PCT WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 5 : **B60C 7/10, 7/08, B62D 55/26 B62D 55/28**

A1

(11) International Publication Number: **WO 91/18754**

(43) International Publication Date: 12 December 1991 (12.12.91)

(21) International Application Number: PCT/AU91/00243

(22) International Filing Date: 6 June 1991 (06.06.91)

(30) Priority data:
PK 0504 6 June 1990 (06.06.90) AU

(71) Applicant *(for all designated States except US):* ALTRACK LIMITED [AU/AU]; 2nd Floor, 681 Murray Street, West Perth, W.A. 6005 (AU).

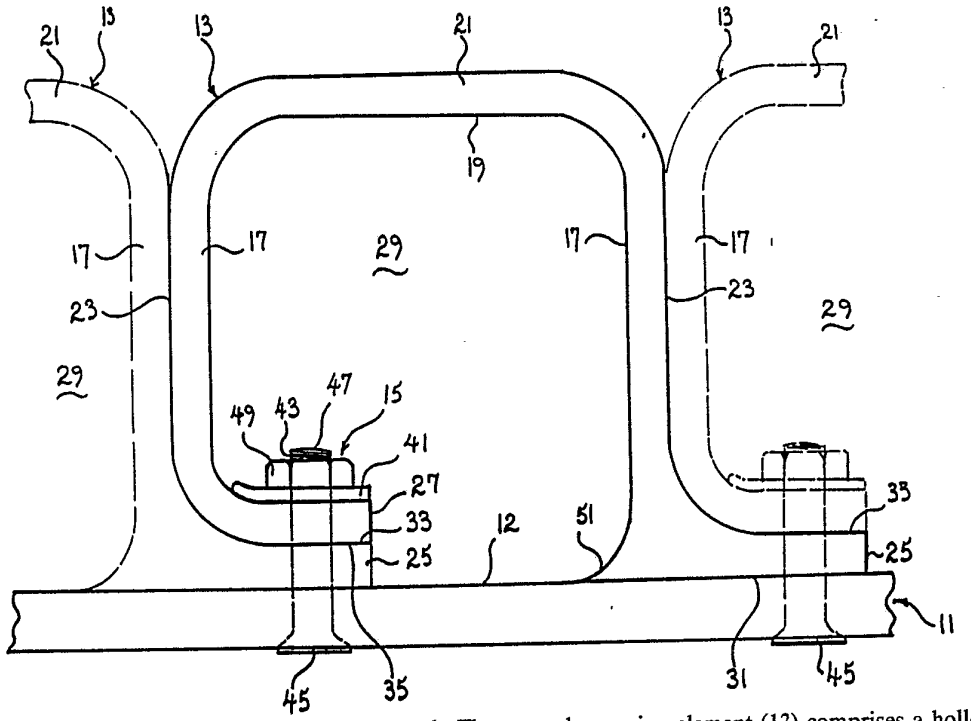
(72) Inventor; and
(75) Inventor/Applicant *(for US only) :* ROLLINSON, Phillip, John [AU/AU]; 55 Clotilde Street, Mt Lawley, W.A. 6050 (AU).

(74) Agents: HARWOOD, Errol, John et al.; Wray & Associates, P.O. Box 6282, East Perth, W.A. 6004 (AU).

(81) Designated States: AT (European patent), AU, BE (European patent), BR, CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FR (European patent), GB (European patent), GR (European patent), IT (European patent), JP, KR, LU (European patent), NL (European patent), SE (European patent), SU, US.

Published
With international search report.

(54) Title: GROUND ENGAGING ELEMENT



(57) Abstract

A ground engaging element for a wheel or endless track. The ground engaging element (13) comprises a hollow body of resiliently flexible material. The hollow body having first and second mounting flanges (25, 27). The first mounting flange (25) extends outwardly and has a mounting face (31) adapted to contact a base (11) and a further face (33) spaced from said mounting face. The second mounting flange (27) having a face (35) so disposed as to be spaced from the base (11) when the mounting face (31) of the first mounting flange (25) is in contact with the base (11) whereby the first mounting flange of a similar ground engaging element can be received in said space with the face (35) of said second mounting flange (27) in contact with said further face (33) of the first mounting flange.

FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AT	Austria	**ES**	Spain	**MG**	Madagascar
AU	Australia	**FI**	Finland	**ML**	Mali
BB	Barbados	**FR**	France	**MN**	Mongolia
BE	Belgium	**GA**	Gabon	**MR**	Mauritania
BF	Burkina Faso	**GB**	United Kingdom	**MW**	Malawi
BG	Bulgaria	**GN**	Guinea	**NL**	Netherlands
BJ	Benin	**GR**	Greece	**NO**	Norway
BR	Brazil	**HU**	Hungary	**PL**	Poland
CA	Canada	**IT**	Italy	**RO**	Romania
CF	Central African Republic	**JP**	Japan	**SD**	Sudan
CG	Congo	**KP**	Democratic People's Republic of Korea	**SE**	Sweden
CH	Switzerland			**SN**	Senegal
CI	Côte d'Ivoire	**KR**	Republic of Korea	**SU**	Soviet Union
CM	Cameroon	**LI**	Liechtenstein	**TD**	Chad
CS	Czechoslovakia	**LK**	Sri Lanka	**TG**	Togo
DE	Germany	**LU**	Luxembourg	**US**	United States of America
DK	Denmark	**MC**	Monaco		

"Ground Engaging Element"

THIS INVENTION relates to ground engaging elements for wheels and endless tracks for motor vehicles and to wheels and endless tracks incorporating such ground engaging elements.

In one form the invention resides in a ground engaging element for mounting on a base, comprising a hollow body of resiliently flexible material, the hollow body having first and second mounting flanges, the first mounting flange extending outwardly and having a mounting face adapted to contact said base and a further face space from said mounting face, the second mounting flange having a face so disposed as to be spaced from the base when the mounting face of the first mounting flange is in contact with the base whereby the first mounting flange of a similar ground engaging element can be received in said space with the face of said second mounting flange in contact with said further face of the first mounting flange.

With this arrangement, two of said ground engaging elements disposed in side by side relation can be secured to said base with the first mounting flange of one element disposed between the base and the second mounting flange of the other element, and those two mounting flanges being fixed to the base by any suitable fixing means such as one or more fixing bolts passing through aligned holes formed in the two mounting flanges.

Preferably the hollow body has a pair of longitudinal side faces, and an outer longitudinal face for contacting the ground.

Preferably, said longitudinal side faces are generally planar and so arranged as to be generally normal to the plane of said base.

Preferably, the junction between each side wall and the adjacent mounting flange is curved.

Preferably, a stabilising flange is provided on the side of the body corresponding to said first mounting flange to extend inwardly of the body.

Preferably, the hollow body is substantially tubular and open along a longitudinal portion thereof, said open longitudinal portion being disposed so as to confront said base when the element is fixed to said base. Preferably the ends of the tubular body are open.

In circumstances where the ground engaging element forms part of a wheel for a motor vehicle, said base to which the ground engaging element is fixed may be in the form of a rim of the wheel.

In circumstances where the ground engaging element forms part of an endless track of a motor vehicle, said base to which the ground engaging element is fixed may comprise an endless band passing around spaced end rollers. The combination of the endless band and the ground engaging elements mounted thereon provide the endless track.

In another form the invention resides in a wheel comprising a rim and a plurality of ground engaging elements as aforesaid mounted on the periphery of said rim to provide a ground engaging surface. The resilient nature of the ground engaging elements provides cushioning for the ground engaging surface.

In still another form the invention resides in an endless track for a vehicle comprising an endless band and a plurality of ground engaging elements as aforesaid mounted on the band to provide a ground engaging surface. The resilient nature of the ground engaging elements provides cushioning for the ground engaging surface. The endless base may be in the form of a continuous flexible band which is able to flex so as to provide further cushioning for the vehicle.

Preferably, neighbouring ground engaging elements are closely associated with each other to provide mutual support when deflecting under load.

The invention will be better understood by reference to the following description of one specific embodiment thereof as shown in the accompanying drawings in which:-

Fig. 1 is a fragmentary schematic side view of an endless track for a tracked vehicle, showing one ground engaging element in bold lines and neighbouring elements in phantom lines.

The embodiment shown in the drawings is directed to an endless track for a tracked vehicle. The endless track comprises an endless flexible band 11 mounted between a pair of end rollers (not shown) of the track. In this embodiment, the endless band is of one piece construction and is constructed from reinforced, resiliently flexible material.

A plurality of ground engaging elements 13 are detachably fixed to the endless band 11 by way of fixing means 15 to be described in more detail later.

Each ground engaging element 13 is in the form of a hollow body of tubular form. The hollow body is elongated and is arranged to extend across the endless band 11 in a direction substantially perpendicular to the direction of travel of the endless track. The hollow body includes a pair of spaced longitudinal side walls 17 and a longitudinal outer wall 19 which has an outer face 21 arranged for contacting the ground. A tread may be provided on the outer face 21 if desired. Each longitudinal side wall 17 has a longitudinal outer face 23 which is substantially normal to the plane of the endless band 11, as shown in the drawings.

Each ground engaging element 13 is provided with a first mounting flange 25 and a second mounting flange 27. The first mounting flange 25 extends outwardly of one longitudinal side wall 17 in the direction away from the cavity 29 defined within the hollow body. The second mounting flange 27 extends inwardly from the other longitudinal side wall 17 towards the cavity 29. The two mounting flanges 25 and 27 also extend along the length of the hollow body.

The first mounting flange 25 has a mounting face 31 which is adapted to contact the outer face 12 of the endless band 11 when the ground engaging element is in position on the endless band. Additionally, the first mounting flange 25 has a further face 33 spaced from the mounting face 31, said further face 33 being the outer face of the mounting flange.

The second mounting flange 27 has a face 35 which is so disposed to be spaced from the endless band 11 when the mounting face 31 of the first mounting flange is in contact with the endless band whereby a first mounting flange 25'

of a neighbouring element 13' can be received in said space with the face 35 of said second mounting flange in contact with said further face 33' of the first mounting flange of said neighbouring element 13'.

The co-operating first and second flanges of neighbouring ground engaging elements 13 and 13' are fixed to the base 11 by fixing means 15 as previously mentioned. The fixing means 15 is in the form of a clamping plate 41 which bears against the outer face of the second mounting flange 27 of element 13 and a plurality of bolts 43 each having a head 45 countersunk into the inner face of endless band 11 and a threaded shank 47 which extends through aligned apertures (not shown) in the co-operating first and second flanges 25' and 27 as well as in the clamping plate 41 to receive a nut 49 which co-operates with the bolt and clamping plate to retain the co-operating mounting flanges in position.

The ground engaging element 13 is provided with a stabilising flange 51 which extends inwardly of the longitudinal side wall 17 on which is provided with the first mounting flange 25. The stabilising flange 51 has an inner face which is integral with and planar with the mounting face 31 of the first mounting flange 33.

When the ground engaging elements 13 are secured to the endless band 11, the outer faces 23 of neighbouring longitudinal side walls 17 are in contact with each other so as to provide mutual support when under load.

As shown in the drawings, the junctions between the outer wall 21 and the side walls 17 are curved. Similarly, the junctions between the side walls 17 and the respective first and second mounting flanges 25 and 27 respectively are also curved.

The assembly of the ground engaging elements 13 and the endless base 12 provide a ground engaging surface for the endless track. The ground engaging surface is cushioned by virtue of the resilient nature of the ground engaging elements 13. This provides cushioning for the vehicle and additional cushioning is provided by virtue of the resilient nature of the endless band 11.

It should be appreciated that the scope of the invention is not limited to the scope of the embodiment described. In particular, while the embodiment has been described in relation to endless tracks for vehicles, it should be appreciated that the invention can also be applied to wheels. In this regard, the ground engaging elements would be mounted around the periphery of a rim to provide a wheel assembly having a ground contacting surface which is cushioned by virtue of the resilient nature of the ground engaging elements.

Additionally, while in the embodiment which has been described the elements extend across the track or wheel in a direction which is normal to the direction of travel, it should be understood that the elements could be disposed obliquely with respect to the direction of travel. Furthermore, while in this embodiment described the elements are straight lengthwise, they could be of any suitable shape such as of V-formation to create a chevron pattern when in place on the wheel or track.

THE CLAIMS defining the invention are as follows:-

1. A ground engaging element for mounting on a base, comprising a hollow body of resiliently flexible material, the hollow body having first and second mounting flanges, the first mounting flange extending outwardly and having a mounting face adapted to contact said base and a further face space from said mounting face, the second mounting flange having a face so disposed as to be spaced from the base when the mounting face of the first mounting flange is in contact with the base whereby the first mounting flange of a similar ground engaging element can be received in said space with the face of said second mounting flange in contact with said further face of the first mounting flange.

2. A ground engaging element according to claim 1 wherein the hollow body has a pair of longitudinal side faces, and an outer longitudinal face for contacting the ground.

3. A ground engaging element according to claim 2 wherein said longitudinal side faces are generally planar and so arranged as to be generally normal to the plane of said base.

4. A ground engaging element according to claim 2 or 3 wherein the junction between each side wall and the adjacent mounting flange is curved.

5. A ground engaging element according to any one of the preceding claims wherein a stabilising flange is provided on the side of the body corresponding to said first mounting flange to extend inwardly of the body.

6. A ground engaging element according to any one of the preceding claims wherein the hollow body is substantially tubular and open along a longitudinal portion thereof, said open longitudinal portion being disposed so as to confront said base when the element is fixed to said base.

7. A ground engaging element according to claim 6 wherein the ends of the tubular body are open.

8. A wheel comprising a rim and a plurality of ground engaging elements as claimed in any one of the preceding claims mounted on the periphery of said rim to provide a ground engaging surface.

9. A wheel according to claim 8 wherein neighbouring ground engaging elements are closely associated with each other to provide mutual support when deflecting under load.

10. An endless track for a vehicle comprising an endless band and a plurality of ground engaging elements as claimed in any one of claims 1 to 8 mounted on the band to provide a ground engaging surface.

11. An endless track according to claim 10 wherein neighbouring ground engaging elements are closely associated with each other to provide mutual support when deflecting under load.

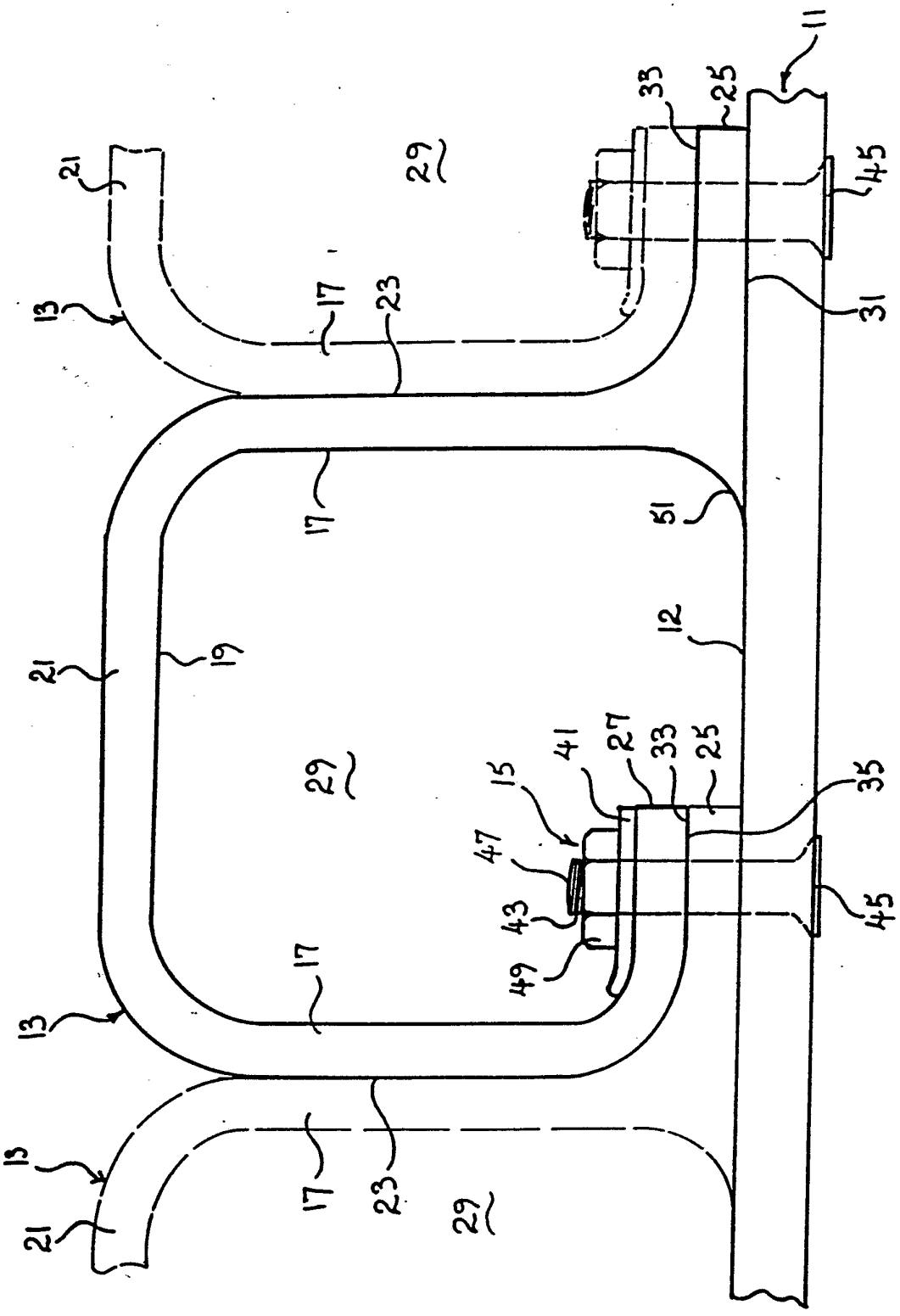

11
33
25
45
21
29
13
17
23
31
17
51
12
21
19
41
27
33
25
35
29
15
47
43
45
49
17
13
17
23
21
29

Fig. 1.

INTERNATIONAL SEARCH REPORT

International Application No. PCT/AU 91/00243

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) 6

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl.[5] B60C 7/10, 7/08, B62D 55/26, 55/28

II. FIELDS SEARCHED

Minimum Documentation Searched 7

Classification System	Classification Symbols
IPC	B60C 7/10, 7/08, 11/02, B62D 55/26, 55/28

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched 8

AU : IPC as above

III. DOCUMENTS CONSIDERED TO BE RELEVANT 9

Category*	Citation of Document, [11] with indication, where appropriate, of the relevant passages 12	Relevant to Claim No 13
X	GB,A, 293638 (WITKOPP) 12 July 1928 (12.07.28). See page 2 lines 110-125 and Figs. 6 and 8	(1 - 3, 8, 10)
A	AU,A, 39602/88 (ALTRACK LIMITED) 19 February 1990 (19.02.90)	
A	US,A, 2901021 (BOOHARIN) 25 August 1959 (25.08.59)	
A	GB,A, 207632 (BLAKEY) 5 December 1923 (05.12.23)	
A	DE,A, 424158 (FIRMA ALLGEMEINE ELEKTRICITATS-GESELLSCHAFT) 18 January 1926 (18.01.26)	

* Special categories of cited documents: 10

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"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

"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

IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
28 August 1991 (28.08.91)	9 September 91
International Searching Authority	Signature of Authorized Officer
Australian Patent Office	C M WYATT

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON
INTERNATIONAL APPLICATION NO. PCT/AU 91/00243

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report	Patent Family Members					
AU 39602/89	BR	8907568	CN	1040956	EP	425543
	WO	9000983	ZA	8905450		