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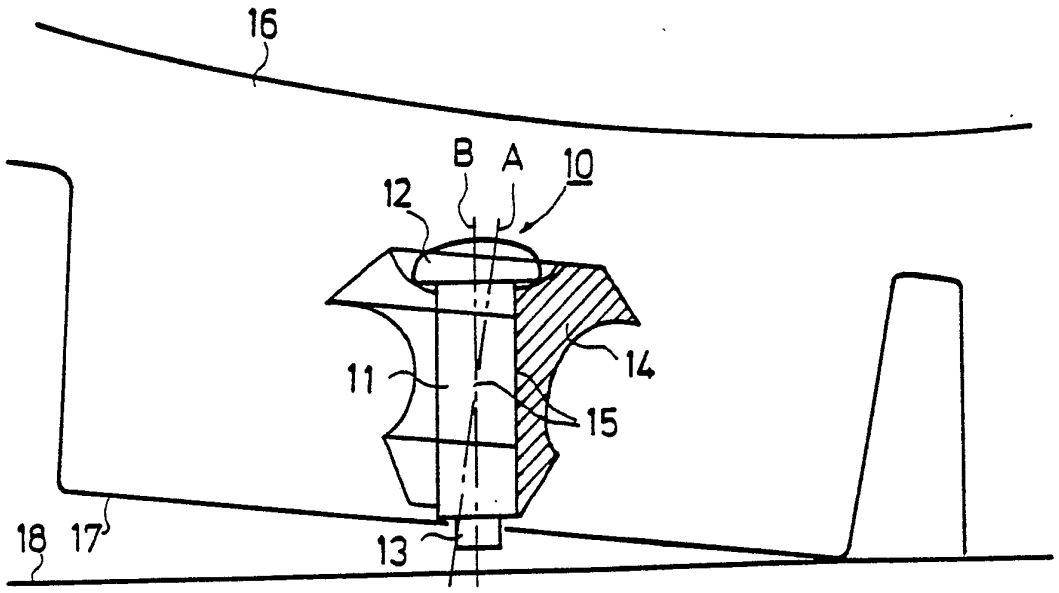
(54) Title: SLEEVE-MOUNTED SPIKE FITTED TO A VEHICLE TYRE



(57) Abstract

The sleeve (14) of the substantially symmetric sleeve-mounted spike (10) is provided with an oblique hole (15) for a rivet, the sleeve-mounted spike (10) being arranged, at first contact with the road surface (18), to meet the surface of the road (18) in a substantially upright position.

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Sleeve-mounted spike fitted to a vehicle tyre

The present invention concerns a sleeve-mounted spike fitted to a vehicle tyre.

Increasing traffic load and spike tyres in combination have proved to be a remarkable road attrition factor. In some countries this has even led to prohibition of spike tyres, or at least to considerable restrictions.

In Nordic conditions, the beneficial effect of an anti-slip means on the safety and flexibility of traffic has on the other hand been irrefutably demonstrated, and this effect should not be sacrificed: instead, the associated drawbacks should be eliminated. Good results will be achieved by further developing both the road superstructures and the anti-slip tyres.

As a pneumatic automobile tyre rolls on an even surface, it is considerably flattened radially, owing to its flexibility, whereby in the contact region longitudinal as well as transversal forces are generated owing to changes of the rolling radius.

The longitudinal forces acting on the spike when the tyre is rolling are due to bending of the body structure, to longitudinal slipping and to the stress wave in the rubber.

When a spike approaches the point of contact with the road, the tyre body undergoes bending such that the radius of the bent part is significantly smaller than that of equivalent parts of the load-free tyre. This deflects the spike, which has been mounted at right angles against the surface, to assume a vertical position before contact with the road. Owing to the protrusion of the spike point, however, the spike is not turned into a fully upright pos-

ition: it meets the road surface in an oblique position. At this stage, the forces due to slipping tendency also begin to exert their influence.

A further consequence of the oblique angle of encounter is an increased road attrition effect also at the moment when the spike loses contact with the road. Stresses build up around the spike which is urged into the tyre in an oblique position, and these are further enhanced, owing to the rotary motion of the tyre, during passage over the road contact region, and they cause a scratching effect which is more powerful than that of a straight-aligned spike in an equivalent situation.

Traditionally, the shape of the sleeve-mounted spike has been symmetric and it has been mounted in a hole perpendicular against the wear surface of the tyre, whereby it meets the road in a slightly oblique position as the forces mentioned and the protrusion of the spike effect its position. The oblique contact of the spike with the road, as well as its being pushed deeper into the tyre in oblique position during the initial part of road contact, cause damage to the rubber and to the spike which impairs the friction properties of the spike, detract from the durability of the spike and increase its road attrition properties.

The aim of the invention is to achieve an improvement in currently known sleeve-mounted spike designs. The more specific aim of the invention is to provide a sleeve-mounted spike in which the drawbacks embarrassing designs of prior art have been avoided.

The aims of the invention are achieved by means of a sleeve-mounted spike which is mainly characterized in that the sleeve of the substantially symmetric sleeve-mounted spike features an oblique hole for the rivet, the sleeve-mounted spike being arranged to meet the road surface, at first contact with the road surface, in a position which is substantially perpendicular.

The invention is described in the following more in detail by referring to some advantageous embodiments of the invention, presented in the figures of the drawing attached, yet to which the invention is not meant to be exclusively confined.

Fig. 1 presents an advantageous embodiment of the sleeve-mounted spike of the invention, in sectional projection.

In Fig. 2 is shown part of the tyre of a vehicle, viewed from the direction of the wear surface.

In the embodiment of Figs 1 and 2, the sleeve-mounted spike of the invention in general is indicated by reference numeral 10. The sleeve-mounted spike 10 comprises a rivet 11, the flange 12 of the rivet 11, a point part 13 and a sleeve 14. In Figs 1 and 2, the rubber of the vehicle tyre is indicated by reference numeral 16, the wear surface of the tyre by reference numeral 17, and the road surface by reference numeral 18.

As taught by the basic idea of the invention, the sleeve 14 of the sleeve-mounted spike 10 is provided with an oblique hole for the rivet 11, the sleeve-mounted spike 10 being arranged in the initial contact with the road surface 18 to meet the road surface 18 substantially in perpendicular position.

It is important in the encounter of the sleeve-mounted spike 10 and the road surface 18 that the motion of the rivet 11 of the sleeve-mounted spike 10 causing road attrition, and the road contact, will be substantially perpendicular against the road surface 18. In the present invention, this has been so solved in that in the sleeve part 14 of the bipartite sleeve-mounted or equivalent spike 10, a hole 15 is made which is oblique with reference to said part's centre-line A. The straight line running through the oblique hole 15 is indicated by letter B. An oblique hole 15 of this kind guides the road contact of the rivet 11 with the road surface 18 to take place in a substantially nearly perpendicular

position when the sleeve 14 has been installed in a position consistent with the slant, in relation to the direction of the wear surface pattern 17 on the tyre.

The advantageous slant of the hole 15 is determined by the above-mentioned forces caused by the bending of the tyre side and by the rotary motion. When said sleeve 14 provided with an oblique hole 15 is installed in a hole substantially perpendicular to the wear surface 17, the sleeve-mounted spike 10 can be tilted in the direction of rotation without changing the perpendicular road contact of the rivet 11. Thus, by the procedure such force components can be made to act on the sleeve-mounted spike 10 which stop the striking movement of the sleeve-mounted spike 10 and turn it into a substantially upright position.

In the foregoing, only one advantageous embodiment of the invention has been described, and it is obvious to a person skilled in the art that numerous modifications thereof are feasible within the scope of the inventive idea presented in the claims attached.

1 Claim

A sleeve-mounted spike, characterized in that the sleeve (14) of the substantially symmetric sleeve-mounted spike (10) features an oblique hole (15) for a rivet, the sleeve-mounted spike (10) being arranged, at first contact with the road surface (18), to meet the surface of the road (18) in a substantially upright position.

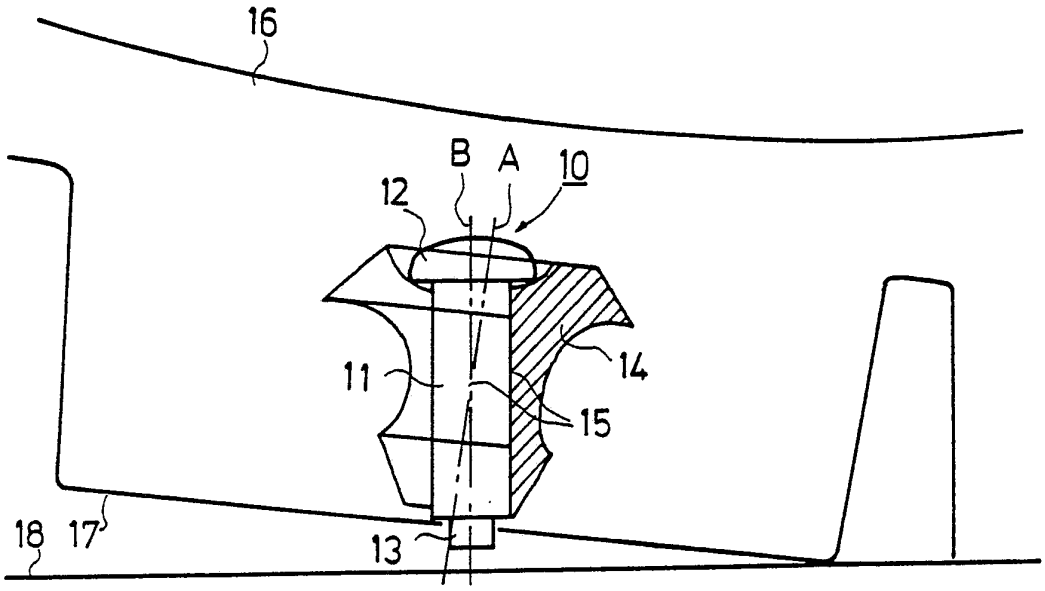

FIG. 1

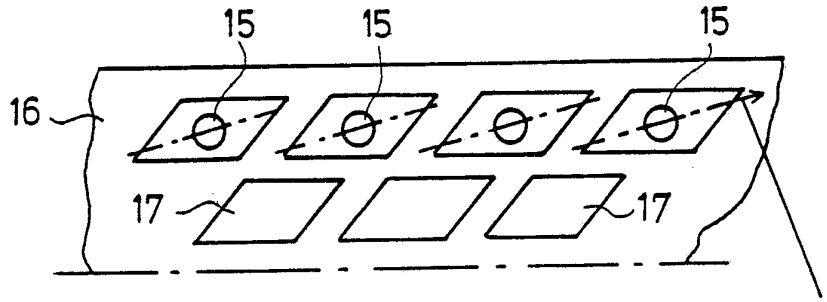

FIG. 2

INTERNATIONAL SEARCH REPORT

International Application No PCT/FI87/00125

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 4

B 60 C 11/16

II. FIELDS SEARCHED

Minimum Documentation Searched [7]

Classification System	Classification Symbols
IPC 4	B 60 C 11/00, /14, /16
Nat Cl	63e: 19/02
US Cl	152:167, 168, 169, 208-212; 156:114

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

SE, NO, DK, FI classes 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]
A	NO, B, 152 684 (O ELLINGSEN) 4 February 1985	

* Special categories of cited documents: [10]

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
1987-12-22	1987 -12- 28
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