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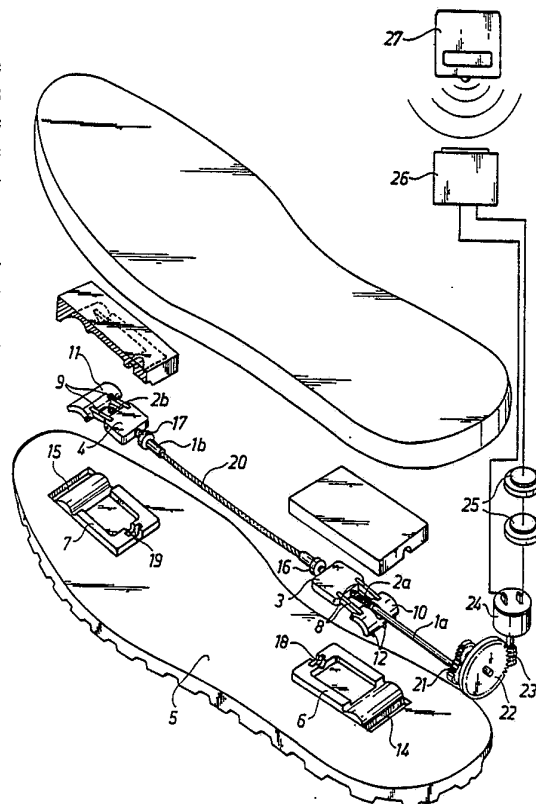
With international search report.

In English translation (filed in Swedish).

(54) Title: ANTI-SKID DEVICE FOR FOOTWEAR

## (57) Abstract

The invention concerns an anti-skid device for footwear in the form of spikes (12, 13), said spikes arranged to be displaced backwards and forwards from an inactive position in or interiorly of the undersole (5) of a shoe, out through an opening (14, 15) formed in the undersole (5) and to an active anti-skid position on the lower face of the undersole (5). The anti-skid device comprises a threaded rotary rod (1a, 1b) extending in the longitudinal direction of the undersole (5). The rod is in threaded engagement with a sliding member (3, 4) which is displaceable backwards and forwards in the longitudinal direction of the undersole (5) and which is hingedly connected to a support element (10, 11) supporting the spikes (12, 13), said spikes projecting from the support element (10, 11) in the direction of movement of the latter. The rotary rod (1a, 1b) is arranged, upon rotation in one sense, to displace the sliding member (3, 4) in one direction lengthwise with respect to the undersole (5) to bring said member to displace the spikes (12, 13) out through the opening (14, 15) in the sole to the anti-skid position. Upon rotation in the opposite sense the slide member (4, 5) is displaced in the opposite direction and retracts the spikes (12, 13) through the opening (14, 15) back into the inactive position.



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ANTI-SKID DEVICE FOR FOOTWEAR

The subject invention concerns an anti-skid device for footwear in the form of spikes. The spikes are arranged to be displaced from an inactive position in or interiorly of the undersole of a shoe, out through an opening formed in the undersole and to an active anti-skid position on the lower face of the undersole, and reversely back into the retracted position inside the latter.

10 Various types of anti-skid device are known. The feature common to all of them is that they are comparatively difficult to reach and that in order to manipulate them it is necessary to stand on one foot at a time to pull out or otherwise shift the anti-skid device to the  
15 active position.

For the purpose of facilitating manipulation of the anti-skid device a construction, described in the Swedish Patent 9000311-2, has been developed. This construction which has the advantage of allowing pull-out or retraction  
20 of two anti-skid means at the same time, one at the rear and one at the front of the undersole of a shoe, by means of one single control member, does, however, suffer from the disadvantage of insufficient strength. Because the structural components of the device cannot be given the  
25 desired dimensions on account of the limited space at the disposal in a shoe, this prior-art construction has a tendency to frequent malfunctioning.

The subject invention provides an anti-skid device which functions in an extremely reliable manner while at  
30 the same time it offers the wearer excellent protection on slippery surfaces. The characterizing features of this anti-skid device appear from the subsequent claims.

The invention will be described in closer detail in the following with reference to the accompanying drawings,  
35 wherein

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Fig. 1 illustrates the anti-skid device in accordance with the invention in an exploded view,

Fig. 2 illustrates the anti-skid device in a view from below,

5 Fig. 3 is a longitudinal sectional view through the device in the inner, retracted position, and

Figs. 4 and 5 are views similar to respectively Figs. 2 and 3 but showing the anti-skid device in the outer position.

10 The drawing figures illustrate one suitable embodiment incorporating one front and one rear anti-skid device mounted in a shoe. Each anti-skid device comprises a rotary rod 1a and 1b, respectively, each having a threaded portion 2a and 2b, respectively, in engagement with an  
15 associated sliding member 3 and 4, respectively. The sliding members 3, 4 are arranged for displacement in the longitudinal direction of the undersole 5 in housings 6 and 7, respectively, arranged on the upper face of the shoe undersole 5. Pairs of link arms 8 and 9,  
20 respectively, interconnect their associated one of the sliding members 3, 4 with the corresponding one of spike-supporting elements 10, 11, each one of which is provided at one of its edges with spikes 12 and 13, respectively. In accordance with the embodiment illustrated in the  
25 drawings,

each support element 10, 11 is shaped as a curved plate and follows the movements of the associated slide member 3, 4 inside the housing 6, 7 along a curved track which ends in a mouth portion 14, 15 formed in the undersole 5.  
30 Collars 16, 17 securely attached to their respective one of the rotary rods 1a, 1b and mounted for free rotational movement inside their respective one of seats 18, 19 in the associated housing 6, 7, are arranged to prevent axial displacement of their respective associated rotary rod 1a,  
35 1b.

In accordance with the embodiment of the invention illustrated in the drawings incorporating one front and one rear anti-skid device in the undersole 5, the rotary rods 1a, 1b are interconnected by means of a flexible means, such as a wire 20, to allow for pliability and flexibility of the undersole 5. In accordance with the shown embodiment the rotary rod 1a is also provided with a gear drive 21 which is associated with a worm gear 23 on the drive shaft of an electric motor 24. The electric motor 24 is powered by a couple of batteries 25.

The function of the device will be explained in closer detail in the following. In their passive or inactive position, the spike supporting plates 10, 11 with the spikes 12, 13 thereon are retracted inside the housing 6, 7 in the manner illustrated in Figs. 2 and 3. When the engine 24 is started the latter will rotate the rotary rods 1a and 1b in one direction via the gear mechanism 22 and the gear 21. The threaded portions 2a and 2b are oppositely threaded with the result that the sliding members 3, 4 will be moved simultaneously in a direction away from each other. The slide members 3, 4 now push the associated spike support plates 10, 11 in front of them inside the respective housing 6, 7, the spike support plates 10, 11 then following the respective curved track inside the associated housing 6, 7 sufficiently far to ensure that the spikes 12, 13 project outside the lower face of the undersole 5. In this position, the motor 24 is stopped.

In a simple and convenient manner an efficient anti-skid device is thus created underneath the undersole 5, at the front as well as at the rear thereof. When the motor 24 is started to rotate in the opposite direction, the two sliding members 3, 4 will pull the spike support plates 10, 11 with the spikes 12, 13 thereon back into the position illustrated in Figs. 2 and 3.

The anti-skid device in accordance with the invention is an efficient and at the same time convenient piece of equipment in the respect that it is possible to bring the anti-skid device to its active position on both feet at the same time and without having to lift any one of the feet. As illustrated in Fig. 1 the convenient use of the device could be further increased by fitting the electric motor 24 with a sensing means 26. Like all the rest of the equipment, the sensing means 26 could be built into the shoe proper. With the aid of an activating means 27 which the wearer may carry in his pocket and which could be controlled for instance by means of ultrasonic waves, the motor 24 may be started and stopped via the sensing means 26. With such equipment it is not even necessary to bend down to activate the anti-skid device.

The invention is not limited to the embodiment illustrated in the drawings and described herein but could be varied in a variety of ways within the scope of the appended claims. It is within the scope of the invention to replace the electric motor 24 and the parts pertaining thereto with a mechanical device to effect the rotational movement of the rotary rods 1a, 1b. The anti-skid device could be used on footwear of various types, such as different kinds of sport shoes, walking shoes or boots, and the like.

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CLAIMS

1. An anti-skid device for footwear in the form of spikes (12, 13), said spikes arranged to be displaced from an inactive position in or interiorly of the undersole (5) of footwear, out through an opening (14, 15) formed in the footwear undersole (5) and to an active anti-skid position on the lower face of the undersole (5), and reversely, back into the retracted position inside the undersole (5), c h a r a c t e r i z e d in that the anti-skid device comprises a threaded rotary rod (1a, 1b) extending in the longitudinal direction of the undersole (5) and being in threaded engagement with a sliding member (3, 4) arranged for displacement backwards and forwards in the longitudinal direction of the undersole (5), said sliding member (3, 4) being hingedly connected to a support element (10, 11) supporting the spikes (12, 13) and moving together with said sliding member (3, 4), said spikes (12, 13) projecting from the spike-support element (10, 11) in the direction of movement of the latter, and in that the rotary rod (1a, 1b) is arranged, upon rotation in one sense, to displace the sliding member (3, 4) in one direction longitudinally with respect to the undersole (5) for displacement of the spikes (12, 13) out through the opening (14, 15) in the undersole (5) to said anti-skid position and, upon rotation in the opposite sense, to displace the sliding member (3, 4) in the opposite direction, for retraction of the spikes (12, 13) through the opening (14, 15) and back into said inactive position.

2. A device as claimed in claim 1, c h a r a c - t e r i z e d in that the element supporting the spikes (12, 13) is a curved plate (10, 11), said plate being hingedly connected to the slide member (3, 4) and being moved by the slide member (3, 4) so as to follow a track which curves downwards through the undersole (5) from the path of movement of the slide member (3, 4) and then merges into the opening (14, 15) formed in the undersole (5), and in that the spikes (12, 13) are mounted on the

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free lateral edge of the plate (10, 11).

3. A device as claimed in any one of the preceding claims, c h a r a c t e r i z e d in that the rotary rod (1a, 1b) is provided with a gear drive (21), said gear  
5 drive being connected to a gear mechanism (22).

4. A device as claimed in any one of the preceding claims, c h a r a c t e r i z e d in that the rotary rod (1a, 1b) is driven by an electric motor (24).

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Fig. 2

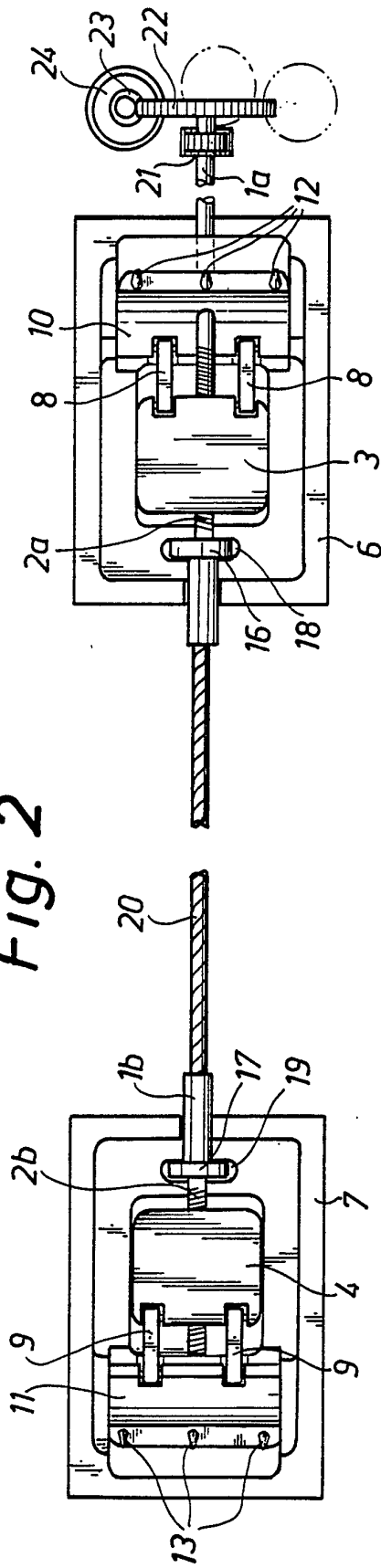
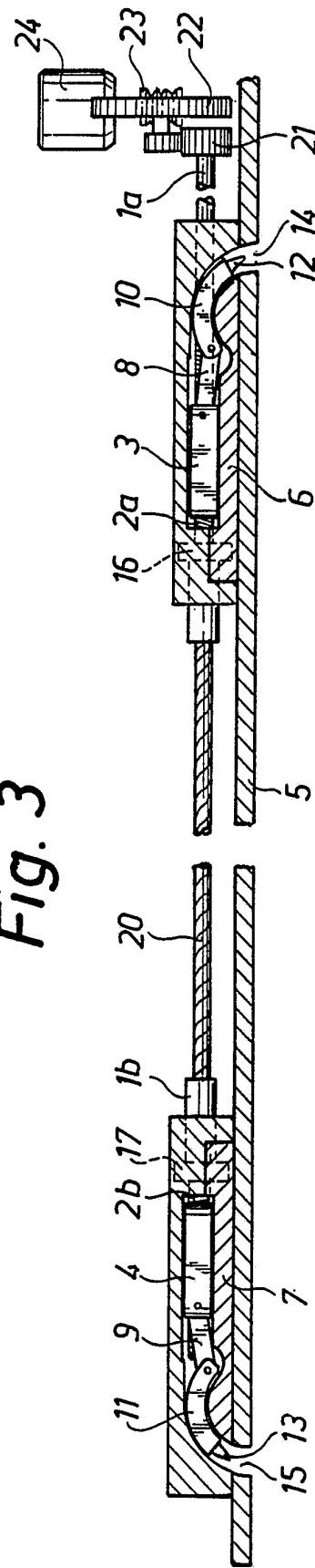


Fig. 3



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Fig. 4

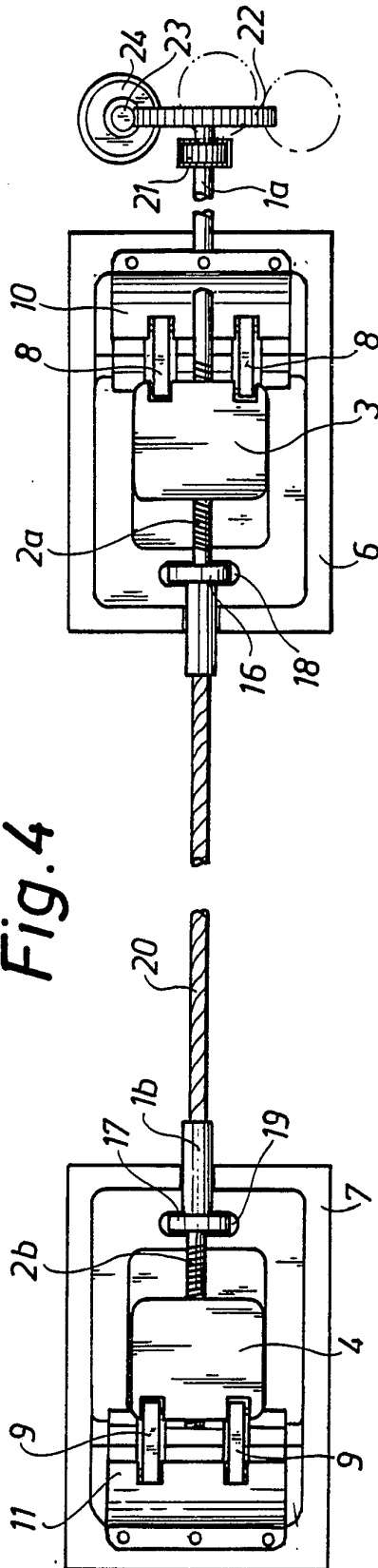
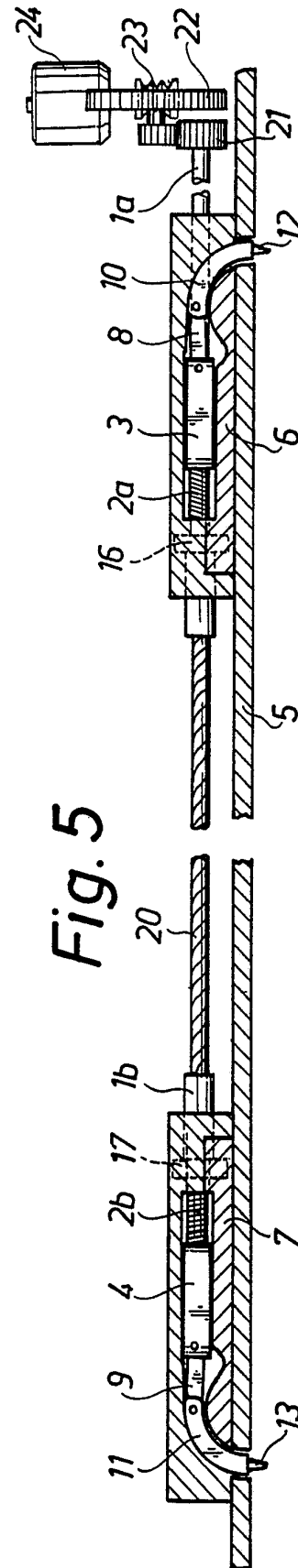


Fig. 5



## INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 93/00049

## A. CLASSIFICATION OF SUBJECT MATTER

IPC5: A43C 14/14

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)

IPC5: A43C

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

SE,DK,FI,NO classes as above

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.
A	SE, B, 467133 (BERTIL SJÖSVÄRD), 1 June 1992 (01.06.92)  -----	

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

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