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(71) Applicant *(for all designated States except CA, MX, US)*: **SOCIETE DE TECHNOLOGIE MICHELIN** [FR/FR]; 23, rue Breschet, F-63000 Clermont-Ferrand (FR).

(71) Applicant *(for all designated States except US)*: **MICHELIN RECHERCHE ET TECHNIQUE S.A.** [CH/CH]; 10 et 12, route Louis-Braille, CH-1763 Granges-Paccot (CH).

(72) Inventor; and

(75) Inventor/Applicant *(for US only)*: **MARTIN, Terry, J.** [US/US]; 101 River Falls Drive, Duncan, SC 29334 (US).

(74) Agent: **FARRELL, Martin**; Michelin North America, Inc., Intellectual Property Department, 515 Michelin Road, Greenville, SC 29605 (US).

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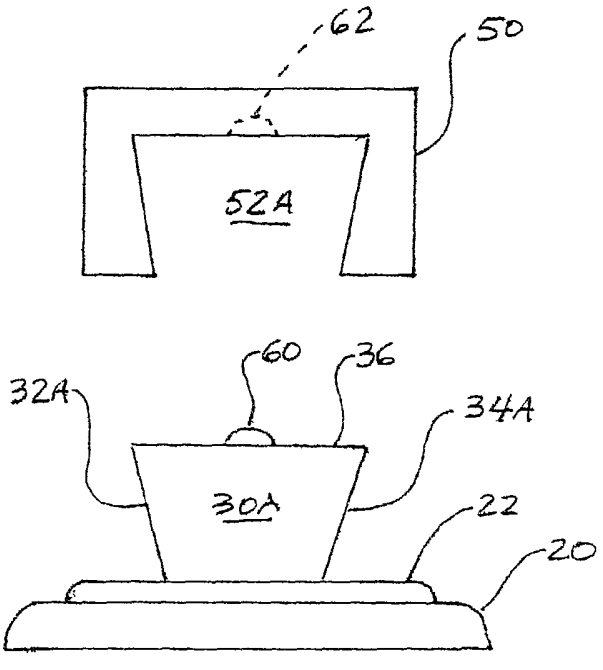
For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) **Title:** DEVICE FOR MOUNTING ELECTRONIC MONITORING COMPONENTS TO A TIRE



(57) **Abstract:** A device (10) for mounting electronic monitoring components to a tire includes a patch (20) having a block (30 A) mounted thereon and a mating monitoring package. The block includes opposing sides (32 A, 34 A) that mutually diverge to form a contour, for example, a dovetail profile, and the package includes a complementary channel for sliding onto the block.

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DEVICE FOR MOUNTING ELECTRONIC MONITORING COMPONENTS TO A TIRE

BACKGROUND AND SUMMARY OF THE INVENTION

[001] The invention relates to a device for mounting electronic monitoring components to a surface of a tire. More specifically, the invention relates to a device for mounting a package containing electronic components securely to a tire.

[002] With the growing interest recently in monitoring the operating conditions of tires, for example, pressure and temperature conditions, an interest in devices for mounting the monitoring devices to the tire has also arisen. A review of the art shows a variety of devices available. Few devices, however, allow for the ready dismounting of electronic equipment, which may be necessary to change a battery, or to remount the device on another tire, for example.

[003] The invention relates to a mounting device for a monitoring package for vehicle tires and is suited especially for large off-road tires for haul vehicles such as earthmovers. The device in accordance with the invention permits ready mounting and dismounting of a monitoring package, which is advantageous for use in the field. The device securely holds the monitoring package in place under the rigorous conditions experienced by an off-road tire.

[004] According to the invention, the device comprises a patch having a surface for bonding with a surface of the tire and a mounting block disposed on a second, opposite surface of the patch. The mounting block extends vertically from the plane of the second surface to provide a mounting position spaced from the patch, and therefore, spaced from the surface of the tire.

[005] The mounting block includes two opposing sides that mutually diverge to provide an engaging contour for slidable mounting of a package on the block. The opposing sides may diverge from the second surface in a linear manner or a concave or convex arcuate manner. Alternatively, the opposing sides may diverge at a particular location, such as a T-shape or I-beam shape. A monitoring package is formed with a channel having a mating contour.

[006] The block and monitoring package may include a detent to lock the block and monitoring package together.

BRIEF DESCRIPTION OF THE DRAWINGS

[007] The invention will be better understood by reference to the following Detailed Description in conjunction with the appended drawings, in which:

[008] Fig. 1 is a top view of mounting patch and block in accordance with the invention;

[009] Fig. 2 is an end view of a first embodiment of the device, showing a monitoring package and a mating mounting block;

[010] Fig. 3 is an end view of a second embodiment of a monitoring package and mounting block;

[011] Fig. 4 is end view of a third embodiment of a monitoring package and mounting block; and,

[012] Fig. 5 is an end view of yet another embodiment of a monitoring package and mounting block.

DETAILED DESCRIPTION

[013] The invention provides a mounting device for an electronic package that facilitates mounting and dismounting. As shown in the top view of Fig. 1, the device 10 includes a patch 20 formed of a layer of rubber material and having a first surface (opposite that shown) conditioned for bonding to an inner surface of a tire. Bonding may be done by adhesive or a rubber curing operation. A mounting pad 22 is formed on a second, opposite or upper surface 24 of the patch 20. A mounting block 30 is disposed on the mounting pad 22 and extends upward from the pad. The mounting pad 22 helps distribute stresses transmitted to the patch from the tire during the tire's rolling movement to prevent damage to the block 30.

[014] The block 30 includes two, opposing sides 32, 34 and an upper side 36 that define a contour for engaging a package for tire monitoring electronics. A package for tire monitoring electronics as used here means a housing, container, box, or

other structure for supporting and protecting electronic devices for sensing operating conditions in the tire, transmitting and receiving data from outside the tire, storing identification information or communication protocols, or any other similar electronic devices as may be used in relation with a tire. The invention is not intended to claim or be limited to any particular electronic device.

[015] The arrangement of the opposing sides 32, 34 and the upper side 36 disposed between them allows the package to slide onto the block 30 in the direction of the opposing sides. Friction between the package and the mating sides 32, 34, 36 prevents the package from sliding off the block during rotation of the monitored tire. Alternatively, a mechanical fastener, such as a screw can be used to fasten the package to the block.

[016] Alternatively, the package may be formed in parts that may be assembled around the block 30 to engage the sides 32, 34 for positive engagement. A fastener may be used to secure the package to the block.

[017] As shown in Figs. 2-5, the opposing sides 32, 34 of the block 30 are shaped or oriented so that movement of the package upwardly or vertically from the block is prevented. In accordance with the invention, the opposing sides 32, 34 mutually diverge to provide resistance to vertical movement.

[018] In Fig. 2, a mounting patch 20 with a first embodiment of the block 40 shows opposing sides 32A, 34A that extend linearly and divergently from the pad 22 to define a dovetail arrangement. A monitoring package 50 is formed with a mating channel or trough 52 having a complementary shape.

[019] Fig. 3 illustrates a second embodiment, in which the opposing sides 32B, 34B are convex arcuate surfaces. The monitoring package 50 has a trough 52B with a cup-shaped profile to mate with the block.

[020] Fig. 4 shows block 30C having arcuate, concave opposing sides 32C, 34C. The monitoring package 50 includes an hourglass-shaped trough to engage the block 30C of this embodiment.

[021] Fig. 5 shows a block 30D with a T-shaped profile, in which the opposing sides 32D, 34D are parallel adjacent the pad 22 and diverge at 180° near the upper surface 36. The monitoring package 50 includes a trough 52D with a T-shaped profile.

[022] The block 30 and package 50 may also have a device to secure the package from sliding movement to supplement the friction of the opposing sides 32, 34,

illustrated in connection with Figs. 1 and 2. A detent 60, for example, a button, may be formed on the upper surface 36 of the block 30 and a mating recess 62 formed in the package 50. The recess 62 receives the button 60 and provides additional force against sliding to help secure the package on the block. Alternatively, a mechanical fastener, such as a screw, can be used to fasten the package 50 to the block.

[023] The invention has been described and illustrated in terms of preferred embodiments; however, those skilled in the art will recognize that the principles disclosed here are applicable to other embodiments. The invention is not limited to what is literally described, but to the full scope of the appended claims.

What is claimed is:

1. A device for mounting a monitoring package on a tire surface, comprising:

a planar patch having a first surface conditioned for bonding to an inner liner of a tire and second surface oppositely disposed; and

a block disposed on the second surface and upstanding therefrom, the block having two opposing sides which mutually diverge to define a contour.

2. The device as claimed in claim 1, further comprising a package for containing electronic monitoring components, the package having a channel with a contour complementary to the contour of the block.

3. The device as claimed in claim 1, wherein the two opposing sides define a trapezoidal cross section.

4. The device as claimed in claim 1, wherein the two opposing sides are convex.

5. The device as claimed in claim 1, wherein the two opposing sides are concave.

6. The device as claimed in claim 1, wherein the two opposing sides define a T-shaped profile with an upper surface of the block.

7. The device as claimed in claim 1, further comprising detent means for engaging a monitoring package to prevent relative sliding movement.

8. A device for mounting a monitoring package on a tire surface, comprising:

a planar patch having a first surface conditioned for bonding to an inner liner of a tire and second surface oppositely disposed;

a block disposed on the second surface and upstanding therefrom, the block having two opposing sides which mutually diverge to define a contour; and,

package for containing tire monitoring devices, the package having a channel with a complementary contour for slidable engagement with the two opposing sides of the block.

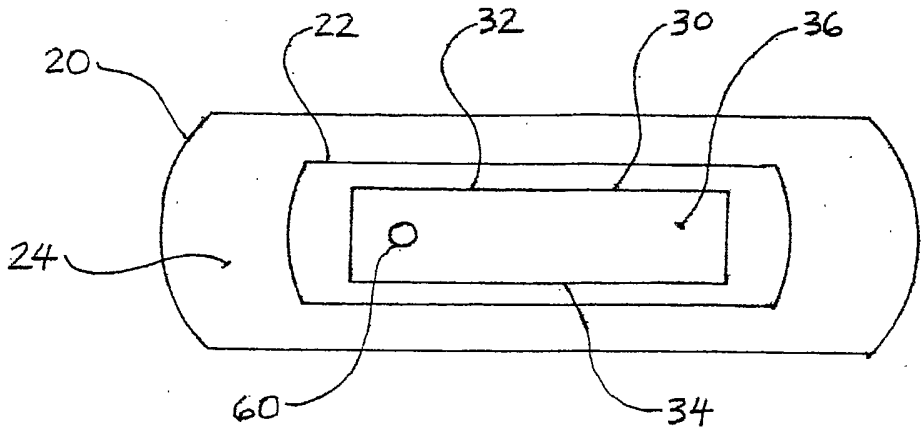

FIG. 1

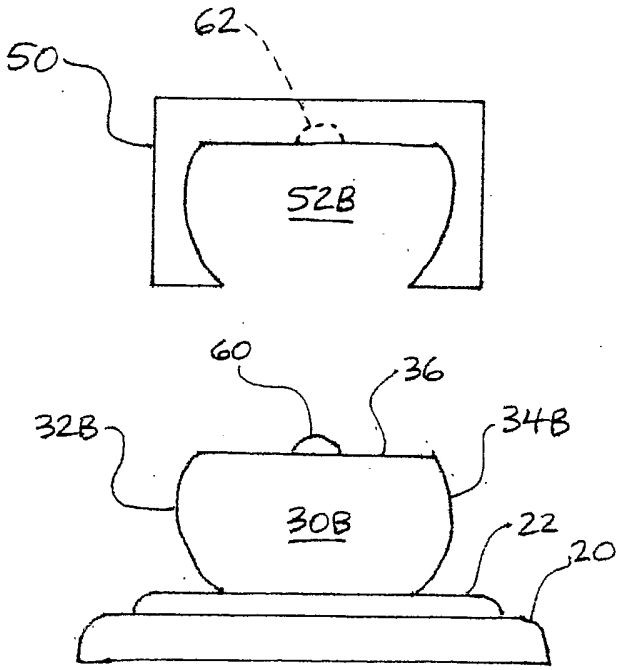

FIG. 3

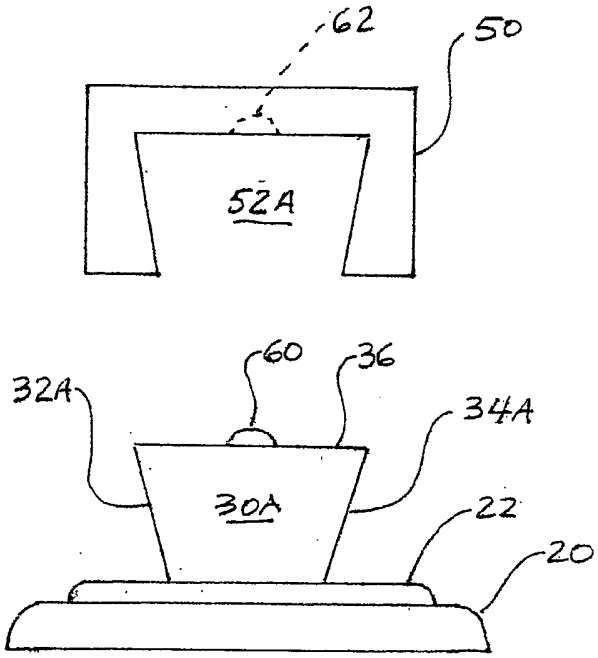

FIG. 2

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INTERNATIONAL SEARCH REPORT

International Application No
PCT/US 03/06669

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B60C23/04

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 7 B60C

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 practical, search terms used)
EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 01 38111 A (MICHELIN RECH TECH ;YOUNG CECIL (US); BALZER RAYMOND J (US); KEMP) 31 May 2001 (2001-05-31)	1,2,6,8
A	page 20, line 16 -page 21, line 12; figures 5A,5B	3-5,7

X	WO 02 07993 A (BRIDGESTONE FIRESTONE INC ;PRZYGOCKI DAVID A (US); FLOYD BRETT A () 31 January 2002 (2002-01-31)	1,2,6
A	page 12, line 29 -page 14, line 5; figures 4A-5E	3-5,7,8

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

☒ Patent family members are listed in annex.

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"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

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Date of the actual completion of the international search	Date of mailing of the international search report
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Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Tx. 31 651 epo nl, Fax: (+31–70) 340–3016	Smeyers, H

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
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