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(54) Title: WHEEL TRACTION COVER WITH TRACTION PADS

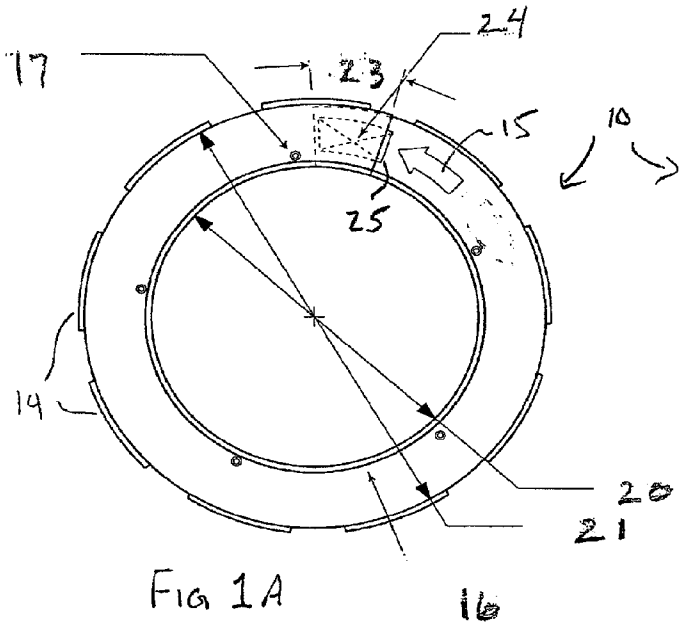

Fig 1A

(57) Abstract: A wheel traction cover includes an interior skirt, an exterior skirt and outer circumferential belt extending between the skirts having a plurality of traction pads extending outward from the belt.

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WHEEL TRACTION COVER WITH TRACTION PADS

The present application claims priority to the October 1, 2007 filing date of provisional patent application, U.S. Ser. No. 60/976,664 which is incorporated herein by reference.

Field of the Invention

[0001] This invention relates to a removable traction device for vehicle tires, the device having traction pads for improving traction between the tires and slippery or wet surfaces.

Background of the Invention

[0002] Certain tires are usually not suitable for use in snowy road situations and it has been the practice to put chains on tires for use on snow covered surfaces. The fitting of chains is cumbersome and time consuming. An alternative is to provide specially designed snow tires which can be fitted to a vehicle for use during adverse weather conditions, but these tires need to be removed and replaced with normal tires, at least on a seasonal basis.

[0003] Other types of traction devices are also known, such as in U.S. Patent No. 3,335,776 which describes an expandable traction device comprising a band of flexible material fitted around the tire and bonded to the tire by means of a pressure adhesive. Also a variety of plastic or fabric "sock" like covering for tires have been designed such as disclosed in U.S. Patent No. 5,624,509 and 7,013,548. Various techniques have also attempted to attach traction devices around wheels including U.S. Patent No. 6,308,757.

[0004] Many issues must be addressed when adding traction devices to vehicle tires, particularly, truck and automobile tires which may be driven at speeds between 30-60 miles an hour, even in adverse weather conditions. When driven at speeds approaching at least 30 miles an hour, traction products may cause undesirable sound and harsh vibration. In addition, some devices may track badly and become misaligned on vehicle tires after relatively short distances.

Other products have very limited durability and provide only a short useful life. Durability issues are aggravated by harsh conditions including abrasion, friction and heat, and simply the stress of being used on a vehicle weighing between about one and three tons, or even more for commercial vehicles.

[0005] While fabric coverings or "socks" for vehicle tires have achieved some of the desired benefits, previous sock-like products have failed to offer sufficiently increased traction, particularly on icy surfaces. Accordingly, a need exists for an improved traction enhancing device for vehicle tires that can be easily installed, provides good performance and durability characteristics, and provides greater traction enhancing benefits that have heretofore been available.

Summary of the Invention

[0006] To address these and other concerns, a device has been designed comprised of a fabric tire covering with an outer circumference or belt to which traction pads are attached. Traction pads may be advantageously made of flexible urethane plastic or rubber. The flexible traction pads provide for greater durability and traction than wheel sock devices made exclusively of fabric. Metal ice studs or similar devices to increase traction on ice may also be incorporated into the traction pads. The belt portion of the device can be made of fabric with traction pads bonded, stitched or otherwise attached to it, or the belt may be comprised entirely of urethane or rubber with traction pads attached or molded into the belt. The circumferential belt is advantageously provided with an inner side skirt and an outer side skirt, both of which are made of a durable fabric or fabric like material. The outer side skirt may cover the outer face of the vehicle tire completely or may leave the center of the wheel and tire assembly uncovered. The primary purpose of the inner and outer skirts is to support the outer circumferential belt and to

hold it in the proper position so that the traction pads remain positioned around the circumference of the tire. The entire wheel covering itself may be split radially on its circumference for ease of installation, or it may be circumferentially continuous and installed over the tire in a sock like fashion.

[0007] In one embodiment of the invention the traction pads have traction enhancing displacement chambers as described in U.S. Patent No. 6,308,757, however, other traction patterns such as chevrons or traction ridges may be suitably used in alternative embodiments. In a further enhancement of the device, metal spikes or snow studs formed of any ice traction enhancing hardened material may be incorporated into the flexible traction pads on the outer circumference of the device.

Brief Description of the Drawings

[0008] The present invention will be understood from the detailed description below taken in reference with the accompanying drawings that are provided by way of illustration only and thus are not limiting of the present invention and wherein:

[0009] Figure 1A is an exterior side plan view of an embodiment of a wheel cover according to the invention.

[00010] Figure 1B is an end view of the wheel cover of Figure 1A.

[00011] Figure 1C is an interior side plan view of the wheel cover of Figure 1A.

[00012] Figure 2 is a sectional view of an embodiment of a wheel cover according to the invention in place over a vehicle tire.

[00013] Figure 3A is an exterior side plan view of a second embodiment of a wheel cover according to the present invention.

[00014] Figure 3B is an end plan view of the wheel cover of Figure 3A.

[00015] Figure 4 is a perspective view of an exemplary traction pad that may be used with wheel covers of the present invention.

[00016] Figure 5A is an exterior side plan view of a third embodiment of a wheel cover according to the invention.

[00017] Figure 5B is an end view of the wheel cover of Figure 5A.

[00018] Figure 6 is an exterior side plan view of a fourth embodiment of a wheel cover according to the invention.

[00019] Figure 7 is a top plan view of a second exemplary traction pad that may be used with wheel covers of the present invention.

[00020] Figure 8 is a sectional view of the traction pad of Figure 7 taken along line A-A.

[00021] Figure 9 is a sectional view of the traction pad of Figure 7 taken along the line B-B.

[00022] Figure 10A is a top plan view of a third exemplary traction pad that may be used with wheel covers of the present invention.

[00023] Figure 10B is a side sectional view of the traction pad of Figure 10A shown in position on a tire.

Detailed Description of the Drawings

[00024] Turning then to Figure 1A, a wheel cover **10** is illustrated with outer skirt **16** having an inner diameter **20** and an outer diameter **21**, a plurality of eyelets **17**, a directional arrow **15** and hook fasteners **24** on inner surface and loop fasteners **25** on outer surface and overlapping portion **23** allowing the hook and loop pads **24, 25** to grip one another. In Figure 1B traction pads **14** are shown mounted in place on outer circumferential belt **12** which has a width **22**. Outer circumferential belt **12** extends between the outer skirt **16** in Figure 1A and the inner skirt **18** in Figure 1C.

[00025] The skirts **16, 18** may be manufactured from a variety of material such as 600 denier polyester or nylon fabric, neoprene or PVC coated tarp material, or other substantial woven, nonwoven and impregnated fabrics. The belt **12** may similarly be made of a variety of materials including urethane or rubber, but more preferably thick rubber coated cloth or other impregnated woven or nonwoven fabrics, 1000 denier nylon fabric or other substantial fabric-like material. The illustrated cover **10** is split radially with overlapping segment **23** so that hook fastener pad **24** at leading edge can be placed on the tire and then covered by trailing edge with hook fastener pad **25** so that hook and loop fasteners on respective pads **24, 25** secure the cover **10** on the tire. Further, securing means such as elastic straps may be affixed to eyelets **17** to pull the cover **10** against the vehicle tire. The difference in the inner diameter **20** and outer diameter **21** of the skirts **16, 18** is typically on the order of 6 to12 inches. Thus, an exemplary size for a wheel cover according to the invention designed for use on a 265/70-16 passenger car tire might be inner diameter of 22 inches, an outer diameter of 31 inches and a width of a 8.5 inches. The overlapping section **23** is typically on the order of 3-12 inches in length depending on the exact fastening configuration.

[00026] Figure 2 illustrates an alternative embodiment of a wheel cover **10** having inner skirt **18,** outer skirt **16** and circumferential belt **12.** Traction pads **14** are attached to circumferential belt **12** by stitching **32** and adhesive **33.** At the interior inner edges of skirts **16, 18** are formed pockets **19** which may advantageously include elastic bands or illustrated cable sheaths **26** and cables **28**. Cable sheaths **26** are typically plastic tubing such as 0.25 to 0.375 inch outer diameter polyethylene tubes. Cables **28** are preferably braided wire cables or rope.

[00027] Figure 3A illustrates a side view of an embodiment of a wheel cover **10** with cables **28** and inner skirt pockets **19.** The cover **10** has outer skirt **16**, traction pads **14,** directional

indicators **15,** outer diameter **21** and overlapping segment **23**. Here it is seen that cable **28** is fixed at one end to a cable fastening device **27** and the other end of the cable **28** is fed around the inner skirt pocket **19** and back to the fastening device **27** and tightened appropriately. The cable fastening device **27** may be a ratchet mechanism, a cable turnbuckle, flexible straps with D-rings, or other adjustable fastening device. Figure 3A also shows that the spacing between traction pad **14** centers may advantageously be approximately 25 degrees permitting mounting of fourteen pads on a car sized tire. Generally, it has been determined too few traction pads **14** leads to a rough noisy ride, while between about 9 to 25 pads having an angular spacing of between 14° and 40° between centers, produces a more comfortable ride experience. On a car tire, traction pads **14** will typically be about 6" wide and 4" to 5" in length. The spacing between pads should not exceed about 2.5" and the spacing should permit one pad to always be in contact with the road surface. Pads **14** preferably have a durometer of between about 60-80 Shore A hardness.

[00028] Figure 4 illustrates a representative traction pad **14** having metal studs **30** to improve ice traction and displacement chambers **31** according to U.S. Patent No. 6,308,757 to improve traction in various adverse conditions. It is to be appreciated that traction pads may be made of a wide variety of materials, preferably urethane or rubber, may or may not include ice studs and may advantageously be utilized in many other configurations than that of Figure 4 including simple chevron tread designs. Preferably, the traction pads **14** with displacement chambers have a relatively soft durometer, between about 60-65 durometer, although substantial variations durometer may be appropriate for different applications. In the exemplary embodiment, metal studs have a base about 0.6 inches in diameter and a plurality of small feet having an area of about 0.01 square inches to mate securely with a base urethane layer having a thickness of about 0.02 to 0.04 inches, and an upstanding metal spike about 0.15 to 0.2 inches in diameter and

extending upwards from the base approximately 0.4 inches to protrude through an upper urethane layer and provide traction on ice or other slippery surface.

[00029] Fastening traction pads **14** to belt **12** presents structural issues due to stresses placed upon pads **14**, as well as the heat, friction and abrasion that wheel covers **10** are subjected to when driven at reasonable speeds. Accordingly, it is desirable to utilize rubber traction pads that have been abraded on their mounting surface with a cushion adhesive to affix those pads to a cured rubber coated cloth belt **12.** This bonding of the pads may be further enhanced by stitching with heavy duty thread on the flanges or in the recessed portions of the pads **14**.

[00030] Figure 5A illustrates wheel cover **110**, with outer skirt **116** having an inner diameter **120** and an outer diameter **121**, a directional arrow **115**, hook fasteners **124** on inner surface, loop fasteners **125** on outer surface and over lapping portion **123** allowing the hook and loop pads **124**, **125** to grip one another. In Figure 5B, traction pads **114** are shown mounted in place on outer circumferential belt **112** which has a width **122**.

[00031] Figure 6 illustrates another wheel cover **210,** with outer skirt **216** having an inner diameter **220,** an outer diameter **221**, a directional arrow **215** and flexible belts **228**, **229** with D-rings **208**, **211**, to secure the inner diameter of the skirt **216**. Another flexible belt **224** may be provided with hook and loop fasteners to hold the flexible belts **228**, **229** in position. The outer circumferential belt **212** has traction pads **214** mounted thereon.

[00032] Figure 7 illustrates an alternative traction pad **314** which is shown in partial sectional views in Figure 8 and Figure 9. Traction pad **314** is approximately 5-6 inches wide and 4 inches in length with a raised grid **335** separating depressions **334** in the pad **314**. Again, the pad can be braided upon its bottom mounting surface and is secured with a cushion adhesive to a cured rubber coated cloth belt. Of particular note are studs **330** with stabilizing members such as rear

support **331** and front support **332** to hold stud **330** in place with protruding edge **333** grasping the surface on which the tire is traveling. A single stud **330** on each side of the traction pad **314** is preferred, although multiple studs and varied configurations are possible. The height from the stabilizing feet **331, 332** to the top of the protruding edge **333** is approximately one-third of an inch. The depth of the depressions **334** in the traction pad **314** is approximately one-sixth of an inch. Traction pads **14** also have a flange of between about one-eighth and one-fifteenth of an inch, and the flange allows the traction pads **314** to be easily stitched to the outer circumferential belt.

[00033] The details of an alternative preferred traction pad **414** are illustrated in Figures 10A and 10B. This traction pad **414** has the same outer flange **436,** depressions **334**, and raised grid **435,** as prior traction pads. However, a rigid and preferably metal cleat **430** has as stabilizing members a forward positioning foot **432** and a rear positioning foot **431** that may be received in the tread of the tire upon which the traction device **10** is secured. In this fashion, when the tire **11** rotates, the positioning feet **432, 431** hold the cleat **430** in position relative to the tire and the protruding edge **433** is able to grip the ice or other material that the tire is contacting securely and the outer circumferential belt **12** of traction device **10** is not permitted to slip with respect to the tire **11**.

[00034] Although the only illustrated embodiments of the wheel cover **10** are shown split radially for ease of fastening about the vehicle tire, it is also possible to manufacture wheel covers in a continuous fashion without hook and loop or other fastening devices. In such cases, it is desirable to place an elastic band or other tensioning device in the wheel cover **10**, such as in inner skirt pocket **19** illustrated in Figure 2.

[00035] All publications, patent, and patent documents mentioned herein are incorporated by reference herein as though individually incorporated by reference. Although preferred embodiments of the present invention have been disclosed in detail herein, it will be understood that various substitutions and modifications may be made to the disclosed embodiment described herein without departing from the scope and spirit of the present invention as recited in the appended claims.

CLAIMS

I claim:

1. A wheel traction cover comprising:

an interior skirt;

an exterior skirt;

an outer circumferential belt extending between interior skirt and exterior skirt; and

a plurality of traction pads mounted to and extending outward from the outer circumferential belt.

2. The wheel traction cover of claim 1 wherein the traction pads have a diameter of between 60-80 Shore A hardness.

3. The wheel traction cover of claim 1 wherein the traction pads further comprise a metal stud.

4. The wheel traction cover of claim 3 wherein the metal stud further comprises forward and rear stabilizing members.

5. The wheel traction cover of claim **4** wherein the wheel traction cover is mounted around a vehicle tire having a tread design and the stabilizing members are received within recesses in the tread design.

6. The wheel traction cover of claim 1 wherein the outer circumferential belt is circumferentially continuous.

7. The wheel traction cover of claim 1 wherein the outer circumferential belt is split radially.

8. The wheel traction cover of claim 1 wherein between 9 and 25 traction pads are mounted to the outer circumferential belt.

9. The wheel traction cover of claim 1 wherein the outer circumferential belt is fabricated from at least one of the group of rubber coated cloth, rubber or urethane impregnated woven fabric, rubber or urethane impregnated nonwoven fabric, and 1000 denier nylon fabric.

10. The wheel traction cover of claim 1 wherein at least one of the interior skirt and the exterior skirt has an interior edge with a pocket.

11. The wheel traction cover of claim 10 wherein the pocket holds a cable or an elastic band to secure the skirt about a vehicle tire.

12. The wheel traction cover of claim 1 wherein at least one of the interior skirt or exterior skirt has an interior edge with eyelets to receive securing means.

13. The wheel traction cover of claim 7 wherein a leading edge of the cover has an outward facing fastener material and can be placed on a vehicle tire and covered by a trailing edge of the wheel traction cover having an inward facing fastener material that cooperates with the outer facing fastener material to secure the wheel traction cover about the vehicle tire.

14. The wheel traction of claim 1 wherein the traction pads are integrally molded in the outer circumferential belt.

15. The wheel traction cover of claim 1 wherein the traction pads are attached to the circumferential belt by stitching and adhesives.

16. The wheel traction cover of claim 1 wherein the spacing between traction pads does not exceed 2.5 inches.

17. The wheel traction cover of claim 1 wherein the traction pads further comprise displacement chambers.

18. A wheel traction cover comprising:

an interior skirt;

an exterior skirt;

an outer circumferential belt extending between interior skirt and exterior skirt, all of the interior skirt, exterior skirt and outer circumferential belt being split radially; and

a plurality of traction pads mounted to and extending outward from the outer circumferential belt wherein at least one of the interior skirt and the exterior skirt has an interior edge with a pocket and the pocket holds a cable or an elastic band to secure the skirt about a vehicle tire.

19. The wheel traction cover of claim 18 wherein the traction pads are angularly displaced from one another by between 18 and 30 degrees and the spacing between the traction pads does not exceed 2.5 inches.

20. The wheel traction cover of claim 18 wherein the traction pads further comprise a metal stud with forward and rear stabilizing members so that when the wheel traction cover is mounted around a vehicle tire having a tread design, the forward and rear stabilizing members are received within recesses in the tread design.

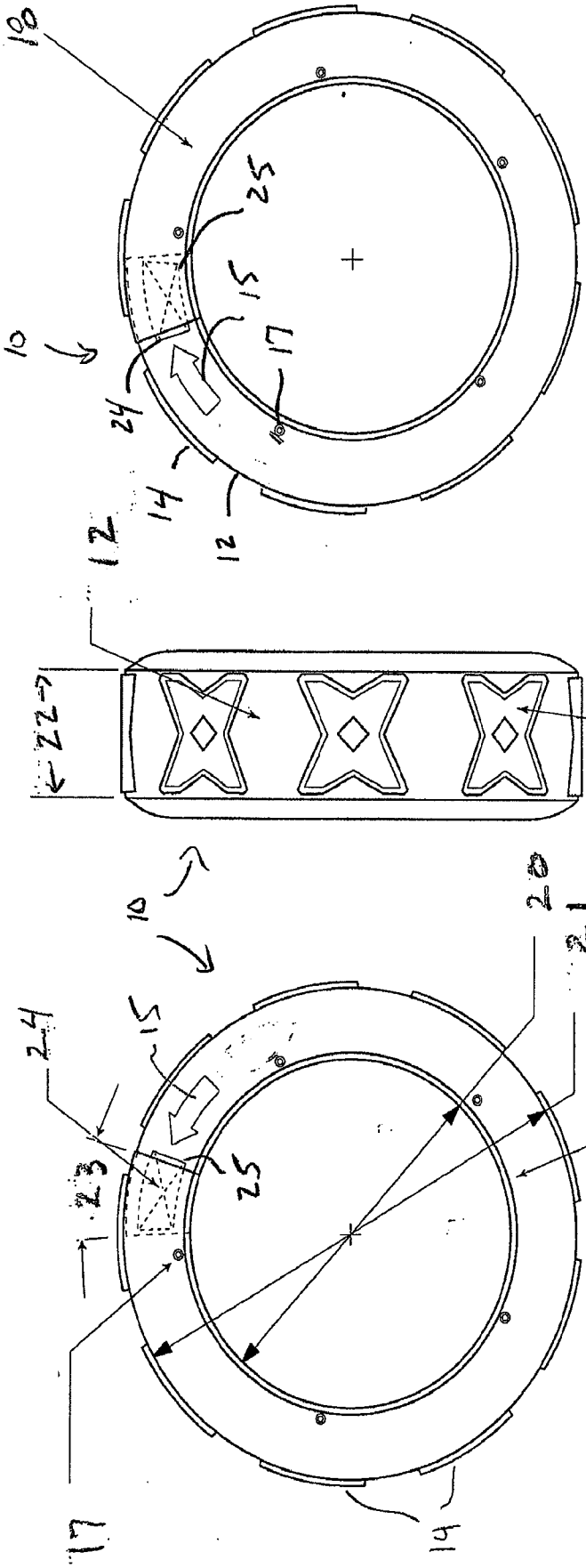


FIG 1C

FIG 1B

FIG 1A 16

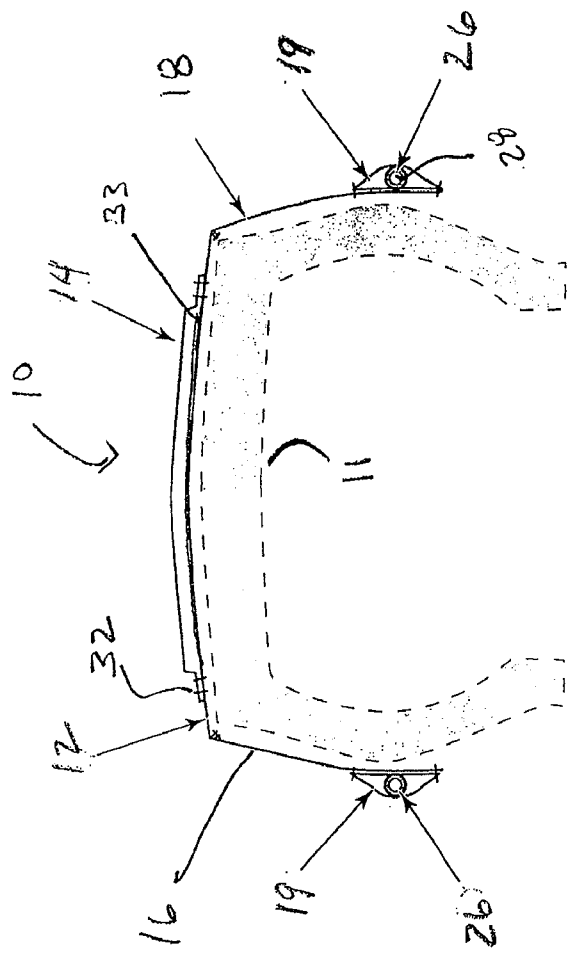


FIG 2

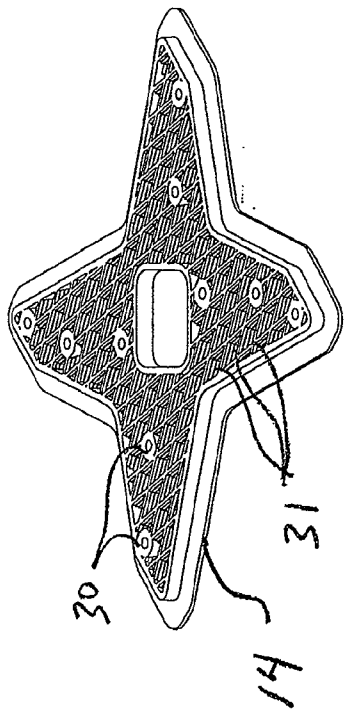


FIG 4

FIG 3B

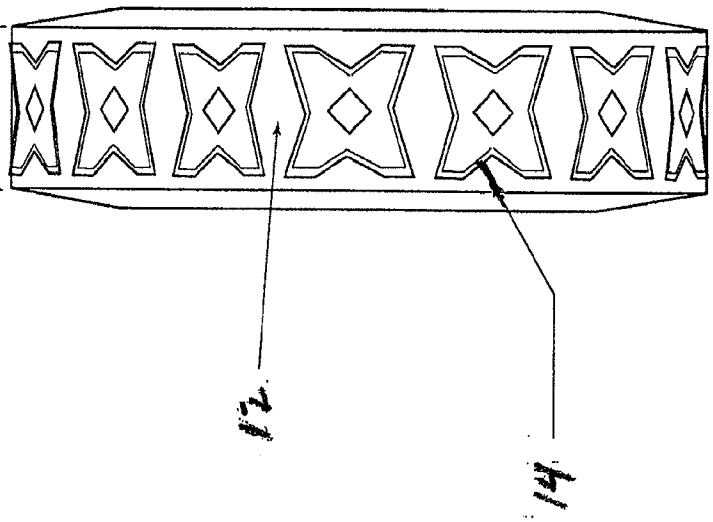
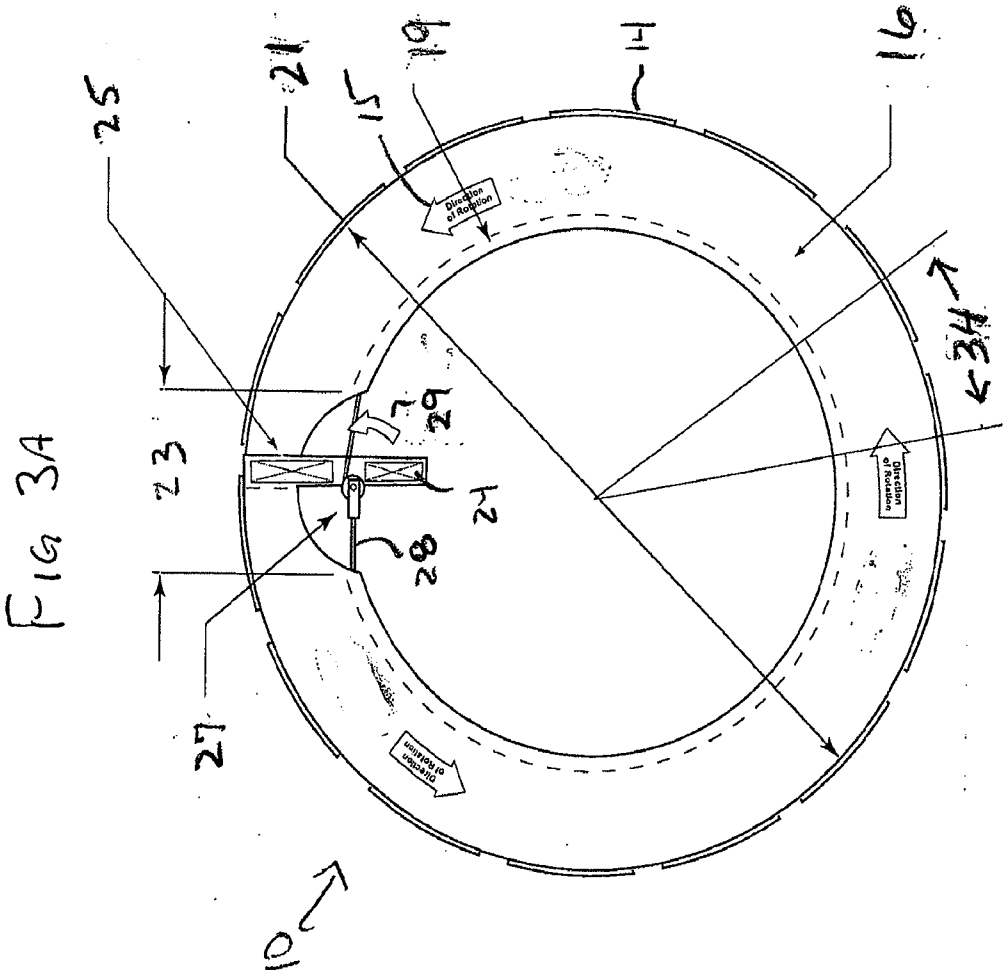

22
12
14

FIG 3A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Direction of Rotation
Direction of Rotation
10

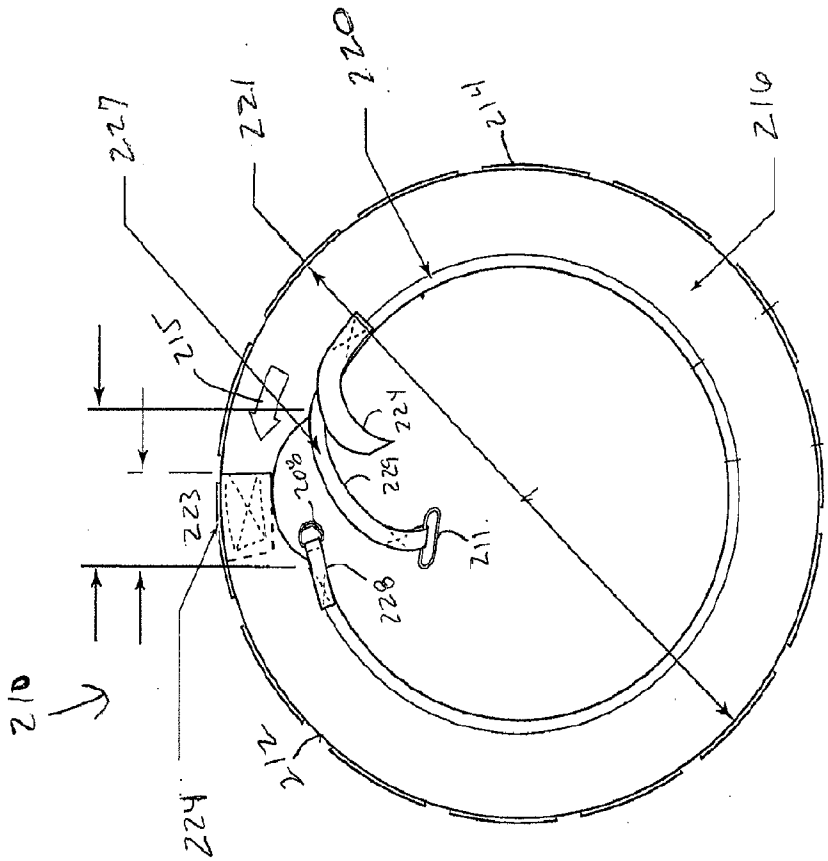


Figure 6

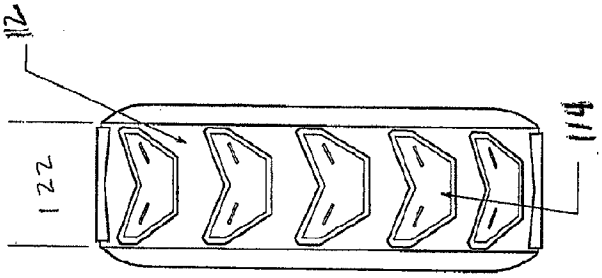


Figure 5B

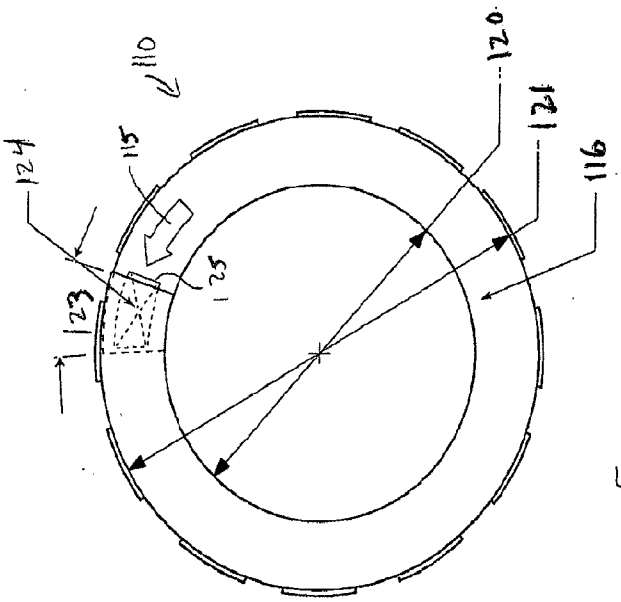
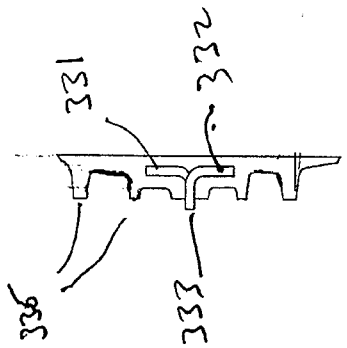


Figure 5A



Section A-A

Figure 8

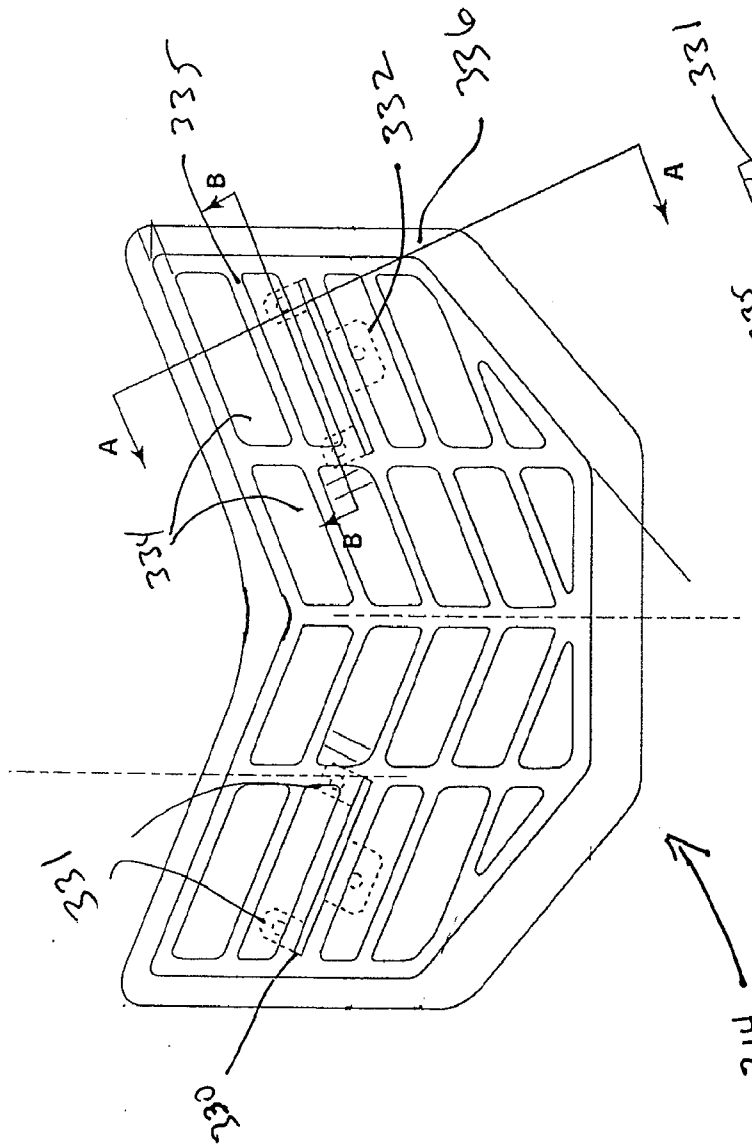
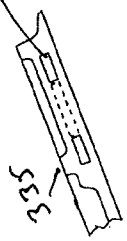
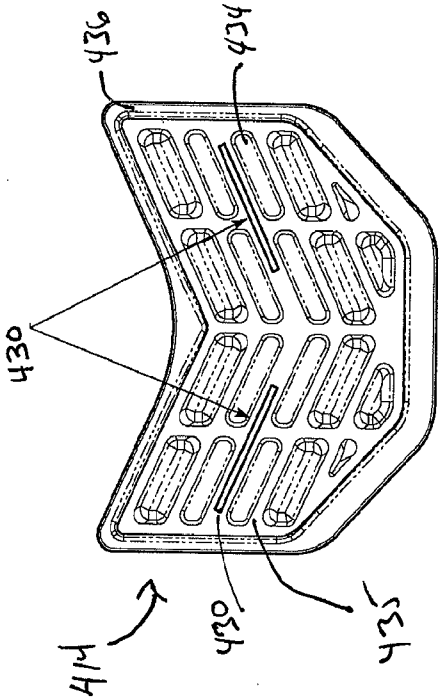


Figure 7



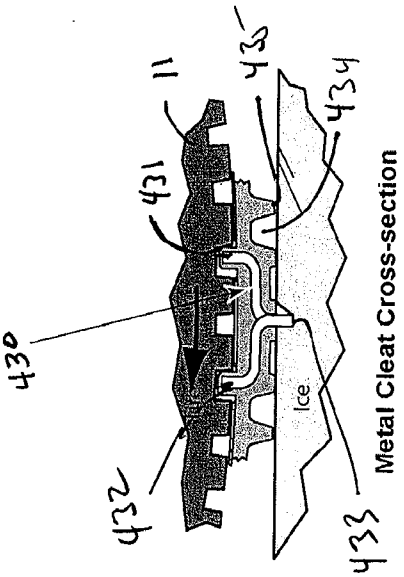
Section B-B

Figure 9



Traction Pad Detail

Fig 10A



Metal Cleat Cross-section

Fig 10B

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2008/078307

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - B60C 27/00 (2008.04)
USPC - 152/213R
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - B60C 27/00 (2008.04)
USPC - 81/15.8; 152/167, 170, 172, 173, 208, 213R

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PatBase

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X -- Y	US 5,267,596 A (LOGAR et al) 07 December 1993 (07.12.1993) entire document	1, 2, 7, 8, 12, 16 ---------- 3-6, 9-11, 13-15, 17-20
Y	US 4,171,718 A (WALRAVE et al) 23 October 1979 (23.10.1979) entire document	3-5, 14, 20
Y	WO 199312944 A1 (STANLEY) 08 July 1993 (08.07.1993) entire document	6, 15
Y	DE 19959381 A1 (RAMSAUER) 21 June 2000 (21.06.2000) entire document	13
Y	US 7,013,548 B1 (LOTVEIT) 21 March 2006 (21.03.2006) entire document	9-11, 18-20
Y	US 5,249,615 A (SUZUKI) 05 October 1993 (05.10.1993) entire document	17

☐ Further documents are listed in the continuation of Box C. ☐

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"A" document defining the general state of the art which is not considered to be of particular relevance
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"O" document referring to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed
"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
25 November 2008	05 DEC 2008
Name and mailing address of the ISA/US Mail Stop PCT, Attn: ISA/US, Commissioner for Patents P.O. Box 1450, Alexandria, Virginia 22313-1450 Facsimile No. 571-273-3201	Authorized officer: Blaine R. Copenheaver PCT Helpdesk: 571-272-4300 PCT OSP: 571-272-7774