines a track assembly having many of the same elements as in claim 1, but it also specifies that the plurality of track-contacting wheels includes an idler wheel. Claims 57 to 59 add limitations similar to those in claims 21 to 23. Claim 60 defines the track assembly to comprise "**a frame interconnecting the first idler wheel and the second idler wheel**." This frame is not further

defined. In my view, it should be construed broadly so as to encompass any rigid structure that positions the idler wheels relative to one another. The other claims of claim group 294:63 depend on claims that correspond to claim 60.

[242] Claim group 294:63 specifies that the frame comprises first and second "**arms**," and that the second arm is shorter than the first. An arm is any portion of the frame that extends from one point to another.

(f) *Claim Groups 294:66, 294:67 and 294:68*

[243] Claim group 294:66 is dependent on several claims including claim group 294:63. It defines the track assembly to comprise "**a tension adjusting mechanism mounted to the frame for adjusting a tension of the endless track**." This claim group refers to a mechanism for ensuring that the endless track has proper tension to ensure that it remains properly mounted on the track assembly.

[244] Claim group 294:67 is dependent on claim group 294:66 and defines the tension adjusting mechanism as being "**configured to adjust a position of a given one of the first idler wheel and the second idler wheel for adjusting the tension of the endless track**." This claim group defines how the tension adjusting mechanism works, by specifying that the position of one of the idler wheels is adjusted.

[245] Claim group 294:68 is dependent on claim group 294:67 and specifies that "**the given one of the first idler wheel and the second idler wheel is the first idler wheel**." This provides that it is the first idler which is adjusted to maintain proper tension in the endless track. Since claim 59 and its corresponding claims identify the first idler as being located at the front of the

track assembly, it would seem that claim group 294:68 is intended to define the tension adjusting mechanism as being configured to adjust the position of the front idler. I note that the multiple dependency of claim group 294:68 does not necessarily include claim 59 and its corresponding claims. Accordingly, there are permutations of claim group 294:68 in which the first idler wheel is not defined as being located at the front of the track assembly. Nevertheless, I maintain my view that claim group 294:68 is intended to refer to the front idler wheel.

(g) *Claim Groups 294:91, 294:92 and 294:94*

[246] Claim group 294:91 defines an "**upper run**" and a "**lower run**" of the endless track extending, respectively, over and under the driving wheel between the idlers. Claim group 294:91 also specifies that the lower run is longitudinally curved between the axes of rotation of the idlers. This curve results in only a limited portion of the lower run being in contact with the ground.

[247] Claim group 294:92 also defines an "upper run" and a "lower run" of the endless track extending, respectively, over and under the driving wheel between the idlers. This claim group specifies that "**in the longitudinal direction of the track assembly, a lowest segment of the lower run of the endless track is located where the driving wheel is located**." Since the lowest segment of the lower run is where the endless track contacts the ground, I construe this term to mean that the area of ground contact is, longitudinally, at least in part under the driving wheel.

[248] Claim group 294:94 is dependent on several claims, including claim groups 294:91 and 294:92. It defines the track assembly to be "**configured to press onto the ground a limited**

portion of the lower run of the endless track that is located where the ground-engaging wheel would contact the ground if the ground-engaging wheel was mounted to the ATV in place of the track assembly." This claim group is similar to claim group 294:92 except that the reference location for the ground contact is not the driving wheel but rather the ground-engaging wheel which is replaced by the track assembly. In the normal situation where the driving wheel is mounted to the ATV in place of the ground-engaging wheel, claim group 294:94 will have substantially the same scope as claim group 294:92.

(h) *Claim Groups 294:95 and 294:96*

[249] Claim group 294:95 specifies that the track assembly is "**steerable to steer the ATV on the ground**." In respect of a normal ATV, this refers to a front track assembly.

[250] Claim group 294:96 specifies that "**the assembly is connected to a body of the ATV via a rod used for direction**." This term is construed as discussed in paragraphs [198] to [202] above.

(3) Claim Construction of the 562 Patent

[251] Many of the elements of the 562 Patent are similar or identical to those discussed above in relation to the 294 Patent. I conclude that, subject to my comments otherwise, such similar or identical elements have the same meaning in the 562 Patent as they have in the 294 Patent.

(a) *Independent Claims*

[252] Claim 1 of the 562 Patent is reproduced again here for convenience:

> 1. A steerable endless track for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, the endless track being steerable by changing an orientation of the endless track by a steering mechanism of the vehicle, the endless track comprising:
>
> (a) an outer ground-engaging surface:
>
> (b) an inner surface opposite to the outer ground-engaging surface;
>
> (c) a plurality of drive projections projecting from the inner surface and arranged longitudinally along the track; and
>
> (d) a plurality of traction projections projecting from the outer ground-engaging surface and arranged longitudinally along the track;
>
> the endless track being free of stiffening members extending transversally of the endless track at longitudinally spaced locations at which a drive projection registers with a traction projection.

[253] As regards similar claim elements, it is my view that the "**outer ground-engaging surface**" of the 562 Patent should be given the same construction as the "ground-engaging outer side" of the 294 Patent, and the "**inner surface opposite to the outer ground-engaging surface**" of the 562 Patent should be given the same construction as the "inner side" of the 294 Patent. Also, the "**drive projections**" of the 562 Patent should be given the same construction as the "drive lugs" of the 294 Patent.

[254] Here, it is necessary only to address claim elements that have not yet been discussed. The only such element in claim 1 of the 562 Patent is the definition of the endless track as "**steerable by changing an orientation of the endless track by a steering mechanism of the vehicle**." This definition of steerability is broad but it does exclude so-called skid-steer arrangements in

which steering is accomplished by driving endless tracks on either side of the vehicle at different speeds, like a bulldozer or a tank.

[255] The only element of the other independent claims of the 562 Patent that has not yet been discussed is the "**plurality of track segments following in succession in a longitudinal direction of the endless track, each track segment including a drive projection projecting from an inner surface of the endless track and a traction projection projecting from the outer ground-engaging surface of the endless track, the drive projection registering in the longitudinal direction of the endless track with the traction projection**," as defined in claims 101 and 146. This element introduces the idea of the endless track having track segments, but is not substantially different from claim 1 which defines "longitudinally spaced locations at which a drive projection registers with a traction projection."

(b) *Claim Groups 562:2 and 562:3*

[256] Claim groups 562:2 and 562:3 specify that the drive projections and traction projections, respectively, are "**equally spaced in a longitudinal direction of the endless track**." This limitation is similar to that found in claims 6 and 14 of the 294 Patent, for traction projections and inner lugs, respectively. The main substantive difference is the addition of the word "equally" in the 562 Patent. However, this makes no difference in the present case.

(c) *Claim Group 562:8*

[257] This claim group defines two rows of transversally spaced-apart drive projections projecting from the inner surface of the endless track, in which drive projections from both rows are "**configured to simultaneously engage a drive wheel which imparts motion to the endless**

track." This claim group contemplates that the drive wheel works by engaging drive projections from two rows at the same time.

(d) *Claim Groups 562:9, 562:10 and 562:11*

[258] Claim group 562:9 specifies that the vehicle contemplated is an ATV. Claim group 562:10 specifies that the steering mechanism contemplated has handlebars. Claim group 562:11 specifies that the vehicle contemplated includes a seat that is straddled by a driver of the vehicle. All of these additional limitations encompass a typical ATV as that term is used today. Claim groups 562:10 and 562:11 exclude UTVs.

(e) *Claim Group 562:12*

[259] This claim group simply defines a pair of endless tracks, both as defined in any one of the claims on which it depends.

(f) *Claim Group 562:14*

[260] Claim 14 is dependent on independent claim 13 which claims a steerable track assembly comprising a steerable endless track similar to that claimed in claim 1, and a plurality of wheels for supporting and driving the endless track.

[261] Claim group 562:14 defines spaced-apart leading and trailing idlers and a "**ground engaging run**" extending between them. In my view these leading and trailing idlers should be construed in the same way as the first and second idler wheels located, respectively at the front and rear of the track assembly as defined in claim group 294:23 of the 294 Patent. Similarly, the

ground engaging run should be construed in the same way as the lower run as defined in claim group 294:91 of the 294 Patent, though without the reference to the curve.

[262] Claim group 562:14 also defines "**a drive wheel in driving engagement with the endless track for imparting movement to the endless track**." The construction of this element was as discussed earlier.

(g) *Claim Group 562:15*

[263] Claim group 562:15 is dependent on claim group 562:14 and defines the "load bearing section" discussed above. It also defines "**a leading section extending between the leading idler and the load bearing section, the leading section being oriented such as to converge toward the ground surface when the endless track is in motion and propels the vehicle**" and "**a trailing section extending between the load bearing section and the trailing idler, the trailing section being oriented such as to diverge from the ground surface when the endless track is in motion and propels the vehicle**." These leading and trailing sections constitute the portions of the ground engaging run between the load bearing section and, respectively, the leading and trailing idlers. The converging toward the ground surface of the leading section and the diverging from the ground surface of the trailing section define a ground engaging run with a longitudinal profile which provides a reduced area of contact of the endless track with the ground. This reduced contact area is key to the central goal of the patents in suit of reducing steering effort.

(h) *Claim Group 562:16*

[264] Claim group 562:16 defines first, second and third axes of rotation for the leading idler, trailing idler and drive wheel, respectively. It also specifies as follows: "**a first horizontal distance defined between the first axis of rotation and the third axis of rotation being different from a second horizontal distance defined between the second axis of rotation and the third axis of rotation**." This means that the horizontal distance between the leading idler and the drive wheel is different from that between the trailing idler and the drive wheel, though without indicating which is closer. This is similar to claim group 294:22 of the 294 Patent discussed above except that the measure is "**horizontal distance**" rather than "longitudinal direction." "Horizontal" means parallel to flat ground.

(i) *Claim Groups 562:17 and 562:18*

[265] Claim group 562:17 specifies that the steerable track assembly includes a "**support structure**." This support structure, which is similar to the "frame" defined in claim 60 of the 294 Patent, is defined as having "**a center portion rotatably supported at the third axis of rotation**" and first and second "**support arms**" mounted thereto and "**extending along a radial direction of the drive wheel**" toward, respectively, a leading and a trailing end of the track assembly. The supports arms are substantially the same as the arms defined in claim group 294:63 of the 294 Patent. The term "**radial direction**" defines a direction extending from the axis of rotation of the drive wheel.

[266] Claim group 562:18 specifies that the first and second support arms define, respectively, first and second angles with "**an imaginary horizontal axis which extends through the third**

axis of rotation," and that said angles are different from one another. As in claim group 562:16, "horizontal" means parallel to flat ground.

(j) *Claim Group 562:22*

[267] Claim group 562:22 specifies that "**the load bearing section is located closer to one of the leading and trailing idlers than to the other of the leading and trailing idlers**." Though some of the dependency permutations of claim group 562:22 lack antecedence for the "load bearing section," I conclude that the load bearing section, as defined in claim group 562:15, is intended to be incorporated into claim group 562:22.

[268] The additional limitation of claim group 562:22 is similar to that of claim group 562:16 in that it defines different distances between the drive wheel axis and each of the idlers, though without defining which is closer. The key difference between claim group 562:16 and claim group 562:22 is that the latter references the relative distances to the load bearing section rather than the axis of rotation of the drive wheel.

(k) *Claim Group 562:23*

[269] Claim group 562:23 specifies that one of the support arms is longer than the other. This is similar to claim group 294:63 of the 294 Patent.

(l) *Claim Group 562:25*

[270] Claim group 562:25 specifies that "**the third axis of rotation is located above the first axis of rotation and the second axis of rotation**." This means that the drive wheel axis is

located above the axes of both of the idlers. “Above” is determined based on a vertical line perpendicular to flat ground.

(m) *Claim Groups 562:26 and 562:27*

[271] Claim group 562:26 defines first and second upper and lower horizontal imaginary planes at the peripheries of the drive wheel and one of the idlers, respectively. It specifies that the lower plane of the drive wheel is below the upper plane of the idler. This simply means that the bottom of the drive wheel is below the top of one of the idlers. “Below” is determined, as in claim group 562:25, based on a vertical line perpendicular to flat ground.

[272] Claim group 562:27 is similar to claim group 562:26. It defines first and second upper and lower horizontal imaginary planes being at the peripheries of the drive wheel and the leading idler, respectively, and it also defines third upper and lower horizontal imaginary planes at the peripheries of the trailing idler. Claim group 562:27 specifies that the lower plane of the drive wheel is below the upper planes of both of the idlers.

(n) *Claim Group 562:28*

[273] Claim group 562:28 specifies that “**the plurality of wheels imparts a generally triangular path of travel to the endless track**.” The triangular shape defined in this claim group results from a relatively flat area at or near the ground, and a raised portion as the upper run of the endless track passes over the drive wheel. Because of its dependency on claim group 562:15, which defines leading and trailing sections which, respectively, converge toward and diverge from the ground surface, it is clear that the term “generally triangular” in claim group

562:28 encompasses an assembly in which the lower run of the endless track is not completely flat.

(o) *Claim Group 562:29*

[274] Claim group 562:29 specifies that "**the plurality of wheels define a track supporting and guiding arrangement that is in rolling contact with the inner surface at a plurality of positions, one of said positions being the load bearing section**." As in claim group 562:22, some of the dependency permutations of claim group 562:29 lack antecedence for the "load bearing section," but I conclude that this element is intended to be incorporated into claim group 562:29.

[275] The key aspect of claim group 562:29 is that the endless track is supported and guided at the load bearing section by rolling contact with at least one of the plurality of wheels defined in independent claim 13.

(p) *Claim Group 562:48*

[276] Claim group 562:48 is dependent on claims which define an endless track having drive lugs (or projections) projecting from an inner surface thereof. Claim group 562:48 defines transversally-spaced first and second drive projections which engage a drive wheel simultaneously, similar to claim group 562:8.

(q) *Claim Group 562:110*

[277] This claim group simply defines a set of four endless tracks wherein at least two are as defined in any one of several claims including independent claim 102.

(4) Claim Construction of the 509 Patent

(a) *Independent Claims*

[278] Claim 1 of the 509 Patent is reproduced again here for convenience:

> 1. A track assembly for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, steerable by changing an orientation of the track assembly by a steering mechanism of the vehicle, the track assembly having a leading end and a trailing end and comprising:
>
> a) an endless track having an outer ground engaging surface and an opposite inner surface; and
>
> b) a plurality of wheels for supporting and driving the endless track, the plurality of wheels including:
>
> i) a leading idler and a trailing idler, the leading and trailing idlers being in a spaced apart relationship, a segment of the endless track extending between the leading and trailing idlers defining a ground engaging run, the leading idler having a first axis of rotation, the trailing idler having a second axis of rotation; and
>
> ii) a drive wheel having a third axis of rotation, the drive wheel being in driving engagement with the endless track for imparting movement to the endless track;
>
> the ground engaging run having:
>
> i) a load bearing section located between the leading idler and the trailing idler, the load bearing section transferring to the ground surface a major portion of the load carried by the track assembly, the load bearing section having a longitudinal extent that does not exceed a diameter of the drive wheel;
>
> ii) a leading section extending between the leading idler and the load bearing section, the leading section being oriented such as to converge toward

> the ground surface when the endless track is in motion and propels the vehicle;
>
> iii) a trailing section extending between the load bearing section and the trailing idler, the trailing section being oriented such as to diverge from the ground surface when the endless track is in motion and propels the vehicle;
>
> a first horizontal distance defined between the first axis of rotation and the third axis of rotation being different from a second horizontal distance defined between the second axis of rotation and the third axis of rotation.

[279] This claim is similar to claim group 562:16 of the 562 Patent (when dependent on claim group 562:15) with two important differences:

- This claim does not define the plurality of drive projections, the plurality of traction projections, or the absence of transverse stiffening members at locations where drive projections register with traction projections; and
- This claim specifies that the load bearing section has "**a longitudinal extent that does not exceed a diameter of the drive wheel**."

[280] The terms "longitudinal extent" and "diameter" being easy to understand, and the term "load bearing section" having been construed above, no further discussion of the meaning of this claim is necessary.

[281] The other independent claims in issue of the 509 Patent contain no additional elements that require discussion on the issue of construction.

(b) *Claim Groups 509:2, 509:3 and 509:4*

[282] These claim groups progressively restrict the longitudinal extent of the load bearing section to "**less than the diameter of the drive wheel**" in claim group 509:2, to "**does not exceed a radius of the drive wheel**" in claim group 509:3, and to "**less than a radius of the drive wheel**" in claim group 509:4.

[283] Claim group 509:2 also specifies that the vehicle defined is an ATV "**with a seat straddled by a user and wherein the steering mechanism has handlebars**." This excludes UTVs.

(c) *Claim Group 509:5*

[284] Claim group 509:5 specifies that "**an imaginary vertical axis that intersects the third axis of rotation also intersects the load bearing section**." The scope of this claim is based on a line from the axis of rotation of the drive wheel and extending perpendicular to flat ground passing through some portion of the load bearing section. Essentially, the drive wheel axis must not be horizontally spaced from the load bearing section.

(d) *Claim Groups 509:7 and 509:8*

[285] Claim group 509:7 defines a support structure with a center portion and support arms, similar to that defined in claim group 562:17 of the 562 Patent. Claim group 509:8 defines different angles for the support arms, as defined in claim group 562:18 of the 562 Patent.

(e) *Claim Groups 509:10 and 509:11*

[286] Claim group 509:10 specifies that "**the drive wheel is in overlapping relationship with one of the leading and trailing idlers, when viewed in a plane that is normal to the third axis of rotation**." This means that the drive wheel overlaps one of the idlers when the track assembly is viewed from the side.

[287] Claim group 509:11 is similar to claim group 509:10 but specifies that the drive wheel overlaps the trailing idler.

(f) *Claim Groups 509:12 and 509:13*

[288] Claim group 509:12 specifies that the load bearing section is closer to one of the idlers than the other. This is similar to claim group 562:22 of the 562 Patent. Claim group 509:13 specifies that one of the support arms is longer than the other. This is similar to claim group 562:23 of the 562 Patent.

(g) *Claim Group 509:15*

[289] This claim group specifies that the endless track is free of transverse stiffening rods. This limitation is similar to one of the elements defined in claim 1 of the 294 Patent.

(h) *Claim Group 509:17*

[290] This claim group introduces drive lugs projecting from the inner surface of the endless track. These drive lugs are similar to those defined in claim 16 of the 294 Patent.

(i) *Claim Group 509:18*

[291] Claim group 509:18 specifies that "**the endless track has a pair of opposite lateral edge portions and a central portion between the lateral edge portions, the opposite lateral edge portions being free of stiffening rods extending in a transverse direction of the endless track**." This limitation divides the endless track into three longitudinally-extending portions, a central portion, and two lateral portions on either side. In this claim group, the absence of transverse stiffening rods applies only to the lateral portions. Accordingly, the central portion may still include stiffening rods.

(j) *Claim Groups 509:20 and 509:21*

[292] Claim group 509:20 divides the endless track into segments, each including a drive projection extending inwardly from the inner face for engaging the drive wheel, a traction lug projecting outwardly and registering longitudinally with the drive projection, and no transverse stiffening rod at that registering position. The idea of the endless track having track segments is similar to that discussed earlier in respect of independent claims 101 and 146 of the 562 Patent.

[293] Claim group 509:21 specifies that the endless track has "**a plurality of drive projections longitudinally spaced apart along the track for sequentially engaging the drive wheel such that rotation of the drive wheel imparts motion of the endless track to propel the vehicle**" and "**a plurality of traction lugs projecting from the ground engaging outer face, the traction lugs being longitudinally spaced apart and registering with respective drive projections**," and no transverse stiffening rods at those registering positions. Though it is

phrased differently, I find that claim group 509:21 is substantially the same as claim group 509:20 for the purposes of this case.

(k) *Claim Groups 509:22, 509:23, 509:24, 509:25 and 509:26*

[294] Claim group 509:22 specifies that the third axis is located above the first two. This is similar to claim group 562:25 of the 562 Patent.

[295] Claim group 509:23 defines first and second upper and lower horizontal imaginary planes at the peripheries of the drive wheel and one of the idlers, respectively, and specifies that the lower plane of the drive wheel is below the upper plane of the idler. This is similar to claim group 562:26 of the 562 Patent.

[296] Claim group 509:24 defines three upper and lower horizontal imaginary planes at the peripheries of the drive wheel and both of the idlers, and specifies that the lower plane of the drive wheel is below the upper planes of both of the idlers. This is similar to claim group 562:27 of the 562 Patent.

[297] Claim group 509:25 defines a triangular path of travel of the endless track, similar to claim group 562:28 of the 562 Patent.

[298] Claim group 509:26 specifies rolling contact of the plurality of wheels, including in the load bearing section. This is similar to claim group 562:29 of the 562 Patent.

(l) *Claim Group 509:27*

[299] This claim group specifies that "**the drive wheel has an extent along the third axis of rotation that is less than a transverse dimension of the endless track**." This means that the endless track is wider than the drive wheel.

(m) *Claim Group 509:30*

[300] Claim group 509:30 specifies that "**the load bearing section is located between a frontmost point and a rearmost point of the drive wheel in a longitudinal direction of the track assembly**." I understand this to mean that the load bearing section is located entirely below the drive wheel.

(n) *Claim Groups 509:112, 509:113, 509:114 and 509:132*

[301] The 509 Patent introduces a few claim elements only later in the claims. Claim groups 509:112, 509:113, 509:114 and 509:132 are dependent on several claims including independent claim 108 which defines a track assembly having many of the elements already discussed.

[302] One new element introduced in independent claim 108 is "**when the track assembly is on hard horizontal ground, a ground-contacting area of the endless track in contact with the hard horizontal ground has an extent in the longitudinal direction of the track assembly that does not exceed a diameter of the drive wheel**." This element has been discussed earlier.

[303] Claim group 509:112 specifies that "**the distance between the axis of rotation of the drive wheel and the axis of rotation of the leading idler wheel in the longitudinal direction**

of the track assembly is greater than the distance between the axis of rotation of the drive wheel and the axis of rotation of the trailing idler wheel in the longitudinal direction of the track assembly." Though stated in different words, this claim group defines substantially the same relationship as claim group 294:23 of the 294 Patent.

[304] Claim group 509:113 defines "**a track frame supporting the leading idler wheel and the trailing idler wheel and comprising a first arm extending downwardly and forwardly towards the leading idler wheel and a second arm extending downwardly and rearwardly towards the trailing idler wheel**." The frame defined in this claim group is similar to that defined in claim 60 of the 294 Patent, with the additional limitation that the first arm extends downward and forward towards the leading idler and second arm extends downward and rearward towards the trailing idler.

[305] Claim group 509:114 specifies that the first arm is longer than the second. Though it is defined in different words, this is substantially the same as is claimed in claim group 294:63 of the 294 Patent.

[306] Claim group 509:132 specifies that the steering mechanism defined in claim 108 comprises handlebars. This is similar to claim group 562:10 of the 562 Patent.

(o) *Claim Group 509:133*

[307] This claim group defines a set of traction assemblies wherein at least two are as defined in any one of several claims including claim 108.

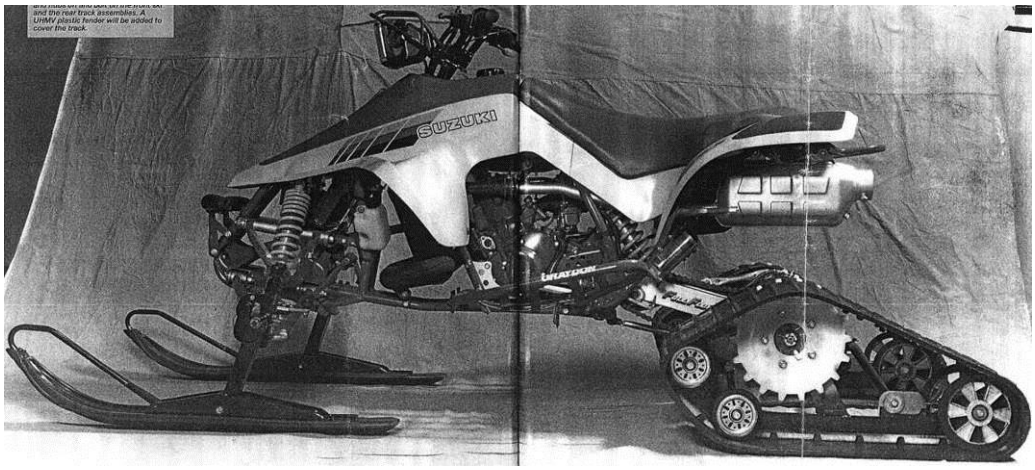
D. *Anticipation and Obviousness*

[308] Because the issues of anticipation and obviousness involve some of the same prior art references, it is convenient to discuss two of these separately first.

(1) Relevant Prior Art

(a) *SCI's Sno-Traxx, Sno-Quad and Quad-Traxx*

[309] As indicated earlier, Mr. Shaw testified concerning his company, SCI, and the track conversion kits it developed and sold in the 1990s. Here is a photograph from the November 1992 edition of *3&4 Wheel Action* magazine displaying a prototype of a product then called Snow-Trax by Mr. Shaw's predecessor company, Valley Cycle:



ATV with the Snow-Trax conversion kit installed

[310] This was a track conversion kit for a 2-wheel drive ATV, with front wheels replaced by skis and rear wheels replaced by track assemblies. The endless track incorporated transverse stiffening rods.

[311] In 1993, as part of an effort to commercialize his kits, Mr. Shaw entered into contact with Camso as a potential supplier of endless tracks. In July 1994, Mr. Shaw and some associates brought a prototype to Plattsburgh, New York to demonstrate to representatives of Camso. Following this meeting, Camso supplied 10 prototype tracks. Though Mr. Shaw's affidavit dated June 8, 2018 states otherwise, he acknowledged at trial that these prototype tracks incorporated stiffening rods.

[312] Later, apparently in an effort to reduce costs, it was decided to remove the stiffening rods for an order of 100 endless tracks that SCI made to Camso in 1995. At trial, these were called the production tracks. The purchase of these production tracks was corroborated by two invoices dated in November 1995. The absence of stiffening rods from the production tracks was confirmed by a technical drawing thereof, as well as recent photographs of one of the production kits from that time showing the track bending transversally in a way that would be impossible for an endless track with stiffening rods. The kit in these photographs is called Sno-Quad.

[313] Mr. Shaw testified, and I accept, that SCI never obtained any endless tracks for its conversion kits after the production tracks supplied by Camso. Mr. Shaw testified that SCI used the production tracks for kits for sale until they ran out, and they never made any further orders, either from Camso or anyone else.

[314] SCI was incorporated in January 1995. Mr. Shaw testified that he created and distributed a brochure and began attending ATV and snowmobile trade shows with his kits. Mr. Shaw's testimony concerning marketing efforts in 1995 is corroborated by a profile in the March 1995 edition of *dirt wheels* magazine and a briefer announcement in the Fall 1995 edition of *Mod*

Stock Competition magazine. A good photograph of SCI's 1995 kit is shown in the March 1995 *dirt wheels* magazine:

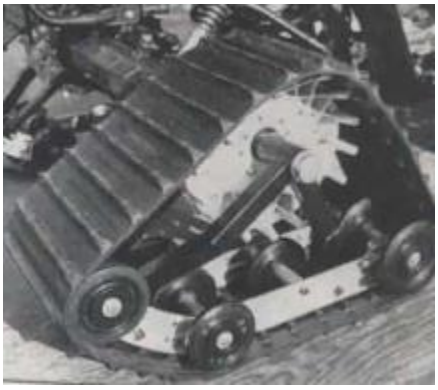
ATV with SCI's 1995 conversion kit installed

[315] Though Mr. Shaw stated in his affidavit and testified at trial that the endless tracks on this kit had no stiffening rods, there was no corroboration of this. Moreover, given that the photograph was presumably taken some time prior to March 1995, it seems unlikely that these were production tracks (invoices for which were issued only in November 1995). I conclude that the endless tracks in the photograph above had transverse stiffening rods. However, I also accept that rodless production tracks were eventually supplied to SCI, and that these were used, shown, and sold publicly.

[316] At trial, Mr. Shaw showed a statement (apparently computer-generated) of sales of his kits, which spanned from 1995 to 1997. Though the provenance of this statement was not clear (Mr. Shaw indicated that he found it the week before trial in some old file boxes and that his administrator at SCI likely created it in the 1990s), the numbers of sales and the dates thereof are consistent with the verifiable information.

[317] It is clear that the bulk of SCI's sales were for 2-wheel drive ATVs. However, the March 1995 *dirt wheels* magazine profile indicated that SCI was developing a kit for a 4-wheel drive ATV, which would have tracks replacing all four wheels. This led to another profile in *dirt wheels* magazine, this in the March 1997 edition, which showed both 2-wheel and 4-wheel kits. Photographs of the 4-wheel kit, described there as a prototype and called Quad-Traxx, are shown here:

ATV with Quad-Traxx conversion kit installed



Front track assembly of Quad-Traxx conversion kit

ATV with Quad-Traxx conversion kit installed (side view)

[318] Mr. Shaw's statements about sales of the 4-wheel kits were uncorroborated and sometimes contradictory. In his affidavit, he stated that sales of the 4-wheel kits amounted to 30% of SCI's ATV track conversion kits. This did not seem possible in view of the numbers of tracks supplied to SCI, and the number that were used for 2-wheel conversions (either sold or tested). In the end, the defendants assert that a mere three kits were sold by SCI for 4-wheel ATVs. Even this limited number is uncorroborated, and relies on Mr. Shaw's testimony.

[319] However, I believe Mr. Shaw's testimony that, during 1997, he was promoting and showing both SCI's 2-wheel and 4-wheel kits, and that he was permitting potential customers free inspection of his kits. I believe this because, having arranged the profile in the March 1997 edition of *dirt wheels* magazine, it would be surprising if he had not engaged in these other promotional activities. Moreover, given that the large majority of the endless tracks that had been supplied to SCI were rodless, it is more likely than not that SCI's 4-wheel kit was shown publicly with rodless tracks. The evidence is undisputed that a potential customer inspecting such a kit would easily have been able to recognize that the endless tracks were rodless.

[320] Mr. Kittel offered his opinion that the endless tracks shown in the photographs of SCI's 4-wheel kits appear to have transverse stiffening rods. He based this opinion on the flatness of the endless track despite its tension. I am not prepared to accept this based on the limited information provided in these photographs, and given that Mr. Kittel's expertise does not reasonably extend to determining whether endless tracks in photographs have stiffening rods. In addition, Mr. Kittel's comfort in opining about the presence of stiffening rods in an endless track based on these grainy photographs seems at odds with his inability, elsewhere in his analysis, to determine (based on the same photographs) whether the axis of the front drive wheel is located closer horizontally to the axis of the rear idler than to the axis of the front idler.

[321] In the end, it is unimportant for me to determine whether the endless tracks in the photographs had rods, since I accept that rodless tracks were used in public showings of the 4-wheel kit. In addition, I accept that the last of the three photographs reproduced above from the March 1997 *dirt wheels* magazine shows the axis of the front drive wheel located closer

horizontally to the axis of the rear idler than the axis of the front idler. This conclusion is based on the relative distance of parallel vertical lines drawn through each of the axes.

[322] As part of his efforts to develop and promote SCI's track conversion kits, Mr. Shaw sought and obtained US Patent No. 6,095,275 (Shaw Patent). This patent issued in 2000 based on an application that was filed in 1998, which itself was based on earlier applications filed in 1995 and 1996. Though this patent shows the 2-wheel kit designed for use in snow, it clearly contemplates use in other conditions, and it contemplates a 4-wheel kit:

> Although the exemplary embodiment is discussed in terms of a snowmobile, it should be understood that tracks designed equivalently for mud, or other adverse conditions can also be used. In addition, the track assembly could be mounted on the front axle of the ATV, resulting in an ATV having tracks at all locations where standard tires were previously mounted. Thus the scope of the invention is not constrained by the type of track employed, or the location of the wheels being replaced.

[323] Both this patent and a set of assembly instructions that were produced by Mr. Shaw show that the 2-wheel kit had means to adjust tension in the endless track by turning a screw at the rear idler.

[324] Because the terms Sno-Traxx, Sno-Quad and Quad-Traxx have not always been used consistently, I will refer hereinafter instead to SCI's 2-wheel kit and 4-wheel kit.

(b) *Brazier Patent*

[325] The defendants rely on US Patent No. 5,607,210 (Brazier Patent) in support of several of their anticipation allegations. This patent issued in 1997. Figures 1 and 2 are representative and are reproduced here:

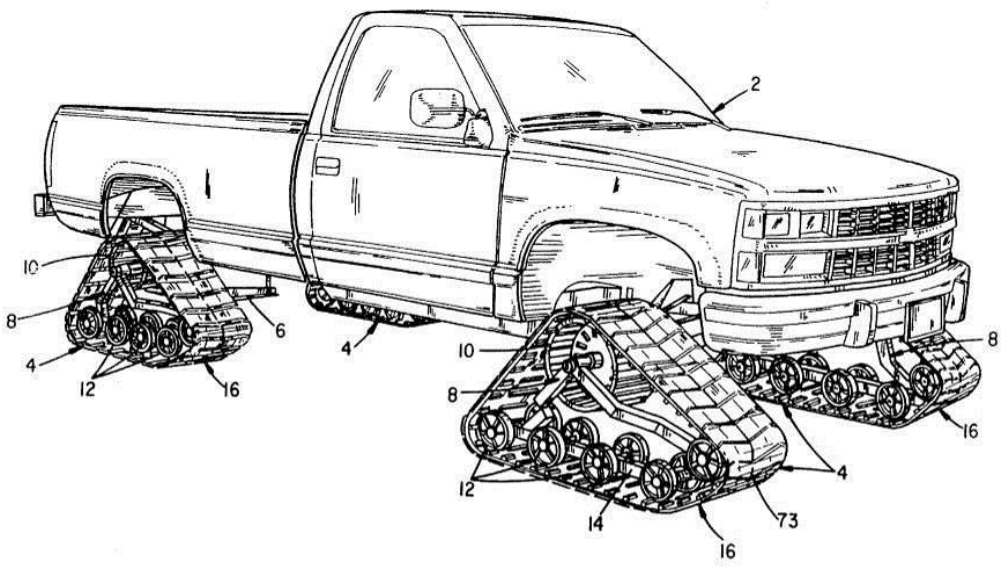


Figure 1: Track conversion kits on a pick-up truck

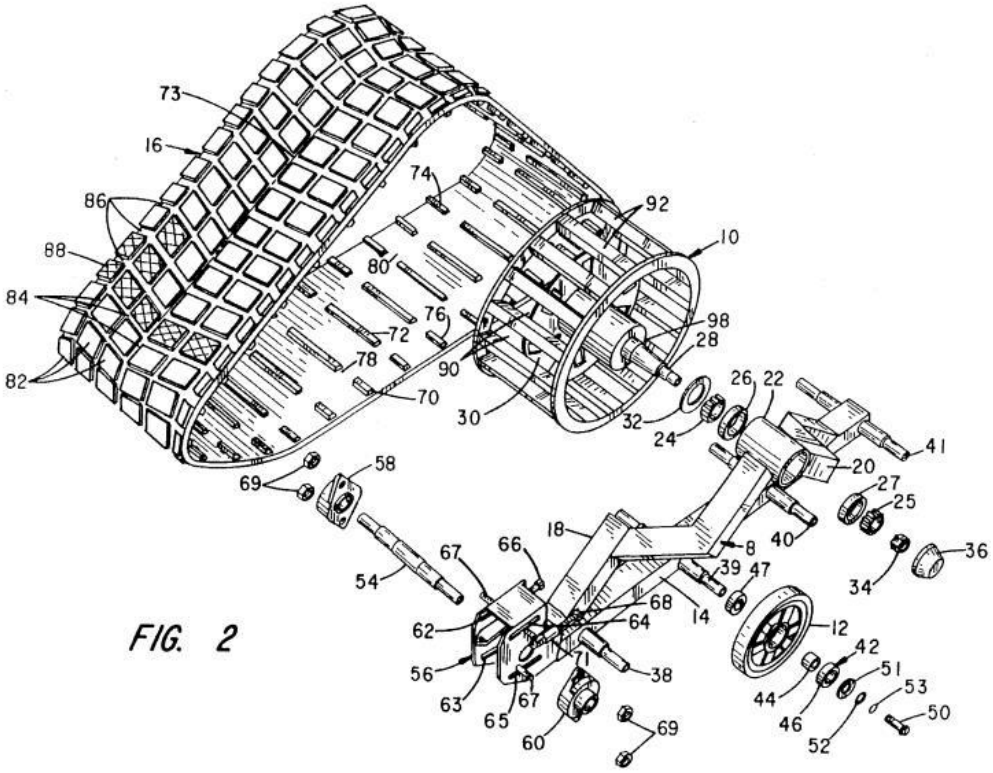


Figure 2: Track conversion kit parts

[326] Though Figure 1 shows the track conversion kit used on a truck, the “Summary of the Invention” section of the disclosure clearly contemplates ATVs as well.

[327] An important debate at trial was whether the Brazier Patent contemplates an endless track that is free of stiffening rods. The patent is silent on the point. Mr. Leblanc noted that rodless tracks were known as an option to the skilled person at the time. Also, Mr. Leblanc noted a reference to the endless track belt in the disclosure of the Brazier Patent which is detailed but which makes no mention of the presence of stiffening rods. Mr. Leblanc inferred from this that the endless tracks contemplated in the Brazier Patent were intended to be free of stiffening rods. He also noted that the W-shaped pattern of the traction lugs in the endless track belt would introduce design constraints that would make it difficult to include transverse stiffening rods. Mr. Leblanc also referred to an alternative embodiment in which traction lugs are riveted to the outside surface of the endless track. He reasoned that the use of rivets would indicate to a skilled reader that the traction lugs were rigid, which would not be the case if the endless track already had stiffening rods.

[328] On the other side of the debate, Mr. Kittel noted the prevalence of endless tracks with stiffening rods at the time, and the advantage of flotation on snow if such rods were used. Mr. Kittel also opined that neither the W-shaped pattern of the traction lugs in the endless track belt nor the alternative embodiment indicates necessarily the absence of transverse stiffening rods. Mr. Kittel's opinion was buttressed by information that a commercial version of the assembly described in the Brazier Patent (which was sold by Mattracks Inc. as the LiteFoot) included endless tracks with stiffening rods at least until 2006.

[329] In my view, there is insufficient evidence to conclude that the Brazier Patent would teach the skilled person of a rodless track. The points noted by Mr. Leblanc suggest, but do not teach, that transverse stiffening rods might be absent.

(2) Analysis of Anticipation Allegations

[330] Provided that the claims are construed as the defendants assert, they acknowledge that most of the claims in issue are valid. The exceptions are claims 1-3, 9-12, 43, 49-52, and 101 of the 562 Patent. The defendants argue that these claims are invalid (for anticipation, obviousness and overclaiming) regardless of which side's claim construction prevails. These are the same claims that the defendants acknowledge are infringed if they are valid (see paragraph [20] above).

[331] In the event that the claims are not construed as they assert, the defendants argue that all of the claims in issue of the 562 Patent, as well as all of the claims in issue of the 294 and 509 Patents, are invalid for anticipation, obviousness, insufficient disclosure, and/or overclaiming.

[332] Since Camso's construction of the claims has prevailed for the most part, it should be understood that the validity of all of the claims in issue are in dispute.

(a) *Brazier Patent*

[333] The defendants argue that the claims of the 562 Patent that are admitted to be infringed are anticipated by the Brazier Patent. They also argue that most of the claims in issue of the 294 and 562 Patents are anticipated by the Brazier Patent if Camso's claim construction prevails.

[334] I can dispose of this argument on the basis that all of the claims in issue of the 294 and 562 Patents define an absence of transverse stiffening rods (or members or inserts), and I am not convinced that the Brazier Patent contains so clear a direction to exclude transverse stiffening

members that a skilled person reading and following the patent would in every case and without possibility of error be led to the claimed invention.

(b) *SCI's Kits*

[335] The defendants argue that the claims of the 562 Patent that are admitted to be infringed are anticipated by SCI's 4-wheel kit. They also argue that most of the claims in issue of the 294 and 562 Patents are anticipated by SCI's 4-wheel and/or 2-wheel kits if Camso's claim construction prevails.

[336] As indicated above, I am convinced that there was public disclosure of SCI's 4-wheel kit with rodless tracks prior to the claim date. I am also convinced that many SCI 2-wheel kits were sold with rodless tracks prior to the claim date.

[337] Based on the seven elements of claim 1 of the 294 Patent as identified in paragraph [69] above, I am satisfied that both SCI's 2-wheel and 4-wheel kits anticipate this claim. I reach the same conclusion for the other independent claims of the 294 Patent except that some of these define sets of endless tracks or track assemblies and are therefore anticipated only by the 4-wheel kits. The remainder of this anticipation analysis is based on the 4-wheel kits.

[338] I am satisfied that SCI's kit incorporates the additional limitation of claim group 294:2 because the absence of stiffening rods would give the endless track flexibility in the transversal direction to conform to a profile of the ground, such as a bump. However, I am not convinced that the same would necessarily apply to conforming to a depression, per claim group 294:3, or contacting the depression, per claim group 294:4, since its idler wheels are located at the edges of the endless track.

[339] Claim group 294:20 defines two transversely-spaced idler wheels each guided by a pair of rows of guide lugs. This limitation is not satisfied by SCI's 4-wheel kit. As shown in the second photograph reproduced at paragraph [317] above, that kit has three parallel idler wheels, but two of them are guided on only one side by a single row of guide lugs.

[340] I am satisfied that SCI's 4-wheel kit incorporates the additional limitations of the following claim groups:

- 294:22 (axis of driving wheel closer to axis of second idler wheel than to axis of first idler wheel),
- 294:23 (first idler wheel at the front of the assembly, second idler wheel at the rear),
- 294:63 (frame with first arm and second arm shorter than the first),
- 294:66 (tension adjusting mechanism mounted to the frame), and
- 294:67 (tension adjusting mechanism adjusts position of an idler wheel).

[341] Claim group 294:68 is not incorporated in SCI's kit because its tension adjusting mechanism adjusts position of the rear idler wheel.

[342] I am also satisfied that SCI's 4-wheel kit incorporates the additional limitations of the following claim groups:

- 294:91 (upper and lower runs of the endless track extending, respectively, over and under the driving wheel from first idler wheel to second idler wheel, the lower run being curved in the longitudinal direction),
- 294:92 (upper and lower runs of the endless track extending, respectively, over and under the driving wheel from first idler wheel to second idler wheel, the lowest segment of the lower run located where the driving wheel is located),

- 294:94 (limited portion of the lower run pressed onto the ground where the ground-engaging wheel would contact the ground),
- 294:95 (track assembly is steerable), and
- 294:96 (track assembly is connected to a body of the ATV via a rod used for direction).

[343] I conclude that all claims in issue of the 294 Patent are anticipated by SCI's 4-wheel kit except claim groups 294:3, 294:4, 294:20 and 294:68.

[344] I turn now to the 562 Patent. All of the claims in issue of this patent define tracks and assemblies that are steerable. Accordingly, only SCI's 4-wheel kit is relevant.

[345] The seven elements of claim 1 of the 562 Patent are listed at paragraph [78] above. In my view, all of these elements are incorporated in SCI's 4-wheel kit. I reach the same conclusion for the other independent claims of the 562 Patent.

[346] I am satisfied that SCI's 4-wheel kit incorporates the additional limitations of the following claim groups:

- 562:2 (drive projections equally spaced),
- 562:3 (traction projections equally spaced),
- 562:8 (two rows of drive projections, one from each row engages drive wheel simultaneously),
- 562:9 (ATV),
- 562:10 (handlebars),
- 562:11 (straddle seat for driver),
- 562:12 (pair of endless tracks),

- 562:14 (plurality of wheels includes leading and trailing idlers spaced apart defining ends of ground-engaging run, and drive wheel),
- 562:16 (horizontal distance from axis of leading idler to drive wheel axis different from horizontal distance from axis of trailing idler to drive wheel),
- 562:17 (support structure having center portion at drive wheel axis, and first and second support arms mounted to center portion extending radially from drive wheel toward leading and trailing ends of track assembly),
- 562:18 (angle of first support arm from horizontal different from angle of second support arm),
- 562:22 (load bearing section located closer to one of the idlers than the other),
- 562:23 (one of the support arms longer than the other),
- 562:25 (drive wheel axis above axes of idlers),
- 562:26 (bottom of drive wheel below top of one of the idlers),
- 562:28 (generally triangular path of travel of endless track),
- 562:29 (wheels in rolling contact with the inner surface at load bearing section),
- 562:48 (two rows of drive projections, one from each row engages drive wheel simultaneously), and
- 562:110 (set of four endless tracks at least two of which are as defined).

[347] Claim group 562:15 is not incorporated because SCI's 4-wheel kit does not have a trailing section diverging from the ground surface when the endless track is in motion. Claim group 562:27 is not incorporated because the bottom of the drive wheel of SCI's 4-wheel kit is not below the top of the rear idler.

[348] I conclude that all claims in issue of the 562 Patent are anticipated by SCI's 4-wheel kit except claim groups 562:15 and 562:27. This conclusion applies to any permutations of claim dependency that do not include either claim group 562:15 or claim group 562:27.

(c) *Tatou*

[349] This section addresses the various versions of the Tatou kit which predate the claim date, including the Tatou 2 as shown in paragraph [152] above (which was the last evolution of the Tatou before the claim date) and the Tatou 1 as shown in paragraph [150] above (which was the version that was tested for the purposes of this case). The endless tracks of the Tatou kits had stiffening rods and therefore do not anticipate any of the claims in issue of the 294 and 562 Patents. However, the defendants assert that, in the event that the claims in issue are construed as Camso urges, many claims of the 509 Patent are anticipated by Tatou.

[350] At paragraph [89] above, I have listed the 22 elements of claim 1 of the 509 Patent. Camso's principal focus in defence of this claim concerns the load bearing section having a longitudinal extent that does not exceed a diameter of the drive wheel, and the leading and trailing sections oriented such as to, respectively, converge toward and diverge from the ground when the endless track is in motion.

[351] The defendants argue that these elements are incorporated in the Tatou 1 on the basis that when an ATV equipped with Tatou 1 track assemblies is at rest, each assembly sits on a small region of the endless track near the kink in the bottom frame member, and the track forward and to the rear of that region rises from the ground. The longitudinal extent of the region on which the assembly sits in this position was measured at less than the radius of the drive wheel.

[352] The measurement of the longitudinal extent of the region bearing the weight of the assembly was first discussed in Mr. Leblanc's first expert report. He described sheets of paper placed on the floor just ahead and just behind the region, and then moved toward one another until further movement was stopped by the endless track in contact with the ground. The gap between the two sheets at this point was measured as the "load bearing section." A concern with this measurement was made apparent only in Mr. Leblanc's second expert report. There, he stated for the first time that the measurements presented in his first expert report were not actually made by him. They were made by representatives of Soucy. In fact, given that he felt the need to redo the test for his second report to verify the results, it appears that he was not even present for the initial measurements.

[353] Because similar results were obtained for Mr. Leblanc's second expert report, as well as during a demonstration during the trial, I am satisfied that the initial results were reliable. However, I am concerned that Mr. Leblanc's first expert report was not frank in that it did not acknowledge that he relied on measurements he could not confirm. This is particularly concerning because, as Mr. Leblanc implicitly acknowledged himself, there was a risk that measurements taken by representatives of a party to the present action would be affected by bias. Good practice demands that an expert before the Court who relies on tests that s/he cannot confirm should acknowledge this fact and explain why such testing should nevertheless be considered reliable.

[354] Camso's main criticism of the measurement of the "load bearing section" of the Tatou 1 is that it applies only when the ATV is stationary and with the steering straight. Mr. Kittel noted that the anti-rotation system of the Tatou 1 was unbiased, meaning that it did not urge the

assembly to sit on the region of the endless track that was subject to Mr. Leblanc's measurements. This was demonstrated during the trial in two ways. When the ATV equipped with the Tatou 1 assemblies was in motion, the assemblies adopted a constant jittery back-and-forth rotating motion about the axis of the drive wheel as the region of the endless track that carried the weight of the assembly moved forward and to the rear. Also, when the steering was moved to the left or right while the ATV was stationary, the assembly once again rotated about the drive wheel axis such that the ground contact region moved either forward or to the rear and the size of the region was significantly increased.

[355] Mr. Kittel noted that, without a biased anti-rotation system to ensure that the region of weight bearing remained near the kink in the bottom frame member, the Tatou 1 did not benefit from the advantage of reduced steering effort that was the focus of the patents in suit.

[356] Camso argues that assessment of validity of the claims in issue should not be limited to when the prior art assembly is stationary and straight.

[357] I accept as a fact that the track assembly of the Tatou 1 has an unbiased anti-rotation system and does not remain on the small "load bearing section" when it is in motion or when it is steered to one side or the other. But in my view, it does not follow from this that the Tatou 1 does not anticipate claim 1 of the 509 Patent. I note that Mr. Kittel's review of the defendants' products for the purpose of assessing infringement is based on measurements of these products' contact with the ground when at rest. In my view, this is the correct approach, and it should apply equally to the assessment of validity. In my view, the intention of the inventors was that the load bearing section should be measured on flat, hard ground and with the ATV stationary. Measurement of the load bearing section while in motion would be impractical.

[358] Further, to dismiss the relevance of the Tatou 1 assembly on the basis that its anti-rotation system was unbiased would place too much importance on the anti-rotation system. I am not convinced that the inventors considered the nature of the anti-rotation system to be of particular interest. This system is mentioned only briefly in the disclosure of the patents in suit, and none of the claims in issue relates to this feature.

[359] Moreover, with regard to the issue of reduced steering effort, the evidence was that the kink was added to the bottom frame member precisely so as to reduce steering effort, particularly on hard surfaces. The fact that this assistance might have been improved by employing a biased anti-rotation system is not relevant to the question of anticipation.

[360] In my view, the Tatou 1 incorporates all of the elements of claim 1 of the 509 Patent, including the load bearing section, leading section, and trailing section as defined therein. I reach the same conclusion for the other independent claims of the 509 Patent. Though some of these other claims use the term "intermediate section" or "ground-contacting section," these other terms are at least as broad as "load bearing section."

[361] I am also satisfied that the Tatou 1 incorporates the additional limitations of the following claim groups:

- 509:2 (load bearing section less than diameter of drive wheel, and ATV with straddled seat and handlebars),
- 509:3 (load bearing section not more than radius of drive wheel),
- 509:4 (load bearing section less than radius of drive wheel),
- 509:5 (drive wheel axis vertically intersects load bearing section),
- 509:12 (load bearing section closer to one idler than the other),

- 509:22 (drive wheel axis above idler axes),
- 509:23 (bottom of drive wheel below top of one of the idlers),
- 509:25 (generally triangular path of travel of endless track),
- 509:26 (wheels in rolling contact with the inner surface at load bearing section),
- 509:27 (drive wheel narrower than endless track),
- 509:30 (load bearing section between frontmost and rearmost points of drive wheel),
- 509:112 (distance between drive wheel axis and axis of leading idler wheel greater than distance between drive wheel axis and axis of trailing idler wheel),
- 509:113 (frame comprises first arm extending downwardly, forwardly towards leading idler and second arm extending downwardly, rearwardly towards trailing idler),
- 509:114 (first arm longer than second arm),
- 509:132 (handlebars), and
- 509:133 (set of track assemblies).

[362] The claim groups that I conclude are not incorporated in the Tatou 1 are:

- 509:7 (support structure having center portion at drive wheel axis, and first and second support arms mounted to center portion extending radially from drive wheel toward leading and trailing ends of track assembly),
- 509:8 (angle from horizontal of first support arm that is different from angle from horizontal of second support arm, dependent on claim group 509:7),
- 509:10 (drive wheel in overlapping relationship with one of the idlers),
- 509:11 (drive wheel in overlapping relationship with trailing idler),
- 509:13 (one support arm longer than the other, dependent on claim group 509:7),

- 509:15 (free of transverse stiffening rods),
- 509:17 (drive lugs),
- 509:18 (free of transverse stiffening rods in lateral edge portions of endless track),
- 509:20 (free of transverse stiffening rods where drive projection and traction lug register),
- 509:21 (free of transverse stiffening rods where drive projection and traction lug register), and
- 509:24 (bottom of drive wheel below top of both idlers).

[363] With regard to claim group 509:7 and the other claim groups that are dependent on it, the Tatou 1 does indeed include a support structure having a center portion rotatably supported at the axis of the drive wheel, and first and second support arms mounted to the center portion and extending toward leading and trailing ends of the assembly. But the support arms of the Tatou 1 do not extend along a radial direction. Rather, they extend from positions offset from the drive wheel axis.

[364] With regard to claim group 509:17, the inner surface of the endless track of the Tatou 1 has a number of lugs, but these are guide lugs, not drive lugs. Since the Tatou 1 uses an external drive system, whereby radial teeth on the drive wheel project through and engage holes in the endless track to impart motion, the drive wheel does not engage any lugs on the endless track.

[365] I conclude that all claims in issue of the 509 Patent are anticipated by Tatou 1 except those listed in paragraph [362].

(d) *Conclusions on Anticipation*

[366] Based on my conclusion above that all claims in issue of the 294 Patent are anticipated by SCI's 4-wheel kit except claim groups 294:3, 294:4, 294:20 and 294:68, I conclude that the following uncancelled claims thereof are invalid for anticipation, except where their dependency includes any of the foregoing claim groups: 2, 22, 23, 29, 49, 58, 59, 63, 66, 67, 73, 91, 92, 94, 95, 96, 100, 105, 108, 109, 115, 133, 134, 136, 137, 138, 142, 162, 163, 170, 171, 175, 178, 179, 185, 203, 204, 206, 207, 208, 212, 213, 217, 220, 221, 227, 245, 246, 248, 249, 250.

[367] Based on my conclusion above that all claims in issue of the 562 Patent are anticipated by SCI's 4-wheel kit except claim groups 562:15 and 562:27, I conclude that the following claims thereof are invalid for anticipation, except where their dependency includes either claim group 562:15 or claim group 562:27: 1, 2, 3, 8, 9, 10, 11, 12, 13, 14, 16, 17, 18, 22, 23, 25, 26, 28, 29, 32, 33, 38, 39, 40, 41, 42, 43, 48, 49, 50, 51, 52, 53, 54, 56, 57, 58, 62, 63, 65, 66, 68, 69, 76, 77, 78, 79, 80, 101, 102, 107, 108, 109, 110, 111, 112, 114, 115, 116, 120, 121, 123, 124, 126, 127, 134, 135, 136, 137, 146.

[368] Based on my analysis above, I conclude that the following claims of the 509 Patent are invalid for anticipation, unless their dependency includes a claim that is not anticipated: 1, 2, 3, 4, 5, 12, 22, 23, 25, 26, 27, 30, 33, 34, 35, 36, 37, 44, 47, 48, 50, 51, 54, 55, 56, 57, 58, 65, 75, 76, 77, 78, 79, 80, 87, 101, 102, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 120, 129, 130, 132, 133.

(3) Analysis of Obviousness Allegations

[369] This analysis follows the approach adopted by the SCC and reproduced at paragraph [121] above.

(a) *Person Skilled in the Art*

[370] The skilled person for the purposes of assessment of obviousness is the same as for the purposes of claim construction. In paragraphs [129] and following above, I have concluded that the skilled person is a mechanical engineer with one or two years of relevant experience or a mechanical engineering technician with five or six years of relevant experience, or a team of such people having the relevant experience. The relevant experience encompasses ATVs and tracked vehicles, sufficient to be able to manufacture a conventional endless track.

(b) *Common General Knowledge*

[371] The common general knowledge for the purposes of assessing obviousness is similar to that for the purposes of claim construction, except only information that predates the claim date can be considered.

[372] ATVs, including 2-wheel drive and 4-wheel drive, were commonly known at the relevant time, as were tracked assemblies for attachment to ATVs in place of conventional wheels to permit circulation on soft or uneven terrain, like snow. Tatou was a particularly well-known brand of such tracked assembly. Though most endless tracks used in snowmobiles included transverse stiffening rods, there were many known advantages and disadvantages to such rods, and it was known that including them was a design choice that was open to the skilled person.

Tracked assemblies typically used a collection of wheels and/or sliders to define the extremities of the assembly and give shape to the endless track. The number and location of such wheels and/or sliders was known to be a design choice. Other design choices open to the skilled person were whether to employ an external drive or an internal drive system, and the number and location of drive lugs used in an internal drive system to engage the drive wheel. Finally, it was commonly known to employ an anti-rotation system of some kind on a tracked assembly for installation on an ATV to ensure that the assembly did not come into contact with the body of the ATV.

[373] More generally, it was common general knowledge that steering effort in a vehicle is dependent on the size of the steered assembly's contact patch with the ground, and specifically the distance from the points of contact with the ground and the steering axis.

(c) *Inventive Concept*

[374] Since the presence of stiffening rods in an endless track was a design choice, the simple idea of removing them was not inventive. In order for such removal to be the basis for a valid invention, it would have to be shown that the inventors had overcome an obstacle to their removal. That does not appear to be the case here.

[375] Camso notes that Soucy itself tried unsuccessfully for some time to remove stiffening rods from the endless tracks it was supplying for the Tatou products. The Tatou tracks were experiencing problems of rod breakage. Camso argues that Soucy's difficulties in this effort are an indication that it was not obvious to remove stiffening rods. I disagree. The fact that the effort was made contributes to the argument that the idea of removing the rods was obvious.

Presumably, the reason that Soucy was unsuccessful is that they did not manage to overcome the various technical obstacles to removing the rods. The patents in suit do not help in that regard. The disclosure provides no information that addresses technical obstacles. Rather, it contributes the idea of removing stiffening rods.

[376] In its argument, Camso also focuses on the ability to use the patented track assembly not just on snow, but also on other types of terrain. Camso characterizes the inventive concept as being related to the possibility of use of the patented assembly during all four seasons. Again, I do not agree. Though the disclosure does indeed contemplate use on harder surfaces as well as snow, there is nothing in the disclosure or in the claims in issue that emphasizes 4-season use as the inventive concept. It seems clear that the market has since moved in the direction of 4-season use, but my impression is that this was not contemplated until sometime after the 2002/2003 period.

[377] Moreover, I have already concluded that the kink in the bottom frame of the assembly of the Tatou 1 was introduced in order to facilitate steering on hard surfaces. This feature was already part of the common general knowledge.

(i) The 294 Patent

[378] The claims in issue of the 294 Patent focus on omitting transverse stiffening rods from the endless track for a track assembly to be mounted to an ATV in place of a ground-engaging wheel. The absence of transverse stiffening rods increases the flexibility of the endless track which reduces the contact patch with the ground transversally, which in turn reduces steering effort.

[379] Claim groups 294:2, 294:3 and 294:4 contemplate another advantage of increased track flexibility: conforming to a profile of ground.

[380] Other dependent claims of the 294 Patent expand on the physical features of the endless track and/or the track assembly.

(ii) The 562 Patent

[381] The inventive concept of the 562 Patent is similar to that of the 294 Patent with the following important differences: (i) the claims in issue of the 562 Patent are limited to steerable tracks and track assemblies (that is, front assemblies) in which the tracks include drive projections (or lugs) and traction projections; (ii) in the 562 Patent, the absence of transverse stiffening rods is replaced by transverse stiffening members or inserts, and such absence is limited to locations where a drive projection registers with a traction projection.

[382] The dependent claims in issue of the 562 Patent further define the endless track or the track assembly that shapes the track or the vehicle to which the track assembly is mounted.

(iii) The 509 Patent

[383] The inventive concept of the 509 Patent concerns a track assembly for an ATV (or small off-road vehicle) but focuses on reducing the contact patch not transversally, by omitting stiffening rods (or members or inserts), but longitudinally, by defining a curved ground engaging run of the endless track having a load bearing section (or intermediate section or ground-contacting area) of limited extent bounded by leading and trailing sections that are not in contact with the ground.

[384] Claim groups 509:2, 509:3 and 509:4 further limit the extent of the load bearing section. Other dependent claims define various components of the track assembly and/or their relative positions. Still other dependent claims return to the theme of omitting stiffening rods.

(d) *Differences between State of the Art and Inventive Concept*

[385] This section requires a comparison of the inventive concepts as discussed in the previous section not just with the common general knowledge as discussed beginning at paragraph [371] above and following, but with all of the prior art.

(i) The 294 Patent

[386] I have concluded above that SCI's 4-wheel kit anticipates all of the claims in issue of the 294 Patent except claim groups 294:3 (endless track can conform to depression), 294:4 (central portion of endless track can contact depression), 294:20 (two transversely-spaced idler wheels each guided by a pair of rows of guide lugs), and 294:68 (tension adjusting mechanism adjusts position of the front idler wheel). Naturally, all of the limitations of the anticipated claims are incorporated in SCI's 4-wheel kit. The differences are found in the four claim groups identified in this paragraph.

[387] I concluded earlier that the Brazier Patent does not anticipate the claims in issue of the 294 Patent because it does not clearly disclose the absence of transverse stiffening rods from the endless track. However, I find that the Brazier Patent does disclose most of the other elements of the claims in issue.

[388] Specifically, I find that the Brazier Patent discloses all of the elements of claim 1 of the 294 Patent except the absence of transverse stiffening rods. I reach the same conclusion with regard to the other independent claims in issue of the 294 Patent. With regard to the dependent claims of the 294 Patent, I find that the Brazier Patent describes the additional limitations of the following claim groups:

- 294:2 (endless track can conform to profile of ground),
- 294:3 (endless track can conform to depression),
- 294:4 (central portion of endless track can contact depression),
- 294:22 (axis of driving wheel closer to axis of second idler wheel than to axis of first idler wheel),
- 294:23 (first idler wheel at the front of the assembly, second idler wheel at the rear),
- 294:63 (frame with first arm and second arm shorter than the first),
- 294:66 (tension adjusting mechanism mounted to the frame),
- 294:67 (tension adjusting mechanism adjusts position of an idler wheel),
- 294:68 (tension adjusting mechanism adjusts position of front idler wheel),
- 294:91 (upper and lower runs of the endless track extending, respectively, over and under the driving wheel from first idler wheel to second idler wheel, the lower run being curved in the longitudinal direction),
- 294:92 (upper and lower runs of the endless track extending, respectively, over and under the driving wheel from first idler wheel to second idler wheel, the lowest segment of the lower run located where the driving wheel is located),
- 294:94 (limited portion of the lower run pressed onto the ground where the ground-engaging wheel would contact the ground),

- 294:95 (track assembly is steerable), and
- 294:96 (track assembly is connected to a body of the ATV via a rod used for direction).

[389] As regards claim groups 294:2, 294:3 and 294:4, I find the transverse space between the edges of the endless track of the Brazier Patent and the idlers is sufficient that, in the absence of stiffening rods, the track would conform to, and potentially contact, a depression. As regards claim group 294:91, I find that the change in direction of the lower run of the endless track as it rises to meet the front idler satisfies the requirement of a longitudinal curve.

[390] The only limitation of the dependent claims that I find absent from the Brazier Patent is in claim group 294:20 (two transversely-spaced idler wheels each guided by a pair of rows of guide lugs). Though there are two parallel idler wheels each guided by a pair of rows of guide lugs, a single wide row of guide lugs acts between the idler wheels to guide both. Accordingly, there are not four rows of guide lugs as defined. This is a result of employing a squirrel cage type of driving wheel, rather than the lateral sprocket arrangement present in SCI's kits and described in the Shaw Patent.

(ii) The 562 Patent

[391] I have concluded above that SCI's 4-wheel kit anticipates all of the claims in issue of the 562 Patent except claim groups 562:15 (trailing section diverging from the ground surface) and 562:27 (bottom of drive wheel below top of both idlers).

[392] With regard to claim group 562:27 (bottom of drive wheel below top of both idlers), I note that Figure 1 of the Shaw Patent shows the bottom of the drive wheel below the top of both leading and trailing idlers:

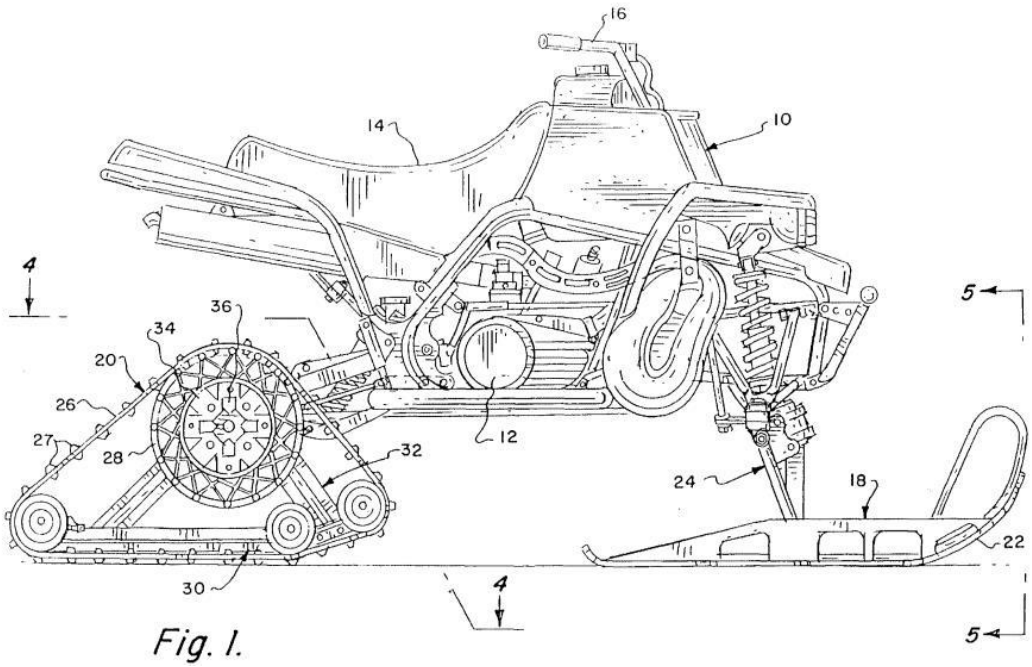


Figure 1: Track conversion kit on an ATV

[393] I concluded earlier that the Brazier Patent does not anticipate the claims in issue of the 562 Patent because it does not clearly disclose the absence of transverse stiffening members (or inserts) from the endless track. However, I find that the Brazier Patent does disclose most of the other elements of the claims in issue.

[394] Specifically, I find that the Brazier Patent discloses all of the elements of claim 1 of the 562 Patent except the absence of transverse stiffening members at locations where a drive projection registers with a traction projection. I reach the same conclusion with regard to the other independent claims in issue of the 562 Patent. With regard to the dependent claims of the 562 Patent, I find that the Brazier Patent describes the additional limitations of the following claim groups:

- 562:2 (drive projections equally spaced),
- 562:3 (traction projections equally spaced),

- 562:9 (ATV),
- 562:10 (handlebars),
- 562:11 (straddle seat for driver),
- 562:12 (pair of endless tracks),
- 562:14 (plurality of wheels includes leading and trailing idlers spaced apart defining ends of ground-engaging run, and drive wheel),
- 562:16 (horizontal distance from axis of leading idler to drive wheel axis different from horizontal distance from axis of trailing idler to drive wheel),
- 562:17 (support structure having center portion at drive wheel axis, and first and second support arms mounted to center portion extending radially from drive wheel toward leading and trailing ends of track assembly),
- 562:18 (angle from horizontal of first support arm that is different from angle from horizontal of second support arm),
- 562:22 (load bearing section located closer to one of the idlers than the other),
- 562:23 (one of the support arms longer than the other),
- 562:25 (drive wheel axis above axes of idlers),
- 562:26 (bottom of drive wheel below top of one of the idlers),
- 562:28 (generally triangular path of travel of endless track),
- 562:29 (wheels in rolling contact with the inner surface at load bearing section), and
- 562:110 (set of four endless tracks at least two of which are as defined).

[395] As regards claim groups 562:10 and 562:11, I find that the Brazier Patent's reference to ATVs implicitly contemplates handlebars and straddle seats for drivers.

[396] The only limitations of the dependent claims that I find absent from the Brazier Patent are in the following claim groups:

- 562:8 (two rows of drive projections, one from each row engages drive wheel simultaneously),
- 562:15 (trailing section diverging from the ground surface),
- 562:27 (bottom of drive wheel below top of both leading and trailing idlers), and
- 562:48 (two rows of drive projections, one from each row engages drive wheel simultaneously).

[397] At paragraph [86] above, I mentioned that a request for re-examination of the 562 Patent was considered by the Re-Examination Board (and that it concluded that a substantial new question of obviousness was raised in respect of all of the claims in issue), but that the re-examination was stayed before any further steps were taken. The key prior art reference cited by the Re-Examination Board was US Patent No. 6,006,847 (Knight Patent). That patent was issued in 1999 and concerned an endless track structure for an ATV. Figures 14a and 16 from that patent are reproduced here:

FIG. 14a

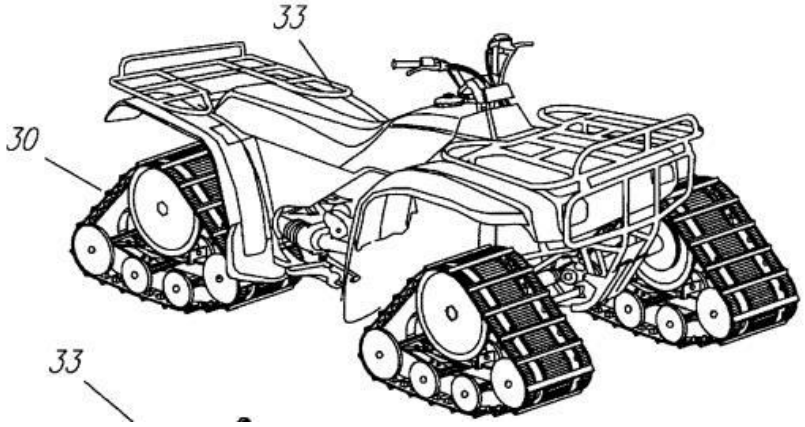


Figure 14a: ATV with track conversion kits

FIG. 16

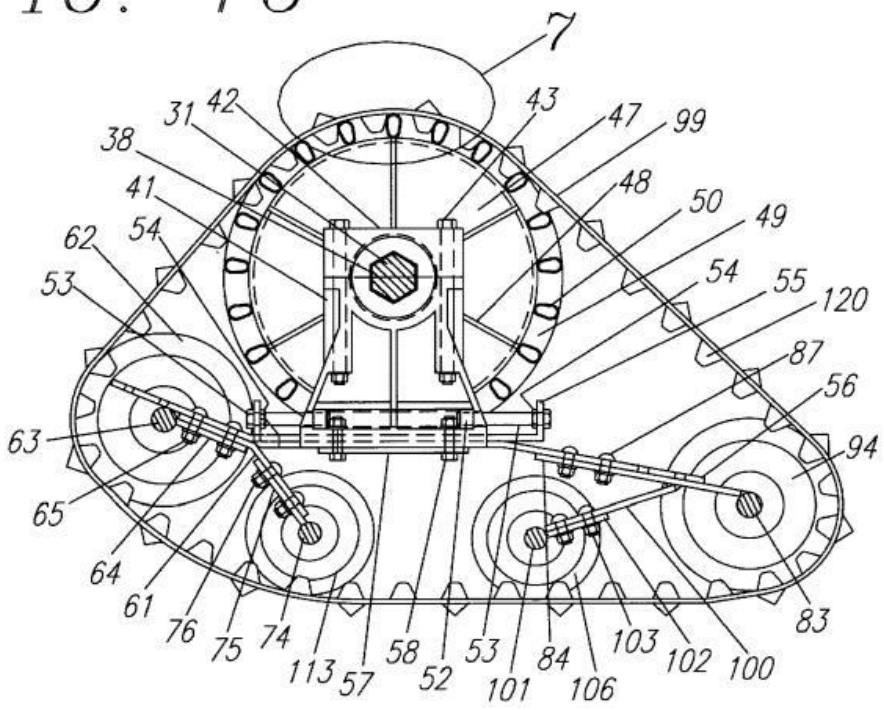


Figure 16: Track assembly kit

[398] The Knight Patent does not anticipate any of the claims in issue of the 562 Patent because its endless track is not free of transverse stiffening members (or inserts) at locations where a

drive projection registers with a traction projection. However, the Knight Patent does disclose most of the other elements of the claims in issue.

[399] Specifically, I find that the Knight Patent discloses all of the elements of claim 1 of the 562 Patent except the absence of transverse stiffening members. I reach the same conclusion with regard to the other independent claims in issue of the 562 Patent. With regard to the dependent claims of the 562 Patent, I find that the Knight Patent describes the additional limitations of the following claim groups:

- 562:2 (drive projections equally spaced),
- 562:3 (traction projections equally spaced),
- 562:9 (ATV),
- 562:10 (handlebars),
- 562:11 (straddle seat for driver),
- 562:12 (pair of endless tracks),
- 562:14 (plurality of wheels includes leading and trailing idlers spaced apart defining ends of ground-engaging run, and drive wheel),
- 562:15 (load bearing section, leading section converging toward ground surface, trailing section diverging from ground surface),
- 562:16 (horizontal distance from axis of leading idler to drive wheel axis different from horizontal distance from axis of trailing idler to drive wheel),
- 562:22 (load bearing section located closer to one of the idlers than the other),
- 562:25 (drive wheel axis above axes of idlers),
- 562:26 (bottom of drive wheel below top of one of the idlers),
- 562:27 (bottom of drive wheel below top of both leading and trailing idlers),

- 562:28 (generally triangular path of travel of endless track),
- 562:29 (wheels in rolling contact with the inner surface at load bearing section), and
- 562:110 (set of four endless tracks at least two of which are as defined).

[400] With regard to claim group 562:15, Mr. Kittel acknowledged in cross-examination that Figure 16 shows a trailing section diverging from the ground surface. I assume that this admission was based on a slight upward curve in the endless track just before it reaches the trailing idler. To my eye, this might indicate the claimed divergence, or it might simply be a quirk introduced by the draftsperson. However, I accept Mr. Kittel's acknowledgement, and defer to him on this point.

[401] As regards claim groups 562:26 and 562:27, I note that Figure 16 of the Knight Patent shows the bottom of the drive wheel below the top of both leading and trailing idlers.

[402] The only limitations of the dependent claims that I find absent from the Knight Patent are in the following claim groups:

- 562:8 (two rows of drive projections, one from each row engages drive wheel simultaneously),
- 562:17 (support structure having center portion at drive wheel axis, and first and second support arms mounted to center portion extending radially from drive wheel toward leading and trailing ends of track assembly),
- 562:18 (angle from horizontal of first support arm that is different from angle from horizontal of second support arm),
- 562:23 (one of the support arms longer than the other), and

- 562:48 (two rows of drive projections, one from each row engages drive wheel simultaneously).

(iii) The 509 Patent

[403] I have concluded above that the Tatou 1 kit anticipates all of the claims in issue of the 509 Patent except those listed in paragraph [362] above. Naturally, all of the limitations of the anticipated claims are incorporated in the Tatou 1 kit. The missing elements can be grouped as follows:

- Support structure with radially extending arms – claim groups 509:7, 509:8 and 509:13,
- Drive wheel overlapping with idlers – claim groups 509:10 and 509:11,
- Absence of transverse stiffening rods – claim groups 509:15, 509:18, 509:20 and 509:21,
- Drive lugs – claim group 509:17, and
- Bottom of drive wheel below top of both leading and trailing idlers – claim group 509:24.

[404] US Patent No. 6,062,661 (Juncker Patent) discloses a track assembly (for agricultural equipment) in which the drive wheel overlaps the leading and trailing idlers.

[405] As discussed in paragraph [401] above, the Knight Patent discloses the bottom of the drive wheel below the top of both leading and trailing idlers. The Shaw Patent also discloses this same feature.

(e) *Obviousness to the Person Skilled in the Art*

(i) The 294 Patent

[406] All of the claims of the 294 Patent that are anticipated by SCI's 4-wheel kit are likewise obvious in view of it. Accordingly, all claims in issue of the 294 Patent are obvious having regard to SCI's 4-wheel kit except those within:

- claim group 294:3 (endless track can conform to depression),
- claim group 294:4 (central portion of endless track can contact depression),
- claim group 294:20 (two transversely-spaced idler wheels each guided by a pair of rows of guide lugs), and
- claim group 294:68 (tension adjusting mechanism adjusts position of the front idler wheel).

[407] In paragraphs [387] above and following, I concluded that the Brazier Patent discloses all of the features of the claims in issue of the 294 Patent except (i) the absence of transverse stiffening rods from the endless track, and (ii) claim group 294:20 (two transversely-spaced idler wheels each guided by a pair of rows of guide lugs).

[408] As I have indicated above, the option of including or omitting transverse stiffening rods was common general knowledge. Even though the Brazier Patent does not clearly state that the endless tracks it describes are free of stiffening rods, it is entirely possible that this was contemplated by the inventor. In any case, there was no invention in the idea of omitting stiffening rods from an endless track, and no technical obstacle to omitting them from the endless tracks described in the Brazier Patent.

[409] With regard to claim group 294:20, the Brazier Patent fails to disclose this element in that a single wide row of guide lugs in the Brazier Patent does the job of the two separate rows of guide lugs contemplated in the claim (see Figure 2 reproduced at paragraph [325] above). The guide lugs in the Brazier Patent perform precisely the same role in the same way as contemplated in claim group 294:20. The Brazier Patent simply extends the guide lugs on the inside of each of the transversely-spaced idler wheels so that they meet in the middle. This is possible, and indeed useful, in the Brazier Patent because it employs a squirrel cage type of driving wheel, and this wide row of guide lugs also performs the role of drive lugs. But the function of the guide lugs would have been performed equally well even if there had been a gap (whether small or large) somewhere in the wide row of guide lugs making it into two rows. In my view, the additional limitation of claim group 294:20 was obvious.

[410] For the foregoing reasons, I conclude that all of the claims in issue of the 294 Patent are obvious having regard to the Brazier Patent in view of the common general knowledge.

(ii) The 562 Patent

[411] All of the claims of the 562 Patent that are anticipated by SCI's 4-wheel kit are likewise obvious in view of it. Accordingly, all claims in issue of the 562 Patent are obvious having regard to SCI's 4-wheel kit except those within:

- claim group 562:15 (trailing section diverging from the ground surface), and
- claim group 562:27 (bottom of drive wheel below top of both leading and trailing idlers).

[412] I find claim group 562:27 also obvious because, even though it is not clear in the documents we have concerning SCI's 4-wheel kit that the bottom of the drive wheel was below

the top of both leading and trailing idlers, the Shaw Patent, which relates to SCI's 2-wheel kit but mentions its applicability to a 4-wheel kit, shows this feature. In my view, a skilled person knowing of SCI's 4-wheel kit would also have learned of the Shaw Patent.

[413] Finally, I do not accept that there is any invention in claim group 562:15 having regard to SCI's 4-wheel kit and in view of the common general knowledge of the Tatou 1 and Tatou 2 kits. These kits incorporated a trailing section diverging from the ground surface for the purpose of reducing steering effort on hard surfaces. In my view, it was obvious to modify SCI's 4-wheel kit to introduce such a well-known trailing section for the same purpose, so as to arrive at the invention defined in claim group 562:15.

[414] It follows that I find all of the claims in issue of the 562 Patent to be obvious having regard to SCI's 4-wheel kit, and the corresponding patent, in view of the common general knowledge.

[415] In paragraphs [393] above and following, I concluded that the Brazier Patent discloses all of the features of the claims in issue of the 562 Patent except (i) the absence of transverse stiffening members from the endless track at locations where a drive projection registers with a traction projection, and (ii) certain claim groups (562:8, 562:15, 562:27 and 562:48).

[416] As discussed above in assessment of obviousness of the 294 Patent, there was no invention in the idea of omitting stiffening rods from an endless track, and no technical obstacle to omitting them from the endless tracks described in the Brazier Patent. It follows that the claims in issue of the 562 Patent, other than those exceptions alluded to in the previous

paragraph, are obvious having regard to the Brazier Patent in view of the common general knowledge.

[417] In addition, as discussed in paragraph [413] above, the additional limitation of claim group 562:15 (trailing section diverging from the ground surface) was part of the common general knowledge. Accordingly, it was obvious to modify the track assembly described in the Brazier Patent to introduce this feature and thereby arrive at the invention defined in claim group 562:15.

[418] In paragraphs [397] above and following, I concluded that the Knight Patent discloses all of the features of the claims in issue of the 562 Patent except (i) the absence of transverse stiffening members from the endless track at locations where a drive projection registers with a traction projection, and (ii) certain claim groups (562:8, 562:17, 562:18, 562:23 and 562:48). Much as discussed in respect of the Brazier Patent, I conclude that the claims in issue of the 562 Patent, other than these exceptions, are obvious having regard to the Knight Patent in view of the common general knowledge.

(iii) The 509 Patent

[419] All of the claims of the 509 Patent that are anticipated by the Tatou 1 are likewise obvious in view of it. Accordingly, all claims in issue of the 509 Patent are obvious having regard to the Tatou 1 except those identified in paragraph [403] above.

[420] As discussed earlier, the Tatou 1 includes most of the features of claim group 509:7, but its support arms do not extend along a radial direction in that they extend from positions slightly offset from the drive wheel axis. However, the Tatou 1's support arms do the same job in the

same way. They maintain the relative positions of the leading end, trailing end and drive wheel. The precise placement of the support arms at the drive wheel end is unimportant. In my view, there is nothing inventive in modifying the Tatou 1's support arms to extend radially from the drive wheel axis. I conclude that claim group 509:7 is obvious.

[421] Claim group 509:8 is dependent on claim group 509:7 and adds that the angles of the support arms from the level are different. Claim group 509:13 is also dependent on claim group 509:7. It adds that the lengths of the support arms are different. The Tatou 1 incorporates both of these additional limitations. Accordingly, these claims are also obvious.

[422] Claim groups 509:10 and 509:11 define the wheel overlapping with one or both leading and trailing idlers. As discussed in paragraph [404] above, this feature is disclosed in the Juncker Patent. Since the Tatou 1 was part of the common general knowledge, considering it along with the Juncker Patent is not the kind of impermissible mosaicing of prior art that is discussed in the jurisprudence: see paragraph [125] above. The skilled person reading the Juncker Patent would already be aware of the Tatou 1. It would not be inventive to arrange the placement and size of the drive wheel and the idlers to have them overlap as contemplated in claim groups 509:10 and 509:11. Therefore, I conclude that these claims are obvious.

[423] Claim groups 509:15, 509:18, 509:20 and 509:21 all specify that the endless track is free of transverse stiffening rods, either entirely or in the lateral edge portions thereof or at locations thereof at which a drive projection registers with a traction lug. I have discussed above that there was no invention in the idea of omitting stiffening rods from an endless track. In the case of the Tatou 1, there was a technical obstacle to omitting them because it used an external drive system. The evidence was consistent that the stresses on the endless track with an external drive system

are such that it is a virtual necessity that the track be reinforced with stiffening rods. However, the skilled person knew that an external drive system is a design choice, and that an internal drive system could easily be used instead. The skilled person would also know that an internal drive system would not have the same virtual necessity for stiffening rods. Because the technical obstacle to omitting stiffening rods from the Tatou 1 would not involve any exercise of inventive ingenuity, I conclude that modifying the Tatou 1 in this way was obvious. Accordingly, I find that claim groups 509:15, 509:18, 509:20 and 509:21 are obvious.

[424] Claim group 509:17 specifies that the endless track has drive lugs projecting from the inner surface for engagement by the drive wheel. The Tatou 1 does not have drive lugs because it has an external drive system. But as discussed, the type of drive system is a design choice. The skilled person knew that an internal drive system could be used instead, and that such a system would require drive lugs. Accordingly, there was nothing inventive in adding drive lugs to the endless track of the Tatou 1. Therefore, I conclude that claim group 509:17 is obvious.

[425] Claim group 509:24 specifies that the bottom of the drive wheel is below the top of both the leading and trailing idlers. The bottom of the drive wheel of the Tatou 1 is below the top of the leading idler but not the trailing idler. However, both the Knight Patent and the Shaw Patent disclose this feature. As discussed in respect of the overlapping of drive wheel and idlers, it would not be inventive to arrange the placement and size of the drive wheel and the idlers to incorporate the additional limitation of claim group 509:24. This conclusion is reinforced by the fact that this additional limitation is described in two distinct prior art references, at least one of which (the Shaw Patent) was tied to a commercial product.

[426] It should be noted that, among the myriad of permutations of claim dependencies of the claims in issue is one in which claim group 509:24 depends on claim group 509:10 or 509:11. This combination defines a track assembly with a drive wheel that both overlaps with one or both of the leading and trailing idlers, and whose bottom is below the top of both idlers. Since there is no one piece of prior art that discloses both of the elements of this combination, there is a temptation to conclude that this combination is not obvious because finding it obvious would require impermissible mosaicing of the prior art. However, I find no invention in this combination. Both elements relate to the relative placement and size of drive wheel and idlers, which, as indicated, was a design choice available to the skilled person. There is no particular effect described in the disclosure (or argued by Camso) of choosing to have the drive wheel overlap one or both of the leading and trailing idlers, or to have the bottom of the drive wheel below the top of the idlers. I conclude that the combination contemplated in this paragraph is obvious.

(f) *Conclusions on Obviousness*

[427] Camso argues that the commercial product that resulted from the patents in suit, called Traxion+, was a commercial success. I note first that, based on the figures provided in the Agreed Statement of Facts, unit sales of Traxion+ never matched those of Tatou. I also note that Camso did not take its argument on commercial success so far as citing authority like those identified in paragraph [126] above. More importantly, it is my view that the issue of commercial success is not helpful in this case. There is no dispute that the disclosure of the patents in suit describes an inventive assembly. The real dispute is whether the wording of the claims is limited to the scope of the invention made and described.

[428] Based on the analysis above, I find that all of the claims in issue are invalid for obviousness.

E. *Overbreadth and Insufficiency*

[429] Because I have found all of the claims in issue invalid for anticipation and/or obviousness, it is not necessary for me to consider the issues of overbreadth and insufficiency.

F. *Section 53 of the Patent Act/Fraud on the Patent Office*

[430] The Final Joint Statement of Issues for Trial indicates that several claims of the 562 Patent are alleged to be invalid because they were granted contrary to section 53 of the *Patent Act*. The defendants did not cite section 53 in their closing argument, though they did have a section concerning alleged fraud on the Patent Office. This argument, which is in the alternative, appears to be based on the allegation that, during prosecution of the applications that led to the patents in suit, Camso submitted to the Patent Office (and was granted) claims to an endless track that encompassed tracks that it had supplied to SCI prior to the claim date. The argument seems to be that Camso deliberately sought claims that it knew to be invalid in view of the prior art.

[431] The defendants cite no authority in support of the principle that a claim can be invalid because it was submitted by an applicant who was aware of material prior art, distinct from the principle that the claim in question would be invalid anyway because the prior art makes it obvious or anticipated. I note that the text of subsection 53(1), reproduced here, focuses on untrue material allegations in the petition and the specification and drawings containing more or less than is necessary to make the invention, rather than overclaiming:

Legal Proceedings in Respect of Patents	*Procédures judiciaires relatives aux brevets*
Void in certain cases, or valid only for parts	**Nul en certains cas, ou valide en partie seulement**
53 (1) A patent is void if any material allegation in the petition of the applicant in respect of the patent is untrue, or if the specification and drawings contain more or less than is necessary for obtaining the end for which they purport to be made, and the omission or addition is wilfully made for the purpose of misleading.	**53 (1)** Le brevet est nul si la pétition du demandeur, relative à ce brevet, contient quelque allégation importante qui n'est pas conforme à la vérité, ou si le mémoire descriptif et les dessins contiennent plus ou moins qu'il n'est nécessaire pour démontrer ce qu'ils sont censés démontrer, et si l'omission ou l'addition est volontairement faite pour induire en erreur.

[432] In the end, and just as with the issues of overbreadth and insufficiency, it is not necessary for me to consider the allegation of invalidity under section 53.

G. *Infringement*

[433] Because of my conclusion that all of the claims in issue are invalid, it is also not necessary for me to consider the issue of infringement. Moreover, the debate between the parties concerning invalidity allegations is based largely on claim construction. Though it is common for a trial judge in a patent matter to consider infringement issues even for claims that have been found invalid (in case the judge is later found to be wrong with regard to invalidity), I am of the view that this would not be efficient in the present case. If I am wrong on any claim construction issues such that any of my invalidity conclusions would be affected, it is difficult to know what other claim construction I should apply instead in assessing infringement. Accordingly, with the exception discussed in the following paragraphs, I will not consider infringement issues.

[434] Claim group 509:24, when dependent on claim group 509:10 or 509:11, was found invalid only for obviousness (not anticipation), and was not a simple call, as discussed in paragraph [426] above. Accordingly, I will address infringement of this claim combination in the event that it is later found to be valid.

[435] Camso alleges that only the front assemblies of the defendants' Wide Track, WTX, and RS4 products infringe claim groups 509:10 and 509:11. Accordingly, the allegations of infringement of claim group 509:24, when dependent on claim groups 509:10 and 509:11, are limited to the same assemblies. In the event that this claim combination is valid, I agree that the defendants' Wide Track, WTX, and RS4 products infringe. Per claim group 509:24, each of these products has a drive wheel whose lower periphery is below the top periphery of both leading and trailing idlers. Also, per claim groups 509:10 and 509:11, each of these products has a drive wheel which overlaps the trailing idler when viewed from the side.

[436] Both claim groups 509:10 and 509:11 can depend on independent claims. The defendants argue two defences to infringement of the 509 Patent: (i) that their products do not include a drive wheel, as they construe it, and (ii) that Camso has not met its burden to prove that their products incorporate a "load bearing section having a longitudinal extent that does not exceed a diameter of the drive wheel."

[437] I have already sided with Camso on construction of the term "drive wheel." Accordingly, this defence to infringement fails.

[438] The defendants' infringement defence concerning the longitudinal extent of the load bearing section is based on the possibility that I side with Camso in its argument that the load

bearing section should not be assessed with the ATV at rest and steered straight. I have not sided with Camso on this argument, and therefore the defendants' infringement defence based thereon does not apply.

[439] This leaves no defences to infringement. I find that the defendants' Wide Track, WTX, and RS4 do indeed infringe the claims of claim group 509:24 when dependent on either claim group 509:10 or claim group 509:11, in the event that there is no invalidity.

H. *Remedies*

[440] Aside from declarations of infringement and validity of the patents in suit, Camso seeks remedies in the form of injunction, delivery up of infringing products, right to elect an accounting of the defendants' profits instead of damages, reasonable compensation under subsection 55(2) of the *Patent Act*, pre- and post-judgment interest, and costs.

[441] Because of my conclusions above, I need not consider these remedies in this decision.

VIII. Conclusions

[442] I have concluded that all of the claims in issue are invalid for anticipation and/or obviousness. Accordingly, a declaration to that effect will be issued and Camso's action will be dismissed with costs. If the parties are unable to agree on the quantum of costs I will receive submissions from the parties as contemplated in the Judgment below.

JUDGMENT in T-2338-14

THIS COURT'S JUDGMENT is that:

1. The action is dismissed.

2. The counterclaim is granted in part.

3. The following claims of the patents in suit are declared invalid:

   Canadian Patent No. 2,388,294: Claims 2, 3, 4, 20, 22, 23, 29, 30, 31, 47, 49, 58, 59, 63, 66, 67, 68, 73, 74, 75, 91, 92, 94, 95, 96, 100, 105, 108, 109, 115, 116, 117, 133, 134, 136, 137, 138, 142, 143, 144, 160, 162, 163, 170, 171, 175, 178, 179, 180, 185, 186, 187, 203, 204, 206, 207, 208, 212, 213, 217, 220, 221, 227, 228, 229, 245, 246, 248, 249, 250

   Canadian Patent No. 2, 822,562: Claims 1, 2, 3, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 22, 23, 25, 26, 27, 28, 29, 32, 33, 38, 39, 40, 41, 42, 43, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 62, 63, 65, 66, 67, 68, 69, 76, 77, 78, 79, 80, 101, 102, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 120, 121, 123, 124, 125, 126, 127, 134, 135, 136, 137, 146

   Canadian Patent No. 2, 825,509: Claims 1, 2, 3, 4, 5, 7, 8, 10, 11, 12, 13, 15, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 30, 33, 34, 35, 36, 37, 39, 40, 42, 43, 44, 45, 47, 48, 49, 50, 51, 54, 55, 56, 57, 58, 60, 61, 63, 64, 65, 66, 68, 70, 71, 73, 74, 75, 76, 77, 78, 79, 80, 82, 83, 85, 86, 87, 88, 90, 92, 93, 95, 96, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 116, 118, 119, 120, 121, 123, 124, 126, 127, 128, 129, 130, 132, 133

4. Costs will follow the event. If the parties are unable to agree on the quantum of costs, the defendants shall serve and file their costs submissions, of no more than twelve (12) pages, within thirty (30) days following the date of this decision. The plaintiff shall have fifteen (15) days following receipt of the defendants' submissions to serve and file its responding costs submissions which shall be limited to fifteen (15) pages. Thereafter, the defendants may, within five (5) days following receipt of responding submissions, serve and file reply costs submissions of no more than three (3) pages.

"George R. Locke"
Judge

APPENDIX

Claims in Issue

Canadian Patent No. 2,388,294

1. An endless track for a track assembly to provide traction to an all-terrain vehicle (ATV), the track assembly being mountable to the ATV in place of a ground-engaging wheel, the track assembly comprising a plurality of track-contacting wheels for contacting the endless track, the plurality of track-contacting wheels including a driving wheel to impart motion to the endless track, the endless track comprising:

   i) an inner side for facing the plurality of track-contacting wheels; and

   ii) a ground-engaging outer side for engaging the ground;

the endless track being free of stiffening rods extending in a transversal direction of the endless track.

2. The endless track claimed in claim 1, wherein a flexibility of the endless track in the transversal direction of the endless track allows the endless track to conform to a profile of the ground.

3. The endless track claimed in claim 2, wherein the profile of the ground includes a depression, the flexibility of the endless track in the transversal direction of the endless track allowing the endless track to conform to the depression.

4. The endless track claimed in claim 3, wherein the endless track includes a central portion aligned with the driving wheel in the transversal direction of the endless track when the driving wheel imparts motion to the endless track, the flexibility of the endless track in the transversal direction of the endless track allowing the central portion of the endless track to contact the depression.

6. The endless track claimed in any one of claims 1 to 5, wherein the ground-engaging outer side comprises a plurality of traction projections spaced apart in a longitudinal direction of the endless track.

14. The endless track claimed in any one of claims 6 to 13, wherein the inner side comprises a plurality of inner lugs distributed in the longitudinal direction of the endless track.

15. The endless track claimed in claim 14, wherein the plurality of inner lugs is arranged into a plurality of rows of lugs spaced apart in the transversal direction of the endless track, the lugs of each row of lugs of the plurality of rows of lugs being spaced apart in the longitudinal direction of the endless track.

16. The endless track claimed in claim 15, wherein a first one of the rows of lugs is a row of drive lugs positioned to engage the driving wheel.

18. The endless track claimed in any one of claims 15 to 17, wherein the plurality of track-contacting wheels includes an idler wheel, a first given one of the rows of lugs being a row of guide lugs to be positioned adjacent to the idler wheel.

19. The endless track claimed in claim 18, wherein the row of guide lugs is a first row of guide lugs, a second given one of the rows of lugs being a second row of guide lugs to be positioned adjacent to the idler wheel such that the idler wheel passes between the first row of guide lugs and the second row of guide lugs.

20. The endless track claimed in claim 19, wherein the idler wheel is a first idler wheel, the plurality of track-contacting wheels including a second idler wheel spaced apart from the first idler wheel in the transversal direction of the endless track, a third given one of the rows of lugs and a fourth given one of the rows of lugs respectively being a third row of guide lugs and a fourth row of guide lugs to be positioned adjacent to the second idler wheel such that the second idler wheel passes between the third row of guide lugs and the fourth row of guide lugs.

21. The endless track claimed in any one of claims 1 to 17, wherein the plurality of track-contacting wheels includes a first idler wheel and a second idler wheel spaced apart from the first idler wheel in a longitudinal direction of the track assembly, an axis of rotation of the driving wheel being located in the longitudinal direction of the track assembly between an axis of rotation of the first idler wheel and an axis of rotation of the second idler wheel.

22. The endless track claimed in claim 21, wherein the axis of rotation of the driving wheel is located closer to the axis of rotation of the second idler wheel than to the axis of rotation of the first idler wheel in the longitudinal direction of the track assembly.

23. The endless track claimed in claim 22, wherein the first idler wheel is located in a front of the track assembly and the second idler wheel is located in a rear of the track assembly.

28. A set of endless tracks for a set of track assemblies to provide traction to an all-terrain vehicle (ATV), the set of track assemblies being mountable to the ATV in place of ground-engaging wheels, each endless track of the set of endless tracks comprising:

i) an inner side for facing a plurality of track-contacting wheels of a track assembly of the set of track assemblies, the plurality of track-contacting wheels including a driving wheel to impart motion to the endless track; and

ii) a ground-engaging outer side for engaging the ground; the endless track being free of stiffening rods extending in a transversal direction of the endless track.

29. The set of endless tracks claimed in claim 28, wherein a flexibility of the endless track in the transversal direction of the endless track allows the endless track to conform to a profile of the ground.

30. The set of endless tracks claimed in claim 29, wherein the profile of the ground includes a depression, the flexibility of the endless track in the transversal direction of the endless track allowing the endless track to conform to the depression.

31. The set of endless tracks claimed in claim 30, wherein the endless track includes a central portion aligned with the driving wheel in the transversal direction of the endless track when the driving wheel imparts motion to the endless track, the flexibility of the endless track in the transversal direction of the endless track allowing the central portion of the endless track to contact the depression.

33. The set of endless tracks claimed in any one of claims 28 to 32, wherein the ground-engaging outer side comprises a plurality of traction projections spaced apart in a longitudinal direction of the endless track.

41. The set of endless tracks claimed in any one of claims 33 to 40, wherein the inner side comprises a plurality of inner lugs distributed in a longitudinal direction of the endless track.

42. The set of endless tracks claimed in claim 41, wherein the plurality of inner lugs is arranged into a plurality of rows of lugs spaced apart in the transversal direction of the endless track, the lugs of each row of lugs of the plurality of rows of lugs being spaced apart in the longitudinal direction of the endless track.

43. The set of endless tracks claimed in claim 42, wherein a first one of the rows of lugs is a row of drive lugs positioned to engage the driving wheel.

45. The set of endless tracks claimed in any one of claims 42 to 44, wherein the plurality of track-contacting wheels comprises an idler wheel, a first given one of the rows of lugs being a row of guide lugs to be positioned adjacent to the idler wheel.

46. The set of endless tracks claimed in claim 45, wherein the row of guide lugs is a first row of guide lugs, a second given one of the rows of lugs being a second row of guide lugs to be positioned adjacent to the idler wheel such that the idler wheel passes between the first row of guide lugs and the second row of guide lugs.

47. The set of endless tracks claimed in claim 45, wherein the idler wheel is a first idler wheel, the plurality of track-contacting wheels including a second idler wheel spaced apart from the first idler wheel in the transversal direction of the endless track, a third given one of the rows of lugs and a fourth given one of the rows of lugs respectively being a third row of guide lugs and a fourth row of guide lugs to be positioned adjacent to the second idler wheel such that the second idler wheel passes between the third row of guide lugs and the fourth row of guide lugs.

48. The set of endless tracks claimed in any one of claims 28 to 44, wherein the plurality of track-contacting wheels includes a first idler wheel and a second idler wheel spaced apart from the first idler wheel in a longitudinal direction of the track assembly, an axis of rotation of the driving wheel being located in the longitudinal direction of the track assembly between an axis of rotation of the first idler wheel and an axis of rotation of the second idler wheel.

49. The set of endless tracks claimed in claim 48, wherein the axis of rotation of the driving wheel is located closer to the axis of rotation of the second idler wheel than to the axis of rotation of the first idler wheel in the longitudinal direction of the track assembly.

56. A track assembly for providing traction to an all-terrain vehicle (ATV), the track assembly being mountable to the ATV in place of a ground-engaging wheel, the track assembly comprising:

a) a plurality of track-contacting wheels which includes:

i) a driving wheel; and

ii) an idler wheel;

and

b) an endless track disposed around the plurality of track-contacting wheels and comprising:

i) an inner side for facing the plurality of track-contacting wheels, the driving wheel being rotatable to impart motion to the endless track; and

ii) a ground-engaging outer side for engaging the ground;

the endless track being free of stiffening rods extending in a transversal direction of the endless track.

57. The track assembly claimed in claim 56, wherein the idler wheel is a first idler wheel, the plurality of track-contacting wheels including a second idler wheel spaced apart from the first idler wheel in a longitudinal direction of the track assembly, an axis of rotation of the driving wheel being located in the longitudinal direction of the track assembly between an axis of rotation of the first idler wheel and an axis of rotation of the second idler wheel.

58. The track assembly claimed in claim 57, wherein the axis of rotation of the driving wheel is located closer to the axis of rotation of the second idler wheel than to the axis of rotation of the first idler wheel in the longitudinal direction of the track assembly.

59. The track assembly claimed in claim 58, wherein the first idler wheel is located in a front of the track assembly and the second idler wheel is located in a rear of the track assembly.

60. The track assembly claimed in any one of claims 57 to 59, comprising a frame interconnecting the first idler wheel and the second idler wheel.

63. The track assembly claimed in any one of claims 60 to 62, wherein the frame comprises a first arm and a second arm shorter than the first arm.

66. The track assembly claimed in any one of claims 60 to 65, comprising a tension adjusting mechanism mounted to the frame for adjusting a tension of the endless track.

67. The track assembly claimed in claim 66, wherein the tension adjusting mechanism is configured to adjust a position of a given one of the first idler wheel and the second idler wheel for adjusting the tension of the endless track.

68. The track assembly claimed in claim 67, wherein the given one of the first idler wheel and the second idler wheel is the first idler wheel.

73. The track assembly claimed in any one of claims 56 to 72, wherein a flexibility of the endless track in the transversal direction of the endless track allows the endless track to conform to a profile of the ground.

74. The track assembly claimed in claim 73, wherein the profile of the ground includes a depression, the flexibility of the endless track in the transversal direction of the endless track allowing the endless track to conform to the depression.

75. The track assembly claimed in claim 72, wherein the endless track includes a central portion aligned with the driving wheel in the transversal direction of the endless track, the flexibility of the endless track in the transversal direction of the endless track allowing the central portion of the endless track to contact the depression.

91. The track assembly claimed in any one of claims 57 to 90, wherein the endless track has an upper run extending over the driving wheel and from the first idler wheel to the second idler wheel and a lower run extending under the driving wheel and from the first idler wheel to the second idler wheel, the lower run of the endless track being curved in the longitudinal direction of the track assembly between the axis of rotation of the first idler wheel and the axis of rotation of the second idler wheel.

92. The track assembly claimed in any one of claims 57 to 90, wherein the endless track has an upper run extending over the driving wheel and from the first idler wheel to the second idler wheel and a lower run extending under the driving wheel and from the first idler wheel to the second idler wheel, the track assembly being configured such that, in the longitudinal direction of the track assembly, a lowest segment of the lower run of the endless track is located where the driving wheel is located.

94. The track assembly claimed in any one of claims 91 to 93, wherein the track assembly is configured to press onto the ground a limited portion of the lower run of the endless track that is located where the ground-engaging wheel would contact the ground if the ground-engaging wheel was mounted to the ATV in place of the track assembly.

95. The track assembly claimed in any one of claims 56 to 94, wherein the track assembly is steerable to steer the ATV on the ground.

96. The track assembly claimed in any one of claims 56 to 94, wherein the track assembly is connected to a body of the ATV via a rod used for direction.

98. A set of track assemblies for providing traction to an all-terrain vehicle (ATV), the set of track assemblies being mountable to the ATV in place of ground-engaging wheels, each track assembly of the set of track assemblies comprising:

a) a plurality of track-contacting wheels which includes:

i) a driving wheel; and

ii) an idler wheel;

and

b) an endless track disposed around the plurality of track-contacting wheels and comprising:

i) an inner side for facing the plurality of track-contacting wheels, the driving wheel being rotatable to impart motion to the endless track; and

ii) a ground-engaging outer side for engaging the ground;

the endless track being free of stiffening rods extending in a transversal direction of the endless track.

99. The set of track assemblies claimed in claim 98, wherein the idler wheel is a first idler wheel, the plurality of track-contacting wheels including a second idler wheel spaced apart from the first idler wheel in a longitudinal direction of the track assembly, an axis of rotation of the driving wheel being located in the longitudinal direction of the track assembly between an axis of rotation of the first idler wheel and an axis of rotation of the second idler wheel.

100. The set of track assemblies claimed in claim 99, wherein the axis of rotation of the driving wheel is located closer to the axis of rotation of the second idler wheel than to the axis of rotation of the first idler wheel in the longitudinal direction of the track assembly.

105. The set of track assemblies claimed in any one of claims 102 to 104, wherein the frame comprises a first arm and a second arm shorter than the first arm.

108. The set of track assemblies claimed in any one of claims 102 to 107, comprising a tension adjusting mechanism mounted to the frame for adjusting a tension of the endless track.

109. The set of track assemblies claimed in claim 108, wherein the tension adjusting mechanism is configured to adjust a position of a given one of the first idler wheel and the second idler wheel for adjusting the tension of the endless track.

115. The set of track assemblies claimed in any one of claims 98 to 104, wherein a flexibility of the endless track in the transversal direction of the endless track allows the endless track to conform to a profile of the ground.

116. The set of track assemblies claimed in claim 115, wherein the profile of the ground includes a depression, the flexibility of the endless track in the transversal direction of the endless track allowing the endless track to conform to the depression.

117. The set of track assemblies claimed in claim 116, wherein the endless track includes a central portion aligned with the driving wheel in the transversal direction of the endless track, the flexibility of the endless track in the transversal direction of the endless track allowing the central portion of the endless track to contact the depression

133. The set of track assemblies claimed in any one of claims 99 to 132, wherein the endless track has an upper run extending over the driving wheel and from the first idler wheel to the second idler wheel and a lower run extending under the driving wheel and from the first idler wheel to the second idler wheel, the lower run of the endless track being curved in the

longitudinal direction of the track assembly between the axis of rotation of the first idler wheel and the axis of rotation of the second idler wheel.

134. The set of track assemblies claimed in any one of claims 99 to 132, wherein the endless track has an upper run extending over the driving wheel and from the first idler wheel to the second idler wheel and a lower run extending under the driving wheel and from the first idler wheel to the second idler wheel, the track assembly being configured such that, in the longitudinal direction of the track assembly, a lowest segment of the lower run of the endless track is located where the driving wheel is located.

136. The set of track assemblies claimed in any one of claims 133 to 135, wherein the track assembly is configured to press onto the ground a limited portion of the lower run of the endless track that is located where the ground-engaging wheel would contact the ground if the ground-engaging wheel was mounted to the ATV in place of the track assembly.

137. The set of track assemblies claimed in any one of claims 98 to 136, wherein a first track assembly and a second track assembly of the set of track assemblies are steerable to steer the ATV on the ground.

138. The set of track assemblies claimed in any one of claims 98 to 136, wherein the track assembly is connected to a body of the ATV via a rod used for direction.

141. An endless track for a track assembly of a set of track assemblies to provide traction to an all-terrain vehicle (ATV), the ATV comprising a straddle seat and handlebars, the track assembly comprising a plurality of track-contacting wheels for contacting the endless track, the plurality of track-contacting wheels including a driving wheel to impart motion to the endless track, the endless track comprising:

i) an inner side for facing the plurality of track-contacting wheels; and

ii) a ground-engaging outer side for engaging the ground;

the endless track being free of stiffening rods extending in a transversal direction of the endless track.

142. The endless track claimed in claim 141, wherein a flexibility of the endless track in the transversal direction of the endless track allows the endless track to conform to a profile of the ground.

143. The endless track claimed in claim 142, wherein the profile of the ground includes a depression, the flexibility of the endless track in the transversal direction of the endless track allowing the endless track to conform to the depression.

144. The endless track claimed in claim 143, wherein the endless track includes a central portion aligned with the driving wheel in the transversal direction of the endless track when the driving wheel imparts motion to the endless track, the flexibility of the endless track in the transversal direction of the endless track allowing the central portion of the endless track to contact the depression.

154. The endless track claimed in any one of claims 141 to 153, wherein the inner side comprises a plurality of inner lugs projecting inwardly.

155. The endless track claimed in claim 154, wherein the plurality of inner lugs is arranged into a plurality of rows of lugs spaced apart in the transversal direction of the endless track, the lugs of each row of lugs of the plurality of rows of lugs being spaced apart in a longitudinal direction of the endless track.

156. The endless track claimed in claim 155, wherein a first one of the rows of lugs is a row of drive lugs positioned to engage the driving wheel.

158. The endless track claimed in any one of claims 155 to 157, wherein the plurality of track-contacting wheels includes an idler wheel, a first given one of the rows of lugs being a row of guide lugs to be positioned adjacent to the idler wheel.

159. The endless track claimed in claim 158, wherein the row of guide lugs is a first row of guide lugs, a second given one of the rows of lugs being a second row of guide lugs to be positioned adjacent to the idler wheel such that the idler wheel passes between the first row of guide lugs and the second row of guide lugs.

160. The endless track claimed in claim 159, wherein the idler wheel is a first idler wheel, the plurality of track-contacting wheels including a second idler wheel spaced apart from the first idler wheel in the transversal direction of the endless track, a third given one of the rows of lugs and a fourth given one of the rows of lugs respectively being a third row of guide lugs and a fourth row of guide lugs to be positioned adjacent to the second idler wheel such that the second idler wheel passes between the third row of guide lugs and the fourth row of guide lugs.

161. The endless track claimed in any one of claims 141 to 160, wherein the plurality of track-contacting wheels includes a first idler wheel and a second idler wheel spaced apart from the first idler wheel in a longitudinal direction of the track assembly, an axis of rotation of the driving wheel being located in the longitudinal direction of the track assembly between an axis of rotation of the first idler wheel and an axis of rotation of the second idler wheel.

162. The endless track claimed in claim 161, wherein the axis of rotation of the driving wheel is located closer to the axis of rotation of the second idler wheel than to the axis of rotation of the first idler wheel in the longitudinal direction of the track assembly.

163. The endless track claimed in claim 162, wherein the first idler wheel is located in a front of the track assembly and the second idler wheel is located in a rear of the track assembly.

168. A track assembly for a set of track assemblies to provide traction to an all-terrain vehicle (ATV), the ATV comprising a straddle seat and handlebars, the track assembly comprising:

a) a plurality of track-contacting wheels which includes:

i) a driving wheel; and

ii) an idler wheel;

and

b) an endless track disposed around the plurality of track-contacting wheels and comprising:

i) an inner side for facing the plurality of track-contacting wheels, the driving wheel being rotatable to impart motion to the endless track; and

ii) a ground-engaging outer side for engaging the ground;

the endless track being free of stiffening rods extending in a transversal direction of the endless track.

169. The track assembly claimed in claim 168, wherein the idler wheel is a first idler wheel, the plurality of track-contacting wheels including a second idler wheel spaced apart from the first idler wheel in a longitudinal direction of the track assembly, an axis of rotation of the driving wheel being located in the longitudinal direction of the track assembly between an axis of rotation of the first idler wheel and an axis of rotation of the second idler wheel.

170. The track assembly claimed in claim 169, wherein the axis of rotation of the driving wheel is located closer to the axis of rotation of the second idler wheel than to the axis of rotation of the first idler wheel in the longitudinal direction of the track assembly.

171. The track assembly claimed in claim 170, wherein the first idler wheel is located in a front of the track assembly and the second idler wheel is located in a rear of the track assembly.

172. The track assembly claimed in any one of claims 169 to 171, comprising a frame interconnecting the first idler wheel and the second idler wheel.

175. The track assembly claimed in any one of claims 172 to 174, wherein the frame comprises a first arm and a second arm shorter than the first arm.

178. The track assembly claimed in any one of claims 172 to 177, comprising a tension adjusting mechanism mounted to the frame for adjusting a tension of the endless track.

179. The track assembly claimed in claim 178, wherein the tension adjusting mechanism is configured to adjust a position of a given one of the first idler wheel and the second idler wheel for adjusting the tension of the endless track.

180. The track assembly claimed in claim 179, wherein the given one of the first idler wheel and the second idler wheel is the first idler wheel.

185. The track assembly claimed in any one of claims 168 to 184, wherein a flexibility of the endless track in the transversal direction of the endless track allows the endless track to conform to a profile of the ground.

186. The track assembly claimed in claim 185, wherein the profile of the ground includes a depression, the flexibility of the endless track in the transversal direction of the endless track allowing the endless track to conform to the depression.

187. The track assembly claimed in claim 186, wherein the endless track includes a central portion aligned with the driving wheel in the transversal direction of the endless track, the

flexibility of the endless track in the transversal direction of the endless track allowing the central portion of the endless track to contact the depression.

203. The track assembly claimed in any one of claims 169 to 202, wherein the endless track has an upper run extending over the driving wheel and from the first idler wheel to the second idler wheel and a lower run extending under the driving wheel and from the first idler wheel to the second idler wheel, the lower run of the endless track being curved in the longitudinal direction of the track assembly between the axis of rotation of the first idler wheel and the axis of rotation of the second idler wheel.

204. The track assembly claimed in any one of claims 169 to 202, wherein the endless track has an upper run extending over the driving wheel and from the first idler wheel to the second idler wheel and a lower run extending under the driving wheel and from the first idler wheel to the second idler wheel, the track assembly being configured such that, in the longitudinal direction of the track assembly, a lowest segment of the lower run of the endless track is located where the driving wheel is located.

206. The track assembly claimed in any one of claims 203 to 205, wherein the track assembly is mountable to the ATV in place of a ground-engaging wheel, the track assembly being configured to press onto the ground a limited portion of the lower run of the endless track that is located where the ground-engaging wheel would contact the ground if the ground-engaging wheel was mounted to the ATV in place of the track assembly.

207. The track assembly claimed in any one of claims 168 to 206, wherein the track assembly is steerable to steer the ATV on the ground.

208. The track assembly claimed in any one of claims 168 to 206, wherein the track assembly is connected to a body of the ATV via a rod used for direction.

210. A set of track assemblies for providing traction to an all-terrain vehicle (ATV), the ATV comprising a straddle seat and handlebars, each track assembly of the set of track assemblies comprising:

a) a plurality of track-contacting wheels which includes:

i) a driving wheel; and

ii) an idler wheel;

and

b) an endless track disposed around the plurality of track-contacting wheels and comprising:

i) an inner side for facing the plurality of track-contacting wheels, the driving wheel being rotatable to impart motion to the endless track; and

ii) a ground-engaging outer side for engaging the ground;

the endless track being free of stiffening rods extending in a transversal direction of the endless track.

211. The set of track assemblies claimed in claim 210, wherein the idler wheel is a first idler wheel, the plurality of track-contacting wheels including a second idler wheel spaced apart from the first idler wheel in a longitudinal direction of the track assembly, an axis of rotation of the driving wheel being located in the longitudinal direction of the track assembly between an axis of rotation of the first idler wheel and an axis of rotation of the second idler wheel.

212. The set of track assemblies claimed in claim 211, wherein the axis of rotation of the driving wheel is located closer to the axis of rotation of the second idler wheel than to the axis of rotation of the first idler wheel in the longitudinal direction of the track assembly.

213. The set of track assemblies claimed in claim 212, wherein the first idler wheel is located in a front of the track assembly and the second idler wheel is located in a rear of the track assembly.

217. The set of track assemblies claimed in any one of claims 214 to 216, wherein the frame comprises a first arm and a second arm shorter than the first arm.

220. The set of track assemblies claimed in any one of claims 214 to 219, comprising a tension adjusting mechanism mounted to the frame for adjusting a tension of the endless track.

221. The set of track assemblies claimed in claim 220, wherein the tension adjusting mechanism is configured to adjust a position of a given one of the first idler wheel and the second idler wheel for adjusting the tension of the endless track.

227. The set of track assemblies claimed in any one of claims 210 to 226, wherein a flexibility of the endless track in the transversal direction of the endless track allows the endless track to conform to a profile of the ground.

228. The set of track assemblies claimed in claim 227, wherein the profile of the ground includes a depression, the flexibility of the endless track in the transversal direction of the endless track allowing the endless track to conform to the depression.

229. The set of track assemblies claimed in claim 228, wherein the endless track includes a central portion aligned with the driving wheel in the transversal direction of the endless track, the flexibility of the endless track in the transversal direction of the endless track allowing the central portion of the endless track to contact the depression.

245. The set of track assemblies claimed in any one of claims 211 to 244, wherein the endless track has an upper run extending over the driving wheel and from the first idler wheel to the second idler wheel and a lower run extending under the driving wheel and from the first idler wheel to the second idler wheel, the lower run of the endless track being curved in the longitudinal direction of the track assembly between the axis of rotation of the first idler wheel and the axis of rotation of the second idler wheel.

246. The set of track assemblies claimed in any one of claims 211 to 244, wherein the endless track has an upper run extending over the driving wheel and from the first idler wheel to the second idler wheel and a lower run extending under the driving wheel and from the first idler wheel to the second idler wheel, the track assembly being configured such that, in the

longitudinal direction of the track assembly, a lowest segment of the lower run of the endless track is located where the driving wheel is located.

248. The set of track assemblies claimed in any one of claims 245 to 24 7, wherein the track assembly is mountable to the ATV in place of a ground-engaging wheel, the track assembly being configured to press onto the ground a limited portion of the lower run of the endless track that is located where the ground-engaging wheel would contact the ground if the ground-engaging wheel was mounted to the ATV in place of the track assembly.

249. The set of track assemblies claimed in any one of claims 210 to 248, wherein a first track assembly and a second track assembly of the set of track assemblies are steerable to steer the ATV on the ground.

250. The set of track assemblies claimed in any one of claims 210 to 248, wherein the track assembly is connected to a body of the ATV via a rod used for direction.

Canadian Patent No. 2,822,562

1. A steerable endless track for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, the endless track being steerable by changing an orientation of the endless track by a steering mechanism of the vehicle; the endless track comprising:

(a) an outer ground-engaging surface;

(b) an inner surface opposite to the outer ground-engaging surface;

(c) a plurality of drive projections projecting from the inner surface and arranged longitudinally along the track; and

(d) a plurality of traction projections projecting from the outer ground-engaging surface and arranged longitudinally along the track;

the endless track being free of stiffening members extending transversally of the endless track at longitudinally spaced locations at which a drive projection registers with a traction projection.

2. A steerable endless track as defined in claim 1, wherein the drive projections are equally spaced in a longitudinal direction of the endless track.

3. A steerable endless track as defined in any one of claims 1 and 2, wherein the traction projections are equally spaced in a longitudinal direction of the endless track.

8. A steerable endless track as defined in any one of claims 1 to 7, wherein the plurality of drive projections is a first row of drive projections, the endless track comprising a second row of drive projections projecting from the inner surface and arranged longitudinally along the endless track, the first row of drive projections and the second row of drive projections being spaced apart in a transverse direction of the endless track, a drive projection of the first row of drive projections and a drive projection of the second row of drive projections being configured to simultaneously engage a drive wheel which imparts motion to the endless track.

9. A steerable endless track as defined in any one of claims 1 to 8, wherein the vehicle is an All-Terrain Vehicle (ATV).

10. A steerable endless track as defined in any one of claims 1 to 9, wherein the steering mechanism of the vehicle has handlebars.

11. A steerable endless track as defined in any one of claims 1 to 10, wherein the vehicle includes a seat that is straddled by a driver of the vehicle.

12. A pair of endless tracks for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, wherein each endless track of the pair of endless tracks is a steerable endless track as defined in any one of claims 1 to 11.

13. A steerable track assembly for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, the track assembly being steerable by changing an orientation of the track assembly by a steering mechanism of the vehicle, the track assembly comprising:

(a) an endless track including:

i. an outer ground-engaging surface;

ii. an inner surface opposite to the outer ground-engaging surface;

iii. a plurality of drive projections projecting from the inner surface and arranged longitudinally along the track;

iv. a plurality of traction projections projecting from the outer ground-engaging surface and arranged longitudinally along the track;

the endless track being free of stiffening members extending transversally of the endless track at longitudinally spaced locations at which a drive projection registers with a traction projection; and

(b) a plurality of wheels for supporting and driving the endless track.

14. A steerable track assembly as defined in claim 13, wherein the plurality of wheels includes:

(a) a leading idler and a trailing idler, the leading and trailing idlers being in a spaced apart relationship, a segment of the endless track extending between the leading and trailing idlers defining a ground engaging run:

(b) a drive wheel in driving engagement with the endless track for imparting movement to the endless track.

15. A steerable track assembly as defined in claim 14, wherein the ground engaging run includes:

(a) a load bearing section located between the leading idler and the trailing idler, the load bearing section transferring to the ground surface a major portion of the load carried by the track assembly;

(b) a leading section extending between the leading idler and the load bearing section, the leading section being oriented such as to converge toward the ground surface when the endless track is in motion and propels the vehicle; and

(c) a trailing section extending between the load bearing section and the trailing idler, the trailing section being oriented such as to diverge from the ground surface when the endless track is in motion and propels the vehicle.

16. A steerable track assembly as defined in any one of claims 14 to 15, wherein the leading idler rotates about a first axis of rotation, the trailing idler rotates about a second axis of rotation and the drive wheel rotates about a third axis of rotation, a first horizontal distance defined between the first axis of rotation and the third axis of rotation being different from a second horizontal distance defined between the second axis of rotation and the third axis of rotation.

17. A steerable track assembly as defined in claim 16, including a support structure having:

i) a center portion rotatably supported at the third axis of rotation;

ii) a first support arm mounted to the center portion and extending along a radial direction of the drive wheel toward a leading end of the track assembly;

iii) a second support arm mounted to the center portion and extending along a radial direction of the drive wheel toward a trailing end of the track assembly.

18. A steerable track assembly as defined in claim 17, wherein the first support arm defines a first angle with an imaginary horizontal axis which extends through the third axis of rotation, the second support arm defines a second angle with the imaginary horizontal axis, and the first angle is different from the second angle.

22. A steerable track assembly as defined in any one of claims 15 to 21, wherein the load bearing section is located closer to one of the leading and trailing idlers than to the other of the leading and trailing idlers.

23. A steerable track assembly as defined in claim 17, wherein one of the first and second support arms is longer than the other of the first and second support arms.

25. A steerable track assembly as defined in claim 16, wherein the third axis of rotation is located above the first axis of rotation and the second axis of rotation.

26. A steerable track assembly as defined in claim 16, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, one of the leading and trailing idlers having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane.

27. A steerable track assembly as defined in claim 16, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, the leading idler having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the trailing idler having a

periphery bound between a third upper horizontal imaginary plane and a third lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane and below the third upper horizontal imaginary plane.

28. A steerable track assembly as defined in any one of claims 13 to 27, wherein the plurality of wheels imparts a generally triangular path of travel to the endless track.

29. A steerable track assembly as defined in any one of claims 15 to 27, wherein the plurality of wheels define a track supporting and guiding arrangement that is in rolling contact with the inner surface at a plurality of positions, one of said positions being the load bearing section.

32. A steerable track assembly as defined in any one of claims 13 to 31, wherein the drive projections are equally spaced in a longitudinal direction of the endless track.

33. A steerable track assembly as defined in any one of claims 13 to 32, wherein the traction projections are equally spaced in a longitudinal direction of the endless track.

38. A steerable track assembly as defined in any one of claims 14 to 37, wherein the plurality of drive projections is a first row of drive projections, the endless track comprising a second row of drive projections projecting from the inner surface and arranged longitudinally along the endless track, the first row of drive projections and the second row of drive projections being spaced apart in a transverse direction of the endless track, a drive projection of the first row of drive projections and a drive projection of the second row of drive projections being configured to simultaneously engage the drive wheel.

39. A steerable track assembly as defined in any one of claims 13 to 38, wherein the vehicle is an All-Terrain Vehicle (ATV).

40. A steerable track assembly as defined in any one of claims 13 to 39, wherein the steering mechanism of the vehicle has handlebars.

41. A steerable track assembly as defined in any one of claims 13 to 40, wherein the vehicle includes a seat that is straddled by a driver of the vehicle.

42. A pair of steerable track assemblies for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, wherein each of the steerable track assemblies is as defined in any one of claims 13 to 41.

43. A steerable endless track for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, the endless track being steerable by changing an orientation of the endless track by a steering mechanism of the vehicle, the endless track comprising a plurality of drive lugs projecting from an inner surface of the endless track and a plurality of traction projections projecting from an outer ground-engaging surface of the endless track, the endless track being free of stiffening members extending transversally of the endless track at areas of the endless track where a drive lug registers in a longitudinal direction of the endless track with a traction projection.

48. A steerable endless track as defined in any one of claims 43 to 47, wherein the drive lug registering in the longitudinal direction of the endless track with a traction projection is a first drive lug and the endless track includes a second drive lug spaced from the first drive lug in a transverse direction of the endless track, the first and second drive lugs being configured to simultaneously engage a drive wheel as the drive wheel imparts motion to the endless track.

49. A steerable endless track as defined in any one of claims 43 to 48, wherein the vehicle is an All-Terrain Vehicle (ATV).

50. A steerable endless track as defined in any one of claims 43 to 49, wherein the steering mechanism of the vehicle has handlebars.

51. A steerable endless track as defined in any one of claims 43 to 50, wherein the vehicle includes a seat that is straddled by a driver of the vehicle.

52. A set of four endless tracks for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, wherein at least two of the endless tracks in the set of four is a steerable endless track as defined in any one of claims 43 to 51.

53. A steerable track assembly for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other, unprepared surfaces, the track assembly being steerable by changing an orientation of the steerable track assembly by a steering mechanism of the vehicle, the steerable track assembly comprising:

a) an endless track comprising a plurality of drive lugs projecting from an inner surface of the endless track and a plurality of traction projections projecting from an outer ground-engaging surface of the endless track, the endless track being free of stiffening members extending transversally of the endless track at areas of the endless track where a drive lug registers in a longitudinal direction of the endless track with a traction projection; and

b) a plurality of wheels for supporting and driving the endless track.

54. A steerable track assembly as defined in claim 53, wherein the plurality of wheels includes:

a. a leading idler and a trailing idler in a spaced apart relationship, a segment of the endless track extending between the leading and trailing idlers defining a ground engaging run; and

b. a drive wheel in driving engagement with the endless track for imparting movement to the endless track.

55. A steerable track assembly as defined in claim 54, wherein the ground engaging run includes:

a. a load bearing section located between the leading idler and the trailing idler, the load bearing section transferring to the ground surface a major portion of the load carried by the track assembly;

b. a leading section extending between the leading idler and the load bearing section, the leading section being oriented such as to converge toward the ground surface when the endless track is in motion and propels the vehicle in a forward direction;

c. a trailing section extending between the load bearing section and the trailing idler, the trailing section being oriented such as to diverge from the ground surface when the endless track is in motion and propels the vehicle in the forward direction.

56. A steerable track assembly as defined in claim 55, wherein the leading idler rotates about a first axis of rotation, the trailing idler rotates about a second axis of rotation and the drive wheel rotates about a third axis of rotation, a first horizontal distance defined between the first axis of rotation and the third axis of rotation being different from a second horizontal distance defined between the second axis of rotation and the third axis of rotation.

57. A steerable track assembly as defined in claim 56, including a, support structure having:

i) a center portion rotatably supported at the third axis of rotation;

ii) a first support arm mounted to the center portion and extending along a radial direction of the drive wheel toward a leading end of the track assembly;

iii) a second support arm mounted to the center portion and extending along a radial direction of the drive wheel toward a trailing end of the track assembly.

58. A steerable track assembly as defined in claim 57, wherein the first support arm defines a first angle with an imaginary horizontal axis which extends through the third axis of rotation, the second support arm defines a second angle with the imaginary horizontal axis, and the first angle is different from the second angle.

62. A steerable track assembly as defined in any one of claims 54 to 61, wherein the load bearing section is located closer to one of the leading and trailing idlers than to the other of the leading and trailing idlers.

63. A steerable track assembly as defined in claim 57, wherein one of the first and second support arms is longer than the other of the first and second support arms.

65. A steerable track assembly as defined in claim 56, wherein the third axis is located above the first axis and the second axis.

66. A steerable track assembly as defined in claim 54, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, one of the leading and trailing idlers having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane.

67. A steerable track assembly as defined in claim 54, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, the leading idler having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the trailing idler having a

periphery bound between a third upper horizontal imaginary plane and a third lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane and below the third upper horizontal imaginary plane.

68. A steerable track assembly as defined in any one of claims 53 to 67, wherein the plurality of wheels impart a generally triangular path of travel to the endless track.

69. A steerable track assembly as defined in any one of claims 53 to 68, wherein the plurality of wheels define a track supporting and guiding arrangement that is in rolling contact with the inner surface at a plurality of locations, one of said locations being the load bearing section.

76. A steerable track assembly as defined in any one of claims 54 to 75, wherein the drive lug registering in the longitudinal direction of the endless track with a traction projection is a first drive lug and the endless track includes a second drive lug spaced from the first drive lug in a transverse direction of the endless track, the first and second drive lugs being configured to simultaneously engage the drive wheel as the drive wheel imparts motion to the endless track.

77. A steerable track assembly as defined in any one of claims 53 to 76, wherein the vehicle is an All-Terrain Vehicle (ATV).

78. A steerable track assembly as defined in any one of claims 53 to 77, wherein the steering mechanism of the vehicle has handlebars.

79. A steerable track assembly as defined in any one of claims 53 to 78, wherein the vehicle includes a seat that is straddled by a driver of the vehicle.

80. A set of steerable track assemblies for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, wherein each of at least two of the steerable track assemblies is as defined in any one of claims 53 to 79.

101. A method for reducing a transverse rigidity of a steerable endless track for use in a reduced-size vehicle, designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, the endless track being steerable by changing an orientation of the endless track by a steering mechanism of the vehicle, the endless track comprising a plurality of track segments following in succession in a longitudinal direction of the endless track, each track segment including a drive projection projecting from an inner surface of the endless track and a traction projection projecting from an outer ground-engaging surface of the endless track, the drive projection registering in the longitudinal direction of the endless track with the traction projection, the method comprising manufacturing the endless track without providing a stiffening member extending transversally of the endless track in a portion of each track segment between the drive projection and the traction projection.

102. An endless track for a track assembly providing traction to an all-terrain vehicle (ATV), the track assembly being substitutable to a ground-engaging wheel of the ATV, the track assembly being steerable by changing an orientation of the track assembly by a steering mechanism of the ATV, the track assembly comprising a plurality of wheels, the endless track comprising flexible material to flex around the plurality of wheels, the plurality of wheels including a drive wheel for imparting motion to the endless track, the endless track comprising:

a) an inner surface for facing the plurality of wheels;

b) a ground-engaging outer surface opposite to the inner surface;

c) a plurality of drive projections projecting from the inner surface, distributed in a longitudinal direction of the endless track, and positioned to engage the drive wheel; and

c) [*sic*] a plurality of traction projections projecting from the ground-engaging outer surface and distributed in the longitudinal direction of the endless track;

the endless track being free of stiffening inserts extending transversally to the longitudinal direction of the endless track and disposed within the flexible material at areas of the endless track where a given one of the drive projections registers in the longitudinal direction of the endless track with a given one of the traction projections.

107. An endless track as defined in any one of claims 102 to 106, wherein the given one of the drive projections registering in the longitudinal direction of the endless track with the given one of the traction projections is a first given one of the drive projections, a second given one of the drive projections being spaced from the first given one of the drive projections in a transverse direction of the endless track, the first given one of the drive projections and the second given one of the drive projections being configured to simultaneously engage the drive wheel.

108. An endless track as defined in any one of claims 102 to 107, wherein the steering mechanism of the ATV comprises handlebars.

109. An endless track as defined in any one of claims 102 to 108, wherein the ATV comprises a straddle seat for a driver of the ATV.

110. A set of four endless tracks for providing traction to an all-terrain vehicle (ATV), wherein each of at least two of the endless tracks in the set of four endless tracks is an endless track as defined in any one of claims 102 to 110.

111. A track assembly for providing traction to an all-terrain vehicle (ATV), the track assembly being substitutable to a ground-engaging wheel of the A TV, the track assembly being steerable by changing an orientation of the track assembly by a steering mechanism of the ATV, the track assembly comprising:

a) a plurality of wheels; and

b) an endless track disposed around the plurality of wheels, the endless track comprising flexible material to flex around the plurality of wheels, the endless track comprising:

- an inner surface for facing the plurality of wheels;

- a ground-engaging outer surface opposite to the inner surface;

- a plurality of drive projections projecting from the inner surface and distributed in a longitudinal direction of the endless track; and

- a plurality of traction projections projecting from the ground-engaging outer surface and distributed in the longitudinal direction of the endless track;

the endless track being free of stiffening inserts extending transversally to the longitudinal direction of the endless track and disposed within the flexible material at areas of the endless track where a given one of the drive projections registers in the longitudinal direction of the endless track with a given one of the traction projections.

112. A track assembly as defined in claim 111, wherein the plurality of wheels includes:

- a leading idler wheel and a trailing idler -wheel spaced apart in a longitudinal direction of the track assembly, a segment of the endless track extending between the leading idler wheel and the trailing idler wheel defining a ground-engaging run of the endless track; and

- a drive wheel for imparting movement to the endless track.

113. A track assembly as defined in claim 112, wherein the ground-engaging run of the endless track comprises:

- a load bearing section located between the leading idler wheel and the trailing idler wheel and transferring to the ground surface a major portion of the load carried by the track assembly;

- a leading section extending between the leading idler wheel and the load bearing section, the leading section being oriented such as to converge toward the ground surface when the endless track is in motion and propels the ATV in a forward direction; and

- a trailing section extending between the load bearing section and the trailing idler wheel, the trailing section being oriented such as to diverge from the ground surface when the endless track is in motion and propels the ATV in the forward direction.

114. A track assembly as defined in any one of claims 112 and 113, wherein the leading idler wheel rotates about a first axis of rotation, the trailing idler wheel rotates about a second axis of rotation and the drive wheel rotates about a third axis of rotation, a first horizontal distance defined between the first axis of rotation and the third axis of rotation being different from a second horizontal distance defined between the second axis of rotation and the third axis of rotation.

115. A track assembly as defined in claim 114, comprising a support structure having:

- a center portion rotatably supported at the third axis of rotation;

- a first support arm mounted to the center portion and extending along a radial direction of the drive wheel toward a leading end of the track assembly; and

- a second support arm mounted to the center portion and extending along a radial direction of the drive wheel toward a trailing end of the track assembly.

116. A track assembly as defined in claim 115, wherein the first support arm defines a first angle with an imaginary horizontal axis which extends through the third axis of rotation, the second support arm defines a second angle with the imaginary horizontal axis, and the first angle is different from the second angle.

120. A track assembly as defined in any one of claims 113 to 119, wherein the load bearing section is located closer to one of the leading idler wheel and the trailing idler wheel than to the other of the leading idler wheel and the trailing idler wheel.

121. A track assembly as defined in claim 115, wherein one of the first and second support arms is longer than the other of the first and second support arms.

123. A track assembly as defined in claim 114, wherein the third axis of rotation is located above the first axis of rotation and the second axis of rotation.

124. A track assembly as defined in claim 112, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, one of the leading idler wheel and the trailing idler wheel having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane.

125. A track assembly as defined in claim 112, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, the leading idler wheel having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the trailing idler wheel having a periphery bound between a third upper horizontal imaginary plane and a third lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane and below the third upper horizontal imaginary plane.

126. A track assembly as defined in any one of claims 111 to 125, wherein the plurality of wheels impart a generally triangular path of travel to the endless track.

127. A track assembly as defined in any one of claims 113 to 126, wherein the plurality of wheels define a track supporting and guiding arrangement that is in rolling contact with the inner surface at a plurality of locations, one of said locations being the load bearing section.

134. A track assembly as defined in any one of claims 111 to 133, wherein the given one of the drive projections registering in the longitudinal direction of the endless track with the given one of the traction projections is a first given one of the drive projections, a second given one of the drive projections being spaced from the first given one of the drive projections in a transverse direction of the endless track, the first given one of the drive projections and the second given one of the drive projections being configured to simultaneously engage the drive wheel.

135. A track assembly as defined in any one of claims 111 to 134, wherein the steering mechanism of the ATV comprises handlebars.

136. A track assembly as defined in any one of claims 111 to 135, wherein the ATV comprises a straddle seat for a driver of the ATV.

137. A set of track assemblies for traction of an all-terrain vehicle (ATV), wherein each of at least two of the track assemblies is a track assembly as defined in any one of claims 111 to 136.

146. A method for reducing a transverse rigidity of an endless track for use in an all-terrain vehicle (ATV), the endless track being steerable by changing an orientation of the endless track by a steering mechanism of the ATV, the endless track comprising flexible material to flex around a plurality of wheels, the endless track comprising a plurality of track segments following in succession in a longitudinal direction of the endless track, each track segment including a drive projection projecting from an Inner surface of the endless track and a traction projection projecting from a ground-engaging outer surface of the endless track, the drive projection registering in the longitudinal direction of the endless track with the traction projection, the method comprising manufacturing the endless track without disposing a stiffening insert extending transversally to the longitudinal direction of the endless track within the flexible material in a portion of each track segment between the drive projection and the traction projection.

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1. A track assembly for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces, steerable by changing an orientation of the track assembly by a steering mechanism of the vehicle, the track assembly having a leading end and a trailing end and comprising:

a) an endless track having an outer ground engaging surface and an opposite inner surface; and

b) a plurality of wheels for supporting and driving the endless track, the plurality of wheels including:

i) a leading idler and a trailing idler, the leading and trailing idlers being in a spaced apart relationship, a segment of the endless track extending between the leading and trailing idlers defining a ground engaging run, the leading idler having a first axis of rotation, the trailing idler having a second axis of rotation; and

ii) a drive wheel having a third axis of rotation, the drive wheel being in driving engagement with the endless track for imparting movement to the endless track;

the ground engaging run having:

i) a load bearing section located between the leading idler and the trailing idler, the load bearing section transferring to the ground surface a major portion of the load carried by the track assembly, the load bearing section having a longitudinal extent that does not exceed a diameter of the drive wheel;

ii) a leading section extending between the leading idler and the load bearing section, the leading section being oriented such as to converge toward the ground surface when the endless track is in motion and propels the vehicle;

iii) a trailing section extending between the load bearing section and the trailing idler, the trailing section being oriented such as to diverge from the ground surface when the endless track is in motion and propels the vehicle;

a first horizontal distance defined between the first axis of rotation and the third axis of rotation being different from a second horizontal distance defined between the second axis of rotation and the third axis of rotation.

2. A track assembly as defined in claim 1, wherein the longitudinal extent of the load bearing section is less than the diameter of the drive wheel and wherein the reduced-size vehicle is an All-Terrain Vehicle (ATV) with a seat straddled by a user and wherein the steering mechanism has handlebars.

3. A track assembly as defined in any one of claims 1 and 2, wherein the longitudinal extent of the load bearing section does not exceed a radius of the drive wheel.

4. A track assembly as defined in any one of claims 1, 2 and 3, wherein the longitudinal extent of the load bearing section is less than a radius of the drive wheel.

5. A track assembly as defined in any one of claims 1 to 4, wherein an imaginary vertical axis that intersects the third axis of rotation also intersects the load bearing section.

7. A track assembly as defined in any one of claims 1 to 6, including a support structure having:

i) a center portion rotatably supported at the third axis of rotation;

ii) a first support arm mounted to the center portion and extending along a radial direction of the drive wheel toward the leading end of the track assembly;

iii) a second support arm mounted to the center portion and extending along a radial direction of the drive wheel toward the trailing end of the track assembly.

8. A track assembly as defined in claim 7, wherein the first support arm defines a first angle with an imaginary horizontal axis which extends through the third axis of rotation, the second support arm defines a second angle with the imaginary horizontal axis, the first angle being different from the second angle.

10. A track assembly as defined in any one of claims 1 to 9, wherein the drive wheel is in overlapping relationship with one of the leading and trailing idlers, when viewed in a plane that is normal to the third axis of rotation.

11. A track assembly as defined in any one of claims 1 to 9, wherein the drive wheel is in over1apping relationship with the trailing idler, when viewed in a plane normal to the third axis of rotation.

12. A track assembly as defined in any one of claims 1 to 11, wherein the load bearing section is located closer to one of the leading and trailing idlers than to the other of the leading and trailing idlers.

13. A track assembly as defined in claim 7, wherein one of the first and second support arms is longer than the other of the first and second support arms.

15. A track assembly as defined in any one of claims 1 to 14, wherein the endless track is free of stiffening rods extending in a transverse direction of the endless track.

17. A track assembly as defined in any one of claims 1 to 16, wherein the endless track has drive lugs projecting from the inner surface for engagement by the drive wheel.

18. A track assembly as defined in any one of claims 1 to 14, wherein the endless track has a pair of opposite lateral edge portions and a central portion between the lateral edge portions, the opposite lateral edge portions being free of stiffening rods extending in a transverse direction of the endless track.

20. A track assembly as defined in any one of claims 1 to 14, wherein the endless track includes a plurality of track segments, each track segment including a drive projection extending inwardly from the inner face for engaging the drive wheel, and a traction lug projecting from the outer ground engaging surface, the drive projection registering in a longitudinal direction of the endless track with the traction lug, the portion of the track segment defined between the drive projection and the traction lug being free of a stiffening rod extending transversally of the endless track.

21. A track assembly as defined in any one of claims 1 to 14, wherein the endless track has a plurality of drive projections longitudinally spaced apart along the track for sequentially engaging the drive wheel such that rotation of the drive wheel imparts motion of the endless track to propel the vehicle, the endless track having a plurality of traction lugs projecting from the ground engaging outer face, the traction lugs being longitudinally spaced apart and registering with respective drive projections, the endless track being free of stiffening rods extending transversally of the endless track at locations of the endless track at which a drive projection registers with a traction lug.

22. A track assembly as defined in any one of claims 1 to 21, wherein the third axis is located above the first axis and the second axis.

23. A track assembly as defined in any one of claims 1 to 22, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, one of the leading and trailing idlers having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane.

24. A track assembly as defined in any one of claims 1 to 22, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, the leading idler having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the trailing idler having a periphery bound between a third upper horizontal imaginary plane and a third lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane and below the third upper horizontal imaginary plane.

25. A track assembly as defined in any one of claims 1 to 24, wherein the plurality of wheels impart a generally triangular path of travel to the endless track.

26. A track assembly as defined in any one of claims 1 to 25, wherein the plurality of wheels define a track supporting and guiding arrangement that is in rolling contact with the inner surface at a plurality of locations, one of said locations being the load bearing section.

27. A track assembly as defined in any one of claims 1 to 26, wherein the drive wheel has an extent along the third axis of rotation that is less than a transverse dimension of the endless track.

30. A track assembly as defined in any one of claims 1 to 29, wherein the load bearing section is located between a frontmost point and a rearmost point of the drive wheel in a longitudinal direction of the track assembly.

33. A track drive and support assembly for a reduced-size vehicle designed primarily for off-highway usage, over undeveloped roads or other unprepared surfaces steerable by changing an orientation of the track drive and support assembly by a steering mechanism of the vehicle, the track drive and support assembly having a leading end and a trailing end and comprising:

a plurality of wheels for supporting and driving an endless track, the plurality of wheels including:

i) a leading idler and a trailing idler, the leading and trailing idlers being in a spaced apart relationship, the leading idler having a first axis of rotation, the trailing idler having a second axis of rotation; and

ii) a drive wheel having a third axis of rotation, the drive wheel being configured for driving engagement with the endless track for imparting movement to the endless track;

the plurality of wheels being configured to impart to the endless track a path of travel having a ground engaging run that extends between the leading idler and the trailing idler, the ground engaging run having:

i) a load bearing section between the leading idler and the trailing idler, the load bearing section transferring to the ground surface a major portion of the load carried by the track drive and support assembly, the load bearing section having a longitudinal extent that does not exceed a diameter of the drive wheel;

ii) a leading section extending between the leading idler and the load bearing section, the leading section being oriented such as to converge toward the ground surface when the endless track is in motion and propels the vehicle;

iii) a trailing section extending between the load bearing section and the trailing idler, the trailing section being oriented such as to diverge from the ground surface when the endless track is in motion and propels the vehicle;

a first horizontal distance defined between the first axis of rotation and the third axis of rotation being different from a second horizontal distance defined between the second axis of rotation and the third axis of rotation.

34. A track drive and support assembly as defined in claim 33, wherein the longitudinal extent of the load bearing section is less than the diameter of the drive wheel and wherein the reduced-size vehicle is an All-Terrain Vehicle (ATV) with a seat straddled by a user and wherein the steering mechanism has handlebars.

35. A track drive and support assembly as defined in any one of claims 33 and 34, wherein the longitudinal extent of the load bearing section does not exceed a radius of the drive wheel.

36. A track drive and support assembly as defined in any one of claims 33 to 35, wherein the longitudinal extent of the load bearing section is less than a radius of the drive wheel.

37. A track drive and support assembly as defined in any one of claims 33 to 36, wherein an imaginary vertical axis that intersects the third axis of rotation also intersects the load bearing section.

39. A track drive and support assembly as defined in any one of claims 33 to 38, including a support structure having:

a) a center portion rotatably supported at the third axis of rotation;

b) a first support arm mounted to the center portion and extending along a radial direction of the drive wheel toward the leading end of the track drive and support assembly;

c) a second support arm mounted to the center portion and extending along a radial direction of the drive wheel toward the trailing end of the track drive and support assembly.

40. A track drive and support assembly as defined in claim 39, wherein the first support arm defines a first angle with an imaginary horizontal axis that intersects the third axis of rotation, the second support arm defining a second angle with the imaginary horizontal axis, the first angle being different than the second angle.

42. A track drive and support assembly as defined in any one of claims 33 to 41, wherein the drive wheel is in overlapping relationship with one of the leading and trailing idlers, when viewed in an imaginary plane that is normal to the third axis.

43. A track drive and support assembly as defined in any one of claims 33 to 42, wherein the drive wheel is in overlapping relationship with the trailing idler, when viewed in an imaginary plane that is normal to the third axis.

44. A track drive and support assembly as defined in any one of claims 33 to 43, wherein the load bearing section is located closer to one of the leading and trailing idlers than to the other of the leading and trailing idlers.

45. A track drive and support assembly as defined in claim 39, wherein one of the first and second support arms is longer than the other of the first and second support arms.

47. A track drive and support assembly as defined in any one of claims 33 to 46, wherein the third axis is located above the first axis and the second axis.

48. A track drive and support assembly as defined in any one of claims 33 to 47, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, one of the leading and trailing idlers having a periphery bound

between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane.

49. A track drive and support assembly as defined in any one of claims 33 to 47, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, the leading idler having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the trailing idler having a periphery bound between a third upper horizontal imaginary plane and a third lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane and below the third upper horizontal imaginary plane.

50. A track drive and support assembly as defined in any one of claims 33 to 49, wherein the path of travel is generally triangular.

51. A track drive and support assembly as defined in any one of claims 33 to 50, wherein the track drive and support assembly is configured such that the plurality of wheels establish a rolling contact with the inner surface of the endless track at a plurality of locations, one of said locations being the load bearing section.

54. A track assembly for an All-Terrain Vehicle (ATV), steerable by changing an orientation of the track assembly by a steering mechanism of the ATV, the track assembly having a leading end and a trailing end and comprising:

a) an endless track having an outer ground-engaging surface and an opposite inner surface; and

b) a plurality of wheels for supporting and driving the endless track, the plurality of wheels including:

i) a leading idler and a trailing idler in a spaced apart relationship, a segment of the endless track extending between the leading and trailing idlers defining a ground-engaging run, the leading idler having a first axis of rotation, the trailing idler having a second axis of rotation; and

ii) a drive wheel in driving engagement with the endless track for imparting movement to the endless track, the drive wheel having a third axis of rotation;

a first horizontal distance defined between the first axis of rotation and the third axis of rotation being different from a second horizontal distance defined between the second axis of rotation and the third axis of rotation;

wherein the ground-engaging run has:

i) an intermediate section located between the leading idler and the trailing idler and having a longitudinal extent not exceeding a diameter of the drive wheel;

ii) a leading section rising from the intermediate section and extending towards the leading idler; and

iii) a trailing section rising from the intermediate section and extending towards the trailing idler.

55. A track assembly as defined in claim 54, wherein the longitudinal extent of the intermediate section is less than the diameter of the drive wheel and wherein the ATV has a seat straddled by a user and wherein the steering mechanism has handlebars.

56. A track assembly as defined in any one of claims 54 and 55, wherein the longitudinal extent of the intermediate section does not exceed a radius of the drive wheel.

57. A track assembly as defined in any one of claims 54 to 56, wherein the longitudinal extent of the intermediate section is less than a radius of the drive wheel.

58. A track assembly as defined in any one of claims 54 to 57, wherein an imaginary vertical axis that intersects the third axis of rotation also intersects the intermediate section.

60. A track assembly as defined in any one of claims 54 to 59, including a support structure having:

i) a center portion rotatably supported at the third axis of rotation;

ii) a first support arm mounted to the center portion and extending along a radial direction of the drive wheel toward the leading end of the track assembly;

iii) a second support arm mounted to the center portion and extending along a radial direction of the drive wheel toward the trailing end of the track assembly.

61. A track assembly as defined in claim 60, wherein the first support arm defines a first angle with an imaginary horizontal axis which extends through the third axis of rotation, the second support arm defines a second angle with the imaginary horizontal axis, the first angle being different from the second angle.

63. A track assembly as defined in any one of claims 54 to 62, wherein the drive wheel is in overlapping relationship with one of the leading and trailing idlers, when viewed in an imaginary plane that is normal to the third axis of rotation.

64. A track assembly as defined in any one of claims 54 to 62, wherein the drive wheel is in overlapping relationship with the trailing idler, when viewed in an imaginary plane normal to the third axis of rotation.

65. A track assembly as defined in any one of claims 54 to 64, wherein the intermediate section is located closer to one of the leading and trailing idlers than to the other of the leading and trailing idlers.

66. A track assembly as defined in claim 60, wherein one of the first and second support arms is longer than the other of the first and second support arms.

68. A track assembly as defined in any one of claims 54 to 67, wherein the endless track is free of stiffening rods extending in a transverse direction of the endless track.

70. A track assembly as defined in any one of claims 54 to 69, wherein the endless track has drive lugs projecting from the inner surface for engagement by the drive wheel.

71. A track assembly as defined in any one of claims 54 to 67, wherein the endless track has a pair of opposite lateral edge portions and a central portion between the lateral edge portions, the opposite lateral edge portions being free of stiffening rods extending in a transverse direction of the endless track.

73. A track assembly as defined in any one of claims 54 to 67, wherein the endless track includes a plurality of track segments, each track segment including a drive projection extending inwardly from the inner face for engaging the driving wheel, and a traction lug projecting from the outer ground engaging surface, the drive projection registering in a longitudinal direction of the endless track with the traction lug, the portion of the track segment defined between the drive projection and the traction lug being free of a stiffening rod extending transversally of the endless track.

74. A track assembly as defined in any one of claims 54 to 67, wherein the endless track has a plurality of drive projections extending inwardly from the inner face, the drive projections being longitudinally spaced apart along the track, the endless track having a plurality of traction lugs projecting from the ground engaging outer face, the traction lugs being longitudinally spaced apart along the track and registering with respective drive projections, the endless track being free of stiffening rods extending transversally of the endless track at multiple locations of the endless track at which a drive projection registers with a traction lug.

75. A track assembly as defined in any one of claims 54 to 74, wherein the intermediate section is located between a frontmost point and a rearmost point of the drive wheel in a longitudinal direction of the track assembly.

76. A track assembly for an All-Terrain Vehicle (ATV), steerable by changing an orientation of the track assembly by a steering mechanism of the ATV, the track assembly having a leading end and a trailing end and comprising:

a) an endless track having an outer ground engaging surface and an opposite inner surface; and

b) a plurality of wheels for supporting and driving the endless track, the plurality of wheels including:

i) a leading idler and a trailing idler, the leading and trailing idlers being in a spaced apart relationship, a segment of the endless track extending between the leading and trailing idlers defining a ground engaging run, the leading idler having a first axis of rotation, the trailing idler having a second axis of rotation; and

ii) a drive wheel having a third axis of rotation, the drive wheel being in driving engagement with the endless track for imparting movement to the endless track;

the ground engaging run having:

i) a load bearing section located between the leading idler and the trailing idler, the load bearing section transferring to the ground surface a major portion of the load carried by the track assembly, the load bearing section having a longitudinal extent that does not exceed a diameter of the drive wheel;

ii) a leading section extending between the leading idler and the load bearing section; and

iii) a trailing section extending between the load bearing section and the trailing idler;

a first horizontal distance defined between the first axis of rotation and the third axis of rotation being different from a second horizontal distance defined between the second axis of rotation and the third axis of rotation.

77. A track assembly as defined in claim 76, wherein the longitudinal extent of the load bearing section is less than the diameter of the drive wheel and wherein the A TV has a seat straddled by a user and wherein the steering mechanism has handlebars.

78. A track assembly as defined in any one of claims 76 and 77, wherein the longitudinal extent of the load bearing section does not exceed a radius of the drive wheel.

79. A track assembly as defined in any one of claims 76 to 78, wherein the longitudinal extent of the load bearing section is less than a radius of the drive wheel.

80. A track assembly as defined in any one of claims 76 to 79, wherein an imaginary vertical axis that intersects the third axis of rotation also intersects the load bearing section.

82. A track assembly as defined in any one of claims 76 to 81, including a support structure having:

i) a center portion rotatably connected at the third axis of rotation;

ii) a first support arm mounted to the center portion and extending along a radial direction of the drive wheel toward the leading end of the track assembly;

iii) a second support arm mounted to the center portion and extending along a radial direction of the drive wheel toward the trailing end of the track assembly.

83. A track assembly as defined in claim 82, wherein the first support arm defines a first angle with an imaginary horizontal axis which extends through the third axis of rotation, the second support arm defines a second angle with the imaginary horizontal axis, the first angle being different from the second angle.

85. A track assembly as defined in any one of claims 76 to 84, wherein the drive wheel is in overlapping relationship with one of the leading and trailing idlers, when viewed in an imaginary plane that is normal to the third axis of rotation.

86. A track assembly as defined in any one of claims 76 to 85, wherein the drive wheel is in overlapping relationship with the trailing idler, when viewed in an imaginary plane normal to the third axis of rotation.

87. A track assembly as defined in any one of claims 76 to 86, wherein the load bearing section is located closer to one of the leading and trailing idlers than to the other of the leading and trailing idlers.

88. A track assembly as defined in claim 82, wherein one of the first and second support arms is longer than the other of the first and second support arms.

90. A track assembly as defined in any one of claims 76 to 89, wherein the endless track is free of stiffening rods extending in a transverse direction of the endless track.

92. A track assembly as defined in any one of claims 76 to 91, wherein the endless track has drive lugs projecting from the inner surface for engagement by the drive wheel.

93. A track assembly as defined in any one of claims 76 to 89, wherein the endless track has a pair of opposite lateral edge portions and a central portion between the lateral edge portions, the opposite lateral edge portions being free of stiffening rods extending in a transverse direction of the endless track.

95. A track assembly as defined in any one of claims 76 to 89, wherein the endless track includes a plurality of track segments, each track segment including a drive projection extending inwardly from the inner face for engaging the driving wheel, and a traction lug projecting from the outer ground engaging surface, the drive projection registering in a longitudinal direction of the endless track with the traction lug, the portion of the track segment defined between the drive projection and the traction lug being free of a stiffening rod extending transversally of the endless track.

96. A track assembly as defined in any one of claims 76 to 89, wherein the endless track has a plurality of drive projections extending inwardly from the inner face, the drive projections being longitudinally spaced apart along the track for sequentially engaging the drive wheel such that rotation of the drive wheel imparts motion of the endless track to propel the vehicle, the endless track having a plurality of traction lugs projecting from the ground engaging outer face, the traction lugs being longitudinally spaced apart and registering with respective drive projections, the endless track being free of stiffening rods extending transversally of the endless track at a plurality of locations of the endless track at which a drive projection registers with a traction lug.

101. A track assembly as defined in any one of claims 76 to 100, wherein the third axis is located above the first axis and above the second axis.

102. A track assembly as defined in any one of claims 76 to 101, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, one of the leading and trailing idlers having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane.

103. A track assembly as defined in any one of claims 76 to 101, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal

imaginary plane, the leading idler having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the trailing idler having a periphery bound between a third upper horizontal imaginary plane and a third lower horizontal imaginary plane, the first lower horizontal plane being imaginary positioned below the second upper horizontal imaginary plane and below the third upper horizontal imaginary plane.

104. A track assembly as defined in any one of claims 76 to 103, wherein the plurality of wheels impart a generally triangular path of travel to the endless track.

105. A track assembly as defined in any one of claims 76 to 104, wherein the plurality of wheels define a track supporting and guiding arrangement that is in rolling contact with the inner surface of the endless track at a plurality of locations, one of said locations being the load bearing section.

106. A track assembly as defined in any one of claims 76 to 105, wherein the drive wheel has an extent along the third axis of rotation that is less than a transverse dimension of the endless track.

107. A track assembly as defined in any one of claims 76 to 106, wherein the load bearing section is located between a frontmost point and a rearmost point of the drive wheel in a longitudinal direction of the track assembly.

108. A track assembly for providing traction to an all-terrain vehicle (ATV), the track assembly being configured to replace a ground-engaging wheel of the ATV, the track assembly being steerable by a steering mechanism of the ATV to change an orientation of the track assembly in order to steer the ATV, the track assembly comprising:

a) a plurality of wheels including:

- a drive wheel; and
- a leading idler wheel adjacent to a leading end of the track assembly and a trailing idler wheel adjacent to a trailing end of the track assembly;

and

b) an endless track disposed around the plurality of wheels and comprising:

- an inner surface for facing the plurality of wheels, the drive wheel being rotatable to impart motion of the endless track;
- a ground-engaging outer surface opposite to the inner surface; and
- a plurality of traction projections projecting from the ground-engaging outer surface;

a bottom run of the endless track being located under the leading idler wheel and the trailing idler wheel and extending in a longitudinal direction of the track assembly from an axis of rotation of the leading idler wheel to an axis of rotation of the trailing idler wheel;

wherein:

i) the plurality of wheels is configured to bend the bottom run of the endless track such that, when the track assembly is on hard horizontal ground, a ground-contacting area of the endless track in contact with the hard horizontal ground has an extent in the longitudinal direction of the track assembly that does not exceed a diameter of the drive wheel; and

ii) a distance between an axis of rotation of the drive wheel and the axis of rotation of the leading idler wheel in the longitudinal direction of the track assembly is different from a distance between the axis of rotation of the drive wheel and the axis of rotation of the trailing idler wheel in the longitudinal direction of the track assembly.

109. A track assembly as defined in claim 108, wherein the extent of the ground-contacting area of the endless track in the longitudinal direction of the track assembly is less than the diameter of the drive wheel.

110. A track assembly as defined in claim 109, wherein the extent of the ground-contacting area of the endless track in the longitudinal direction of the track assembly does not exceed a radius of the drive wheel.

111. A track assembly as defined in claim 110, wherein the extent of the ground-contacting area of the endless track in the longitudinal direction of the track assembly is less than the radius of the drive wheel.

112. A track assembly as defined in any one of claims 108 to 111, wherein the distance between the axis of rotation of the drive wheel and the axis of rotation of the leading idler wheel in the longitudinal direction of the track assembly is greater than the distance between the axis of rotation of the drive wheel and the axis of rotation of the trailing idler wheel in the longitudinal direction of the track assembly.

113. A track assembly as defined in any one of claims 108 to 112, comprising a track frame supporting the leading idler wheel and the trailing idler wheel and comprising a first arm extending downwardly and forwardly towards the leading idler wheel and a second arm extending downwardly and rearwardly towards the trailing idler wheel.

114. A track assembly as defined in claim 113, wherein the first arm is longer than the second arm.

116. A track assembly as defined in any one of claims 108 to 115, wherein an imaginary vertical axis that intersects the axis of rotation of the drive wheel also intersects the ground-contacting area of the endless track.

118. A track assembly as defined in any one of claims 108 to 117, wherein the drive wheel is in overlapping relationship with one of the leading idler wheel and the trailing idler wheel, when viewed in a plane that is normal to the axis of rotation of the drive wheel.

119. A track assembly as defined in claim 118, wherein the drive wheel is in overlapping relationship with the trailing idler wheel, when viewed in the plane normal to the axis of rotation of the drive wheel.

120. A track assembly as defined in any one of claims 108 to 119, wherein the ground-contacting area of the endless track is located closer to one of the leading idler wheel and the trailing idler wheel than to the other of the leading idler wheel and the trailing idler wheel.

121. A track assembly as defined in any one of claims 108 to 120, wherein the endless track is free of stiffening rods extending in a transverse direction of the endless track.

123. A track assembly as defined in any one of claims 108 to 122, wherein the endless track comprises a plurality of drive lugs projecting from the inner surface for engagement with the drive wheel.

124. A track assembly as defined in any one of claims 108 to 120, wherein the endless track has a pair of lateral edge portions and a central portion between the lateral edge portions, the lateral edge portions being free of stiffening rods extending in a transverse direction of the endless track.

126. A track assembly as defined in any one of claims 108 to 120, wherein the endless track includes a plurality of track segments, each track segment including (i) a drive projection projecting from the inner face to engage the drive wheel and (ii) a given one of the traction projections that registers with the drive projection in a longitudinal direction of the endless track, the track segment being free of a stiffening rod extending transversally of the endless track between the drive projection and the given one of the traction projections.

127. A track assembly as defined in any one of claims 108 to 120, wherein the endless track comprises a plurality of drive projections projecting from the inner surface for engaging the drive wheel, the drive projections registering with respective ones of the traction projections in a longitudinal direction of the endless track, the endless track being free of stiffening rods extending transversally of the endless track at locations at which a drive projection registers with a traction projection.

128. A track assembly as defined in any one of claims 108 to 127, wherein the drive wheel has a periphery bound between a first upper horizontal imaginary plane and a first lower horizontal imaginary plane, the leading idler wheel having a periphery bound between a second upper horizontal imaginary plane and a second lower horizontal imaginary plane, the trailing idler wheel having a periphery bound between a third upper horizontal imaginary plane and a third lower horizontal imaginary plane, the first lower horizontal imaginary plane being positioned below the second upper horizontal imaginary plane and below the third upper horizontal imaginary plane.

129. A track assembly as defined in any one of claims 108 to 128, wherein the plurality of wheels imparts a generally triangular path of travel to the endless track.

130. A track assembly as defined in any one of claims 108 to 129, wherein the drive wheel has an extent along its axis of rotation that is less than a transverse dimension of the endless track.

132. A track assembly as defined in any one of claims 108 to 131, wherein the steering mechanism of the ATV comprises handlebars.

133. A set of track assemblies for providing traction to an all-terrain vehicle (ATV), wherein at least two of the track assemblies are as defined in any one of claims 108 to 132.

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