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## (54) Fastening arrangement for sports shoes or boots

(57) Fastening arrangement for ski boots, comprising a rack (12) slidably mounted on an instep portion (11) of the upper (10) by means of a stud (14) that is fixed to the rack and is capable of being slidably displaced in a slot-like aperture (12) provided in the instep portion (11) of the boot upper. The invention is substantially characterized in that said rack is capable of being selectively locked in pre-defined positions relative to the upper or vamp of the boot by means of a first rotation by substantially a right angle of said rack with respect to its working position, its being slidably displaced into the new desired position, and its being finally locked in such a new position by means of a second reverse rotation in the opposite direction with respect to said first rotation. This solution is constructively simple and convenient in use.

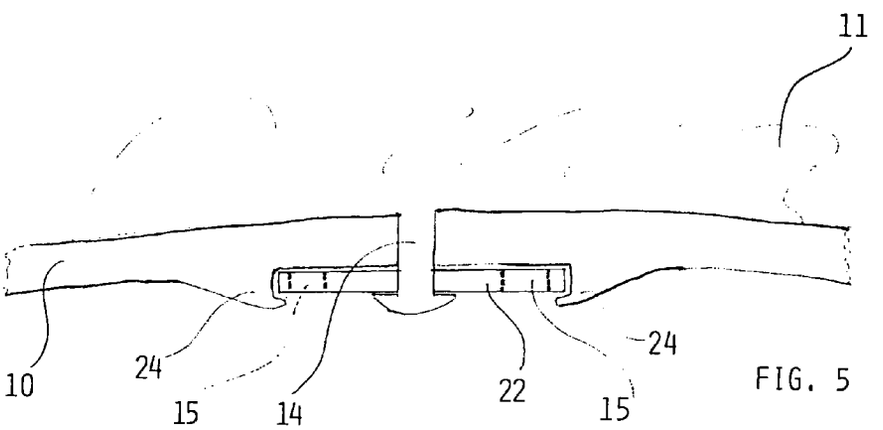


FIG. 5

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## Description

The present invention refers to an improved fastening arrangement for sports shoes, in particular ski boots.

It is commonly known that, in ski boots, the instep portions of the boot upper or vamp are generally tightened together by means of hooks that engage corresponding rack serrations and are then tensioned by means of appropriate levers. Generally, such levers and serrated racks are rigidly coupled with the one and the other of the two insteps of the upper or vamp, respectively.

The terms upper and vamp can be used to indicate the same component part of the boot, as anyone skilled in the art will readily appreciate, so that the more general term of upper will be used in the following for reasons of greater simplicity and clarity.

The above cited construction, although functionally appropriate and generally adopted, has a main drawback in that it does not allow for an easy adaptation to differing sizes of sportsmen's or skiers' feet.

In order to solve this problem, a first known solution lies in replacing the hooks so as to make the fastening arrangement either longer or shorter in accordance with the greater or smaller volumetric size of the foot of the skier. In practice, however, such a solution proves quite difficult and inconvenient, since, among other things, it requires quite great an effort to release the hook which must be fastened, and correspondingly released, by the action of the respective lever.

A second, more rational solution calls for the serrated rack to be arranged in an adjustable manner on the instep portion of the boot upper. To this purpose, the rack is attached to the boot upper by means of a stud extending through an elongated slot-like aperture and fastened to an eccentric pivotally provided underneath the upper. By causing the eccentric to rotate, a corresponding axial displacement of the stud of the rack is brought about, in such a manner as to bring the rack into a position enabling the fastening arrangement of the boot to be clamped. Even this solution, however, proves rather inconvenient in practical use, since it requires the use of a tool, such as for instance a key or the like, for adjusting the eccentric.

It should furthermore be noticed that the afore cited known solutions are regularly practicable when the boots are purchased or put on for the first time, while giving rise to the afore cited difficulties in the case in which any such adjustment has to be carried out afterwards, ie. during the actual use of the boots. It can be easily understood how difficult or even almost impracticable it may prove to replace the hooks in the first case, or rely on the availability of an appropriate implement on the spot in the second case.

It would therefore be desirable, and it is actually a main purpose of the present invention, to provide a fastening arrangement for sports shoes or boots which does away with the inherent drawbacks of the afore cited arrangements and in particular enables an adjustment to be carried out simply and conveniently at any time and in any situation whatsoever, without using any tool and without any particular effort being required.

The arrangement according to the present invention substantially comprises a serrated rack that is fixed to the boot upper by means of adjusting means of the slot-and-stud type, which allow for a lengthwise displacement of the rack so as to enable the length of clamping to be adapted to the actual size of the foot, said arrangement being characterized in that the rack is attached upon the upper of the boot and is provided with a stud extending through an elongated slot in the upper, so that it can be selectively clamped in pre-defined positions with respect to the upper by means of a first rotation, that can be performed manually, by substantially a right angle of said rack with respect to its working position, slidably reset into a new desired position, and finally clamped again by means of a second reverse rotation opposite to said first rotation.

Before going on with the description of the invention, it may be appropriate to emphasize the fact that the tightening of the front instep portions of the boot upper can be adjusted by clamping in a lever-like fashion an appropriate hook that is capable of engaging, with one of its end portions, said rack and, with the other end portion, a clamping means provided on the upper, said rack and said clamping means being provided on two distinct positions, one on the upper and one on the instep to be tightened.

It will be appreciated that, in principle, it is fully unimportant which one of said positions is occupied by the rack and which one by the clamping means.

Those skilled in the art will also appreciate that the adjustment of the tension of said hook can be performed by either adjusting the position of the rack or adjusting the position of the hook clamping means with respect to the corresponding supports.

As a result, the present invention identically applies to the adjustment of the position of the rack and, alternatively, the adjustment of the position of the hook clamping means with respect to their supports, although for reasons of greater simplicity and clarity the invention will be described in the following description by referring solely to the adjustment of the position of the rack.

The features and characteristics of the present invention will be more readily understood from the description that is given below by way of non-limiting example with reference to the accompanying drawings, in which:

- Figure 1 is a partial outside view of the instep of an upper of a ski boot provided with the arrangement according to the present invention in an actuation position;

- Figure 2 is a same view of the same instep as shown in Figure 1, but without any accessory item;

- Figure 3 is a view of the same instep, however seen from inside and according to an improving variant;
- Figure 4 is a longitudinal-section view of the same arrangement;
- Figure 5 is a longitudinal-section view of the same arrangement according to an improving variant;
- Figure 6 is a view of a component part used in said improving variant;
- Figure 7 is a cross-sectional view of a rack according to the invention;
- Figure 8 is a longitudinal-section view of a rack according to the invention;

Under particular reference to Figure 1, the arrangement according to the present invention is shown as applied to the instep portion of an upper 10 of a ski boot (not shown), possibly subdivided into a plurality of similar instep portions in correspondence of the front portion of the boot.

Said instep portion is provided on its upper portion with a rack 11 which, as will be shown more clearly further on, is capable of being caused to slide longitudinally with respect to the portion of upper 10 by rotating said rack 11 accordingly.

As illustrated in Figures 4 through to 7, the rack 11 is provided with a stud 14 extending downwards and passing through an elongated slot-like aperture 12 provided in said instep portion.

As this is best shown in Figures 2 and 3, said elongated slot-like aperture, which has a pre-determined width 13, is shaped so as to provide a plurality of distinct enlarged sections 15 separated from each other, being preferably circular in their shape and arranged at substantially equal intervals along said elongated slot-like aperture.

Said stud 14 has a cross-section which is substantially rectangular with respect to a plane a running parallel to the plane defined by a portion of the inner base of the rack; its shorter side 16 has a width which is smaller than the width 13 of said elongated slot-like aperture in the portions where it has no such enlarged sections 15, whereas its longer side 17 has a width which is larger than the width of said elongated slot-like aperture in the portions where it has no such enlarged section 15, but smaller than the width of said enlarged sections themselves, so as to be capable of being rotated freely within said enlarged sections when said stud is displaced in the corresponding zones or portions.

The longer side 17 of said stud is substantially parallel to the ribs or serrations 18 of said rack.

As it may be noticed in particular in the illustration appearing in Figure 1, said rack is capable of being selectively clamped, with respect to the boot upper, in the positions in which its stud is positioned in correspondence of one of such enlarged sections of the elongated slot-like aperture. As a matter of fact, it is possible for the position of the rack to be displaced with respect to the boot upper by means of a first rotation by substantially a right angle of said rack relative to the working position thereof, so that said stud is positioned "edgewise" and is therefore enabled, owing to the above described mutual dimensional relations of said stud and the slot-like aperture, to cause the rack to slide into the new desired position and clamp it again in such a position by means of a second clamping rotation in the opposite direction with respect to said first rotation. For this second rotation to be carried out, it will of course be necessary that such a stud be positioned in correspondence of another such enlarged section, so as to enable the stud to be turned across it without any interference therewith. As a result, depending on the actual number and the distance from each other of said enlarged sections provided along said elongated slot-like aperture, it is possible for the total displacement range and the accuracy of adjustment of the position of the rack to be defined as desired.

It is furthemore advantageous if, in view of preventing the edges of the elongated slot-like aperture from wearing down in an undesirably quick manner and, as a consequence, give rise to undue widenings of the aperture itself, the edges and corners of the stud 14 are adequately filed or otherwise rounded off so as to eliminate any sharp edge or corner.

In order to ensure that the rack and the related stud will not slip off the associated slot-like aperture, it is of course necessary for appropriate retaining means to be provided.

These retaining means may for instance be provided by forming the inner portion 19 of said stud, ie. its terminal portion facing the interior of the boot, in such a manner that it is given a substantially cylindrical shape. A washer 20, or similar means, shall furthermore be provided for insertion on said substantially cylindrical portion 19 so as to be adapted to form a retaining element, preferably as an undercut, for said terminal portion of the stud, as this will be more clearly explained further on.

In order to fasten said stud against said washer so as to prevent said stud from slipping off, in the case that the opening in said washer is sufficiently wide, use should be made of a screw 21 to be screwed into a threaded hole appropriately provided in the inner end portion of the stud so that its head engages against said washer and, at the same time, prevents the same washer to slip off in the opposite direction with respect to the direction in which the stud would possibly slip off.

As it can be noticed, the fastening arrangement for sports shoes in general, and ski boots in particular, according to the present invention solves the problem associated with the dimensional adaptation to the wearer's or skier's foot by making use of constructively very simple and operationally quite practical and con-

venient means. The use of not always readily available tools or implements is in fact no longer required, while an adjustment can be performed at any time and under any condition, since a simple manual operation, which additionally does not require any particular effort or any particularly accurate handling, is all that is needed to carry it out.

It will of course be appreciated that the described solution according to the present invention may be subject to a number of modifications and variants using the same innovative concept and achieving an equal serviceableness, without departing from the scope of the present invention as defined by the appended claims.

So, for instance, in view of simplifying the retention of the stud, it may prove economically advantageous to eliminate the use of the screw and the provision of the related threaded hole, and to use a rigid, preferably metal plate 22 instead, as illustrated in Figures 3, 5 and 8.

Said plate shall be machined in such a manner as to be provided with a slot-like opening 23 that fully corresponds in its dimensions and shape to the slot-like aperture 12 provided in the instep 10 of the boot upper, on which it is then laid on the inner side of the respective instep.

The stud itself is of course made longer so as to enable it to get beyond the thickness of said plate and washer and come out from the inner side thereof.

Finally, in order to lock said stud against the washer, it may prove particularly advantageous to rivet the end portion of said stud, for instance by hammering, so that the enlargement so obtained on the head of the stud is compressed against the washer, thereby preventing it from slipping off and, as a consequence, retaining also the plate provided thereunder.

Such a solution has a further advantage deriving from the fact that, in this particular case, the displacement of the rack is actually guided by the slot-like opening 23 of the plate, thereby ensuring the highest possible extent of displacement accuracy, reliability, durability and jam-free operation. As a matter of fact, if said rigid plate 22 were not present and the displacement of the rack were guided only by the edges of the elongated slot-like aperture 12, the latter being provided in the instep 10 of the boot upper which is made of a material which, albeit flexible, is not particularly resistant to shearing and fretting stresses, said edges would wear down very quickly, thereby making it difficult for the rack to be displaced and locked in place.

Finally, in order to ensure that said rigid plate 22 is secured in place in a correct a firm manner, so that the slot-like opening 23 thereof is permanently and matchingly situated over the corresponding elongated slot-like aperture 12 of the instep, said instep should appropriately be provided on its inner surface with protrusions 24, which may be formed by moulding, heading or any other suitable forming method, said protrusions being adapted to define a receptacle having such a shape and position as to firmly accomodate said plate in the desired position as described above.

## Claims

1. Fastening arrangement for sports shoes or boots, comprising a clamping element that is adapted to engage a rack (11) at one of its end portions and a securing means at its opposite end portion, said rack and said securing means being applied on mutually opposing, outer surfaces of the upper or vamp of the boot by means of adjusting means of the slot-and-stud type allowing for a longitudinal displacement of the rack and/or, alternatively, of said securing means so as to adapt the clamping length to the actual size of the wearer's foot, said rack or said securing means being provided with a stud (14) which is substantially orthogonal to a plane defined by a portion of the inner base of said rack or said securing means and extends through an elongated slot-like aperture (12) of the upper or vamp of the boot, such an arrangement being **characterized in that** said rack and/or said securing means are capable of being selectively locked in pre-defined positions relative to the upper ot vamp of the boot by means of a first rotation by substantially a right angle of said rack and/or securing means with respect to their respective working position, their slidable displacement into the new desired position, and their final locking in such a new position by means of a second reverse rotation in the opposite direction with respect to said first rotation.

2. Fastening arrangement for sports shoes or boots according to claim 1, **characterized in that**:

   - said elongated slot-like aperture is formed so as to provide a plurality of distinct enlarged sections (15) separated from each other, being preferably circular in their shape and arranged at corresponding zones distributed along said elongated slot-like aperture;

   - said stud has a cross-section which is substantially rectangular with respect to a plane a running parallel to the plane defined by a portion of the inner base of the rack or securing means;

   - the shorter side of said cross-section of the stud has a width which is smaller than the width (13) of said elongated slot-like aperture in the zones where it has no such enlarged sections, and the longer side of said stud cross-section has a width which is larger than the width of said elongated slot-like aperture in the zones where it has no such enlarged section, but smaller than the width of said enlarged sections themselves, so as to be capable of being rotated freely within said enlarged sections

when said stud is displaced in the corresponding zones or portions; and

- the longer side (17) of said stud, when locked in position, is substantially orthogonal to the axis of said elongated slot-like aperture.

3. Fastening arrangement for sports shoes or boots according to claim 2, **characterized in that** said studs are machined or, anyhow, finished at their corners and edges so that the cross-section thereof, which is substantially rectangular with respect to a plane running parallel to the plane defined by a portion of the inner base of the rack or, alternatively, the securing means, is provided with rounded edges and corners.

4. Fastening arrangement for sports shoes or boots according to claim 2 or 3, **characterized in that** the internal end portion of said stud is prevented from slipping offsaid slot-like aperture of the boot upper or vamp by retention means.

5. Fastening arrangement for sports shoes or boots according to claim 4, **characterized in that**:

- the internal portion of said stud has a substantially cylindrical shape (19);

- said retention means are formed by a washer (20) that is adapted to be inserted in said substantially cylindrical portion and to form an undercut for the head of a screw (21) inserted in the internal, substantially cylindrical portion of the stud.

6. Fastening arrangement for sports shoes or boots according to claim 4 or 5, **characterized in that** said washer (21) is locked against said internal end portion of the stud by riveting or hammering said internal end portion of said stud against said washer.

7. Fastening arrangement for sports shoes or boots according to one or more of the preceding claims, **characterized in that**:

- a rigid backing plate (22), preferably of metal, is arranged between the inner surface of said boot upper or vamp, in correspondence of said elongated slot-like aperture, and said retention means;

- said rigid backing plate has a slot-like through-opening (23) having the same dimensions and shape of said elongated slot-like aperture (12) provided in said boot upper or vamp, in such a manner that said two slot-like apertures are matchingly superimposable.

8. Fastening arrangement for sports shoes or boots according to claim 7, **characterized in that** said rigid backing plate is retained in place by an appropriate receptacle obtained by forming protrusions (24) on the inner zone of said boot upper or vamp in correspondence of the edges of said plate.

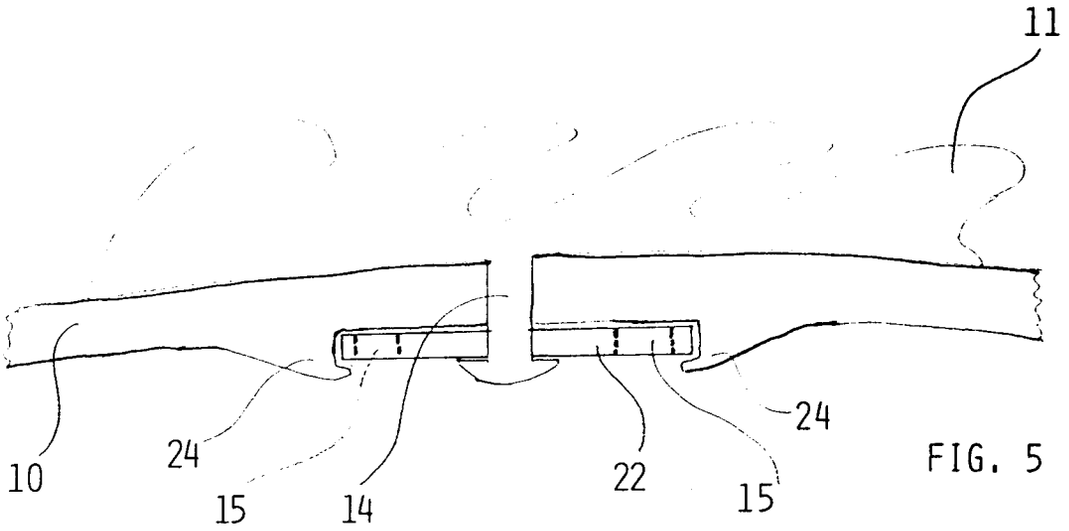


FIG. 5

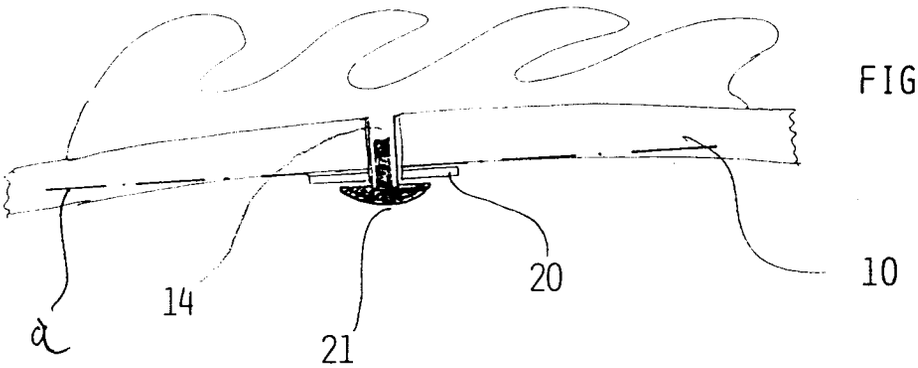


FIG. 4

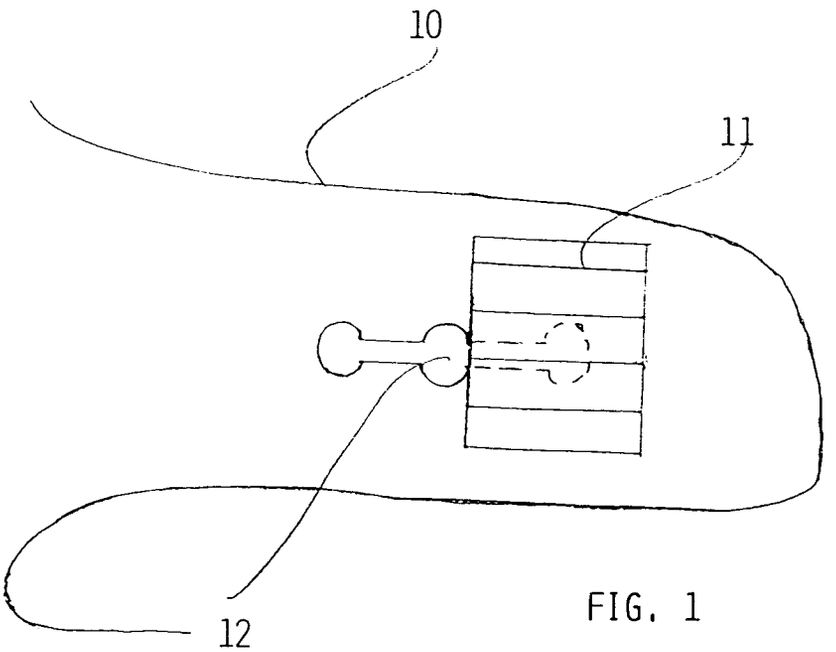


FIG. 1

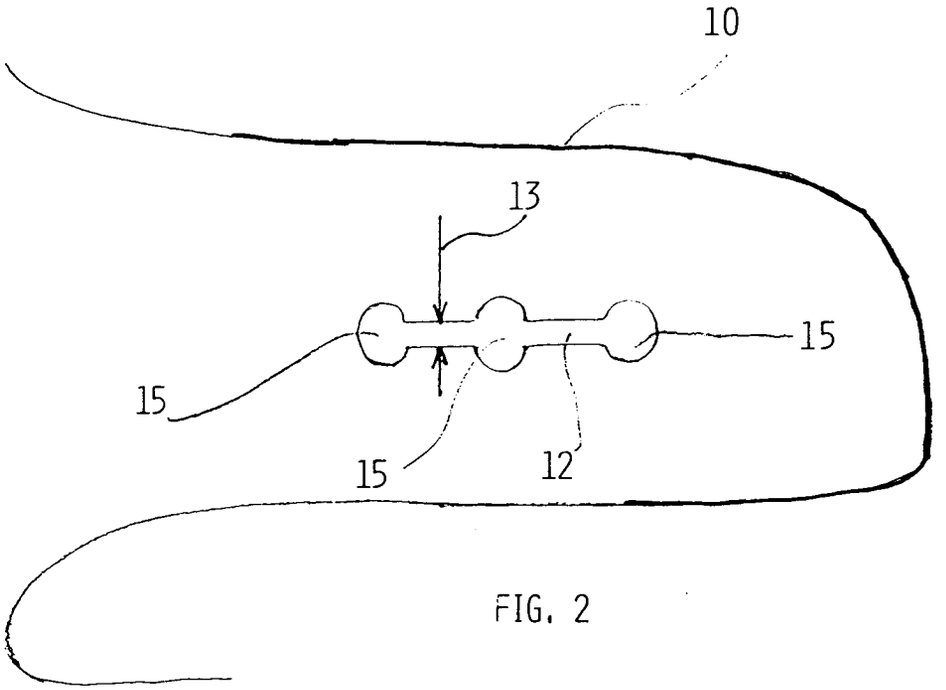


FIG. 2

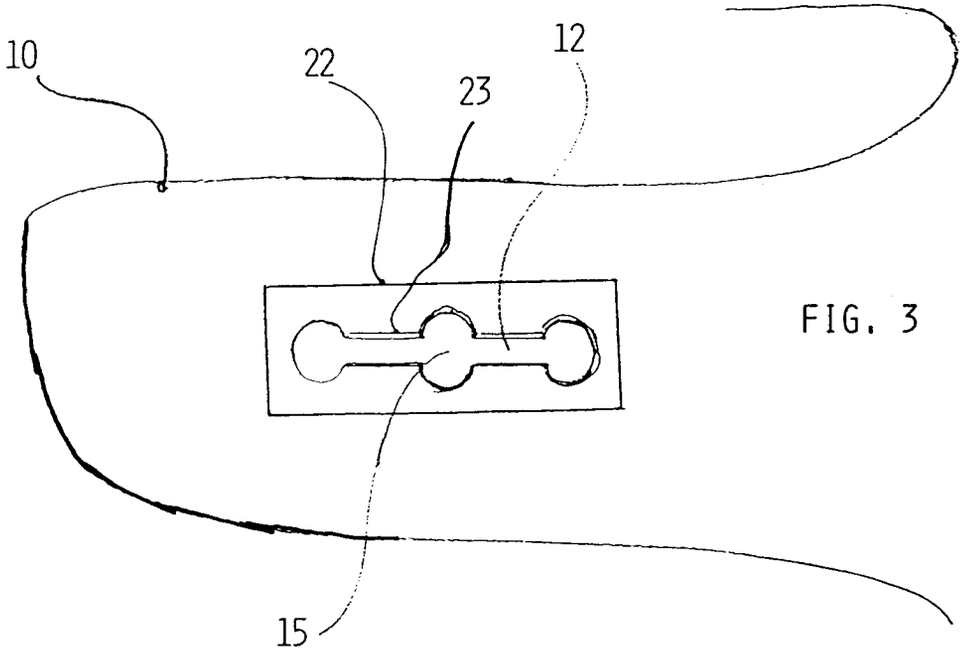


FIG. 3

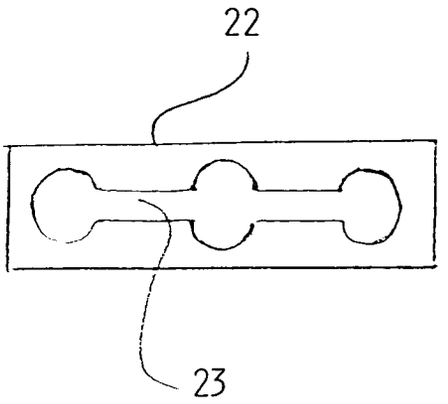


FIG. 8

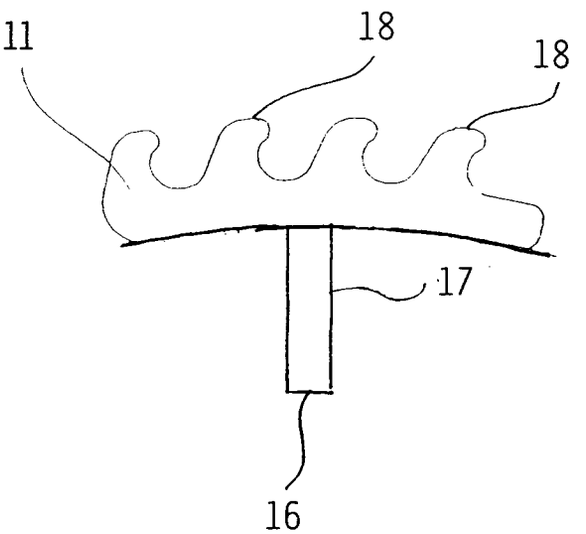


FIG. 6

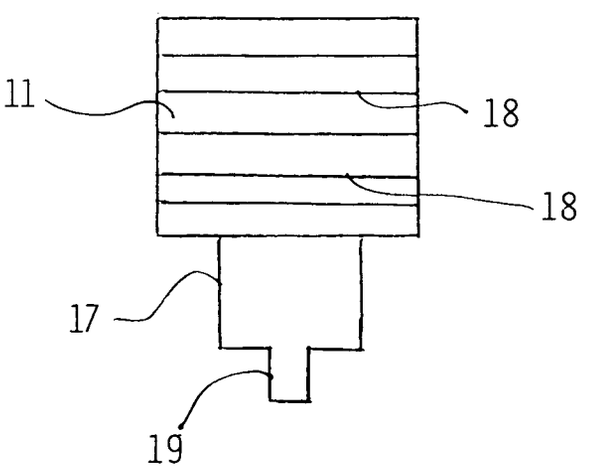


FIG. 7