(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
24 February 2005 (24.02.2005)

PCT

(10) International Publication Number
WO 2005/016975 A3

(51) International Patent Classification[7]: B60C 7/00, 7/10, 7/24

(21) International Application Number: PCT/US2004/025081

(22) International Filing Date: 4 August 2004 (04.08.2004)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/636,354 7 August 2003 (07.08.2003) US

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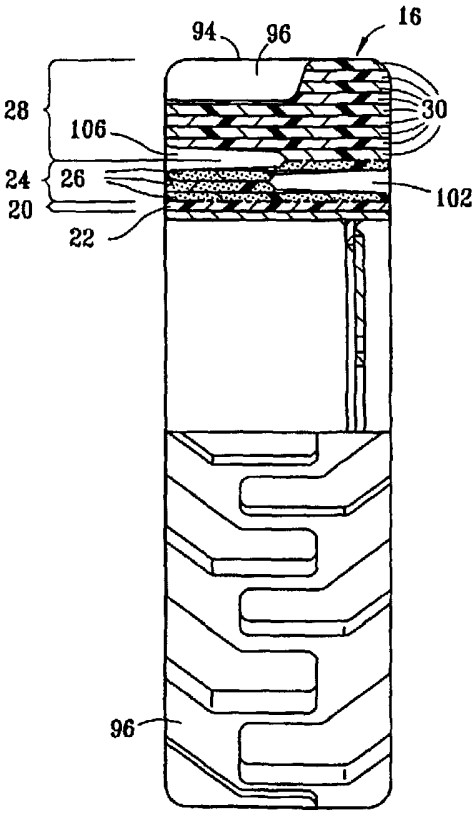
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(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH,

[Continued on next page]

(54) Title: A SOLID RUBBER TIRE



(57) Abstract: A solid rubber tire (16) for use on vehicles such as heavy construction equipment is provided with a plurality of layers (20, 24, 28) of different hardness. One of the layers (24) is relatively softer than the other layers (20, 28) and holes (102, 106) are formed at least partially into the tire (16) to provide added flexibility and smoothness of ride to the solid rubber tire (16).

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GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)*

— *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii)) for the following designations AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, UZ, VC, VN, YU, ZA, ZM, ZW, ARIPO patent (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG)*

Published:

— *with international search report*

— *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

(88) Date of publication of the international search report:
4 August 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US04/25081

A. CLASSIFICATION OF SUBJECT MATTER
IPC(7) : B60C 7/00, 7/10, 7/24
US CL : 152/209.17, 302, 324
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)
U.S. : Please See Continuation Sheet

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)

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 1,026,468 A (SELZER) 14 May 1912 (14.05.1912), entire document.	1-3, 5-8, 10, 11, 13, 34, 35, 37-42, 44, 46-48, 50, 53 --- 4, 9, 12, 14, 36, 45, 49-52, 54
X --- Y	US 1,548,843 A (KORN) 11 August 1925 (11.08.1925), entire document.	1-3, 5, 8, 10, 12, 13, 34, 35, 37-39, 46, 47, 49, 50, 53 --- 4, 9, 14, 36, 51, 52, 54
X --- Y	CH 446 936 B2 (CONTINENTAL GUMMI-WERKE AKTIENGESELLSCHAFT) 15 March 1968 (15.03.1968), entire document.	1-3, 5, 8, 11, 13, 34, 35, 37-39, 48, 52, 53 --- 9, 10, 12, 14, 46, 47, 49, 51, 54

☒ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

* Special categories of cited documents:

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

"E" earlier application or patent 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 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
26 April 2005 (26.04.2005)	26 MAY 2005
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. (703) 305-3230	Authorized officer Adrienne C. Johnstone Telephone No. (571)272-1191

Form PCT/ISA/210 (second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US04/25081

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 1,813,758 A (PARIDY) 07 July 1931 (07.07.1931), p. 1 lines 25-95.	4, 12, 36, 49
Y	US 1,877,988 A (SCHRANK) 20 September 1932 (20.09.1932), p. 1 lines 1-41.	4, 36
Y	US 1,312,491 A (MCCLENATHEN) 05 August 1919 (05.08.1919), p. 1 lines 7-23.	9, 14, 51
Y	US 1,500,786 A (ALLEN) 08 July 1924 (08.07.1924), p. 1 lines 8-59.	9, 14, 51
Y	US 1,552,081 A (RETT) 01 September 1925 (01.09.1925), p. 1 lines 41-78 and 87-92.	10, 12, 46, 47, 49, 52, 54
Y	US 1,670,827 A (SEIBERLING) 22 May 1928 (22.05.1928), p. 1 lines 100-105.	10, 45-47
Y	US 4,877,071 A (TANIGAWA et al) 31 October 1989 (31.10.1989), col. 2 lines 7-49.	50
Y	US 1,328,632 A (KREMER) 20 January 1920 (20.01.1920), p. 3 lines 17-40.	10, 46, 47, 52, 54

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US04/25081

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:
Please See Continuation Sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☒ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.: 1-14 and 34-54

4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest
☐ The additional search fees were accompanied by the applicant's protest.
☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.
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BOX III. OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

Group I, claim(s) 1-14, drawn to a tire comprising a first layer of relatively soft rubber, a second layer of a relatively hard material which extends around the first layer, the first and second layers forming two sidewalls, and a plurality of holes formed into at least one of the sidewalls.

Group II, claim(s) 15-23, drawn to a tire comprising at least a relatively soft layer of rubber and a relatively hard layer of rubber, the layers forming two sidewalls, and a plurality of holes formed into at least one of the sidewalls.

Group III, claim(s) 24-33, drawn to a tire comprising a bonding layer, an inner layer extending around the bonding layer, and an outer layer extending around the inner layer forming two sidewalls, the layers having different hardnesses, and a plurality of holes formed into at least one sidewall.

Group IV, claim(s) 34-54, drawn to a solid rubber tire comprising a bonding layer of relatively hard rubber, a soft layer of rubber relatively softer than the bonding layer and secured to the bonding layer, a wear layer of rubber relatively harder than the soft layer and secured to the soft layer, the layers forming sidewalls defining a width of the tire, and a plurality of holes formed into the sidewalls at least partially into the soft layer and having a depth less than the total width of the tire and running substantially parallel to the axis of the tire.

Group V, claim(s) 55, drawn to a method of forming a solid rubber tire on a vehicular wheel comprising providing a metal wheel rim attachable to a vehicle, forming a bonding layer of relatively hard rubber around the wheel rim, forming a soft layer of relatively soft rubber around the bonding layer, forming a wear layer of relatively hard rubber around the soft layer, molding a plurality of holes into the layers substantially parallel to the axis of the tire including at least partially into the soft layer, and vulcanizing the layers to bond them together on the wheel rim and to cure the tire with the plurality of holes therein.

The inventions listed as Groups I-V do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the subject matter common to claims 1, 15, 24, 34, and 55 does not distinguish over the prior art, as evidenced by Selzer (1,026,468), Korn (1,548,843), and Swiss Patent 446 936 for example, and therefore cannot serve as a special technical feature.

Continuation of B. FIELDS SEARCHED Item 1:
152/209.17, 300-303, 323-326; 156/112, 113; 425/37
B60C 7/00, 7/10, 7/22, 7/24