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(54) **A DEVICE FOR COUPLING AN ITEM OF FOOTWEAR ON AN ITEM OF SPORTS EQUIPMENT**
VORRICHTUNG ZUM BEFESTIGEN VON EINEM SCHUHWERK AUF EINEM SPORTGERÄT
DISPOSITIF DE COUPLAGE D'UN ARTICLE DE CHAUSSURE SUR UN ARTICLE D'EQUIPEMENT
SPORTIF

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Description

[0001] The present invention relates to a device for coupling an item of footwear on an item of sports equipment in order to use the equipment, the device having a structure so as to allow the footwear to be detached from the equipment after use.

[0002] The present invention relates, more specifically but not exclusively, to a device of the type indicated above for use in particular and advantageously for coupling an item of footwear on a snow-board.

[0003] Clearly, however, although specific reference is made to this use by way of example in the present description, the device of the invention may also be used for other sports equipment or products such as, for example, a ski, a roller skate, particularly an in-line roller skate, or a bicycle pedal.

[0004] A known construction, as disclosed by US-A-5 474 322, is a binding device comprising a first body fixed to the sole of the footwear and having a set of shaped protrusions on its visible face and a second body fixed to the sports equipment, in particular a snow-board, and having a set of holes the arrangement and number of which are the same as those of the protrusions and into which the protrusions can extend. In order to ensure a lock of the protrusions when inserted into the holes a mechanism is foreseen which is of a rather complex construction, not so easy to handle by the user and expensive to produce.

[0005] The main object of the present invention is to provide a coupling device the structure of which is such as to enable the shoe to be coupled to the board securely and easily even when the board is subjected to extreme forces resulting from the activity, and which can be used for footwear with various types of construction.

[0006] Another object of the present invention is to provide a binding device which is of a simple construction and particularly easy to use.

[0007] Not the least object is provide a system which can be produced at low cost with the use of known machines, tooling and techniques and thus to afford the industrialized production of the various elements.

[0008] These objects are achieved by the provision of a coupling device composed of two bodies fixed to the footwear and to the equipment, respectively, and of an intermediate body interposed between the first two.

[0009] The first body is fixed to the sole of the footwear and may be made of metal such as steel or an alloy, or of plastics material, generally nylon, pebax, polyurethane, etc. The body has a base for bearing on the sole; the base may be of any shape, for example, circular, and has one or more protrusions, formed by the body itself, on the opposite side to that which bears against the sole. The body is fixed to the sole by known means of any type such as, for example, a system of one or more screws or rivets, or may be directly incorporated in the sole itself

[0010] The protrusions may be of any shape but, for

simplicity of explanation, reference will be made to a hemispherical shape. Moreover, each protrusion has a rounded end portion and a groove of a certain depth is present on the whole or a portion of its periphery. A shoulder of the same material as the first body and formed directly thereby may also advantageously be present on the same side as the protrusions.

[0011] The second body is of the same shape as the first and, in this embodiment, is circular, is formed of the same material as the first body, and is completely closed to prevent infiltration of snow or the like so as to avoid damage and anomalous operation thereof. One face of the second body is fixed to the board by the same system as the first body, by means of screws or rivets. The second face has one or more holes or slots for housing the corresponding protrusions present on the first body.~~[deletion(s)]~~

[0012] The innovative concept upon which the present invention is based, as specified below, consists of the fact that the coupling is achieved simply by the effect of the pressure exerted by the user when he wishes to insert the protuberances or protrusions of the first body in the holes of the second body and of the intermediate body.

[0013] In the condition prior to this insertion, the holes of the second body, and hence of the intermediate body, are out of alignment with one another and, by virtue of a particular flared shape of the holes of the intermediate element, the pressing action performed by the user leads to rotation of the intermediate element and to alignment of the holes allowing the protrusions to be inserted fully.

[0014] Upon completion of this operation, the resilient means interposed between the second body and the intermediate body re-establish the initial relative positions of the two sets of holes which are thus out of alignment again. In particular, the holes of one set become engaged in respective peripheral recesses or grooves of the protrusions, bringing about locking thereof.

[0015] A reverse sequence of steps is performed when the device is to be released, which is easily achieved by temporarily aligning the holes concerned so as to release the protrusions.

[0016] The characteristics and advantages of the device according to the present invention will become clear from the following detailed description of a non-limiting embodiment thereof, given with reference to the appended drawings, in which:

Figure 1 is a general, schematic side view of the coupling device according to the present invention, Figure 2 is a plan view of the first body of the device from the side which bears on and is fixed to the sole of the footwear,

Figure 3 is a plan view of the above-mentioned first body from the side to be connected to and coupled to the second body,

Figure 4 is a cross-sectional view of the first body

taken on the section line IV-IV of Figure 3,

Figure 5 is a plan view of the second body of the device from the side to be coupled to on the first body of the previous drawings,

Figure 6 is a plan view of the above-mentioned second body from the opposite side to Figure 5,

Figure 7 is a plan view of the intermediate element or counter-disk from the side to which the first body of Figures 1 to 4 is coupled,

Figure 8 is a plan view of the above-mentioned intermediate element from the opposite side to the previous drawing,

Figure 9 is a schematic side view showing the first body of the device according to the invention in cross-section,

Figure 10 is a schematic cross-sectional view of the counter-disk of the coupling device according to the invention taken on the section line X-X of Figure 8.

[0017] With reference to the above-mentioned drawings and, in particular, to Figure 1, the coupling device according to the invention comprises a first body, generally indicated by reference 1, to be fixed to the sole of an item of footwear, particularly a sports shoe, shown schematically in broken outline in Figure 1 and generally indicated by 1a.

[0018] The device also comprises a second connection body, generally indicated by reference 2, to be fixed to an item of sports equipment in general such as, for example, a snow-board, shown schematically in broken outline in Figure 1 and indicated 2a.

[0019] Finally, the coupling device comprises an intermediate element, generally indicated 3 and referred to below for brevity as a counter-disk because it cooperates with the first, substantially disk-like body 1.

[0020] The first body 1 and the second body 2, both of which are constituted by disk-like bodies, are fixed to the footwear sole 1a and to the board 2a, respectively, in any conventional manner such as, for example, by the provision of fixing rivets 4.

[0021] The first body 1 of the coupling device according to the present invention will now be described in detail with particular reference also to Figures 2 to 4.

[0022] As can be appreciated, the first body 1 is constituted by a substantially flattened, disk-like body 4 which in the embodiment considered by way of example, has a substantially circular shape which is not intended to be limiting and is intended to be fixed to the sole 1a.

[0023] The disk-like body 5 has, on its periphery, a set of suitably perforated, radially projecting extensions 6 for the fitting of the rivets 4 for fixing the first body 1 to the sole 1a.

[0024] Moreover, the side of the first body 1 opposite that fixed to the sole 1a has a set of protrusions or protuberances, each indicated 7, which can best be seen in Figures 3 and 4. In the embodiment considered, there are three protrusions 7 but, naturally, the number of pro-

trusions 7 may usefully be modified without departing from the scope of the present invention, what is relevant from this point of view being their shape and configuration which will be explained below with reference to Figures 1 and 4.

[0025] From these drawings, it can be seen that each of the protrusions 7 extends with its longitudinal axis substantially perpendicular to the plane of the disk-like body 5.

[0026] Starting from the body 5, the protrusions 7 have a first, substantially cylindrical portion 7a, a peripheral groove 7b, and an end portion 7c which is connected to its first portion 7a through the peripheral groove 7b.

[0027] Moreover, the end portion 7c of each of the protrusions 7 is substantially hemispherical and this non-limiting shape is intended, together with the peripheral groove 7b, to enable the protrusions 7 to be snap-coupled with the second body 2 of the device according to the invention. ~~[deletion(s)]~~

[0028] This operation takes place during the coupling of the first body 1 to the second body 2.

[0029] With reference now to Figures 5 and 6, it can be appreciated that the second body 2 is also constituted by a substantially flattened and disk-like body 8, also of substantially circular shape.

[0030] This shape is of a non-limiting character since the second body 2 is intended to be fixed to the sports equipment, that is, to the board 2a.

[0031] Fixing in this case is also achieved by the use of known rivets 4, visible in Figure 1, fitted in suitably perforated extensions 9 projecting radially from the second body 2.

[0032] According to one of the characteristics of the present invention, the second body 2 has a set of apertures or holes 10 the number of which is equal to the number of protrusions 7 of the first body 1 since they are intended to house these protrusions.

[0033] According to a further characteristic of the invention, the diameter of the holes 10 is substantially equal to or slightly greater than that of the cross-sections of the protrusions 7, particularly of their cylindrical portions 7a and their shaped end portions 7c.

[0034] With regard to the holes 10 alone, the protrusions 7 can thus be inserted therein and removed therefrom freely, the actual coupling of the device being achieved, in particular, owing to the connection with the first body 1 and with the second body 2, of the intermediate element or counter-disk 3 described below with particular reference to Figures 7 to 10.

[0035] The intermediate element or counter-disk 3, which is the sole movable, particularly rotatable, element of the device according to the invention, will now be described in detail with particular reference to these drawings. Its rotations, in a first direction engage the footwear on the board, whereas its rotations in the opposite direction enable the footwear to be detached.

[0036] With reference to these drawings, but also bearing in mind Figure 1, it can be appreciated that the

intermediate element 3 is constituted by a flattened and disk-like body 12 which has a number of holes or apertures 14 equal to the number of holes 10 of the second body 2 and distributed angularly in the same manner, substantially along the periphery.

[0037] The holes 14 are also intended to receive the protrusions 7 of the first body 1 and, more precisely, these holes 14, which can be displaced angularly in a rotary sense relative to the holes 10, on the one hand, allow the protrusions to be inserted and engaged on the second body 2 but, on the other hand, when rotated in the opposite sense, allow the protrusions to be detached.

[0038] The above-mentioned rotations of the counter-disk 3 are coordinated and assisted by the action of a control and operating spring 16 the central portion of which is wound in a helix on a pin 18 of the second body 2, as can be seen from Figure 9. The pin or protrusion 18 projects so as to be perpendicular to the plane of the disk-like body 8 of the second body 2 on the side facing the snow-board 2.

[0039] It will also be noted that an intermediate region of the pin 18 has a peripheral groove 20 for housing and restraining the helical end of the operating spring 16 by any known means.

[0040] With reference now to Figures 1 and 8, it can be seen that the two portions 16a and 16b of the spring 16 which extend radially from the pin 18 have their ends inserted in respective suitable seats 18a and 18b of the intermediate element 3. This element 3 is thus rotatable relative to the second body 2 in opposition to the action of the spring 16 which returns the second body 2 to its initial position once the action bringing about its rotation ceases.

[0041] As indicated above, rotations of the second body 2 in a first direction enable the protrusions 7 of the first body 1 to be inserted in the holes 10 and 14 of the second body 2 and of the intermediate element 3, respectively, whereas rotations in the opposite direction release the protrusions from the above-mentioned holes.

[0042] There are thus two working conditions in the first of which the holes 10 and 14 of the first body 2 and of the intermediate element 3 are brought, by the effect of the pressure exerted by the user, so as to be substantially coaxial with one another and this rotation can easily be brought about by the insertion of the protrusions 7 in the above-mentioned holes. The widened and convex shape of the end portions 7c of the protrusions 7 permits this insertion whereby the holes 10 and 14, which are initially out of alignment with one another, are brought to a coaxial condition by the insertion of the end portions 7c of the protrusions 7, whereas the action of the spring 16 returns the holes to the initial condition in which they are out of alignment and in which the holes 14 of the intermediate element restrain the end portions 7c of the protrusions 7 in the second body 2. In this condition, the first body 1 is temporarily locked on or coupled

to the second body 2, consequently locking the footwear 1 on the board 2.

[0043] The first body 1 can easily be released from the second body 2 by rotating the intermediate element or counter-disk 3 in the opposite direction to the previous one to bring the holes 10, 14 back to a substantially coaxial condition so that the protrusions 7 can be released and removed from the second body 2, thus releasing the footwear 1 from the board 2.

[0044] The above-mentioned operation can easily be brought about by the user by rotating the counter-disk 3. This can be achieved, in the embodiment shown, by means of an operating lever 24 which projects radially from the intermediate element 3 and which can be operated in any known manner by the user who can thus easily disengage and release the device whenever he wishes. The rotation will be of a very limited amplitude so that no particular effort is required by the user to bring about the movement from the engaged condition to the released condition.

[0045] According to a further advantageous characteristic of the device according to the invention, it has been found that the movement of the device to the coupling condition is brought about by the insertion of the protrusions 7 in the holes 10 and 14 and this is performed by the user by exerting a pressure with the footwear 1 and hence with the protrusions 7, on the second body 2 and on the intermediate element 3. To facilitate the insertion of the protrusions 7 in the holes just mentioned, as can be seen in particular from Figure 10, the upper peripheral edge 26 of each hole 14 of the intermediate element 3 is slightly flared so that the curved, convex profile of the end portions 7c of the protrusions 7 can be inserted in the holes 14 with slight forcing. Once this condition has been reached, the intermediate element is returned to the initial condition by the action of the spring 16, bringing about temporary coupling and locking of the device.

[0046] According to yet another characteristic of the device according to the invention, as can be seen from Figures 1, 3 and 4, the first body 1 has on its periphery a set of projecting portions 28 disposed on the same face as the protrusions 7 and constituting a means for guiding and locating the first body 1 relative to the second body 2 in order to position the protrusions 7 extremely easily in alignment with and in the holes 10 and 14. From this point of view, it is worth appreciating that each of the projecting portions 28 is constituted basically by an arc of a circular ring which extends on the periphery of the first body 1 and is thus intended to come into contact with the periphery of the second body 2. For this purpose, the projections 28 are distributed with their inner walls along a circle having a diameter slightly larger than the outside diameter of the second body 2 so as to permit the above-mentioned location.

[0047] In the embodiment illustrated, there are four projecting portions 28 distributed equiangularly on the periphery of the first body 1. However, there could clear-

ly be a different number of projecting portions 28 since their task is that of location for the above-mentioned insertion of the protrusions 7.

[0048] The operation of the device according to the invention is extremely simple and can be inferred from the foregoing description. It is, however, worth to notice in detail particularly advantageous aspects of the device which render it easy for the user to use. From this point of view, it suffices to draw attention to the following two operating conditions, corresponding, respectively, to the coupling of the first body to the second, and to its detachment:

1. the temporary locking of the first body 1 on the second body 2 is achieved simply by the effect of pressure imparted by the user to the shoe so that the end portions 7c of the protrusions 7 act on the flared portions 26 of the counter-disk 3 so as to render the holes 10 and 14 on the second body 2 and on the counter-disk 3 coaxial, allowing the protrusions 7 to be inserted. This rotation of the counter-disk 3 which, however, is limited, takes place by virtue of the provision of the spring 16;
2. the release and detachment operation is performed simply by a rotation of the counter-disk 3 in the opposite direction to the previous one by acting on the operating appendix or lever 24; the holes 10 and 14 are thus rendered coaxial once again, allowing the protrusions 7 to be extracted. The magnitude of the rotation just considered is limited by suitable end limiting means provided, for example, on the second body 2 or on the plate 2a.

[0049] Finally, it is clear that structurally equivalent variations and/or modifications may be applied to the device within the scope of the claims.

Claims

1. A binding device for coupling an item of footwear on an item of sports equipment and for enabling the equipment to be detached when not in use, comprising a first body (1) fixed to the sole (1a) of the footwear and having a set of shaped protrusions (7) on its visible face and a second body (2) fixed to the sports equipment (2a) and having a set of holes (10) the arrangement and number of which are the same as those of the protrusions (7) and into which the protrusions (7) can extend, **characterized in that** an intermediate element (3) is provided which is:
 - rotatable relative to the second body (2) and having a set of holes (14) the arrangement and number of which are the same as those of the protrusions (7) of the first body (1) and
 - movable between a first position in which the

holes (10, 14) are out of alignment with one another and are restrained by resilient means (16) and a second position which can be reached in opposition to the resilient means (16) and in which the holes (10, 14) have been rendered coaxial with one another.

2. A device, according to Claim 1, **characterized in that** the position in which the holes (10, 14) are out of alignment is the position in which the footwear (1a) is coupled to the equipment (2a).
3. A device according to Claim 1, **characterized in that** the second position in which the holes (10, 14) are coaxial with one another is the position in which the footwear (1a) can be released from the equipment (2a) by the extraction of the protrusions (7) from the holes (10, 14).
4. A device according to Claim 1, **characterized in that**, starting from the visible face of the first body (1), each protrusion (7) has a substantially cylindrical portion (7a) as well as a substantially convex and rounded end portion (7c), the portions (7a, 7c) being connected to one another, through a peripheral groove (7b).
5. A device according to Claim 1, **characterized in that** each hole (14) of the intermediate element (3) has, on the side from which the protrusion (7) is inserted, a flared edge (26) constituting a lead-in for the insertion of the protrusion (7).
6. A device according to Claim 1, **characterized in that** the first body (1) has, on the side having the protrusions (7), a set of projecting portions (28) constituting a means for locating the first body (1) relative to the second body (2).
7. A device according to Claim 6, **characterized in that** the projecting portions (28) of the first body (1) are disposed substantially on its periphery.
8. A device according to Claim 1, **characterized in that** the resilient means are constituted substantially by a spring (16) having a central portion wound on a pin (18) of the second body (2), the ends (16a, 16b) of the spring being in coupling with the intermediate body (3).
9. A device according to Claim 1, **characterized in that** the intermediate body (3) has a projecting portion (24) for enabling its rotations to be brought about from outside the device.
10. A device according to Claim 8, **characterized in that** the ends (16a, 16b) of the spring (16) are inserted in respective seats (1 Sa, 18b) of the inter-

mediate body (3).

Patentansprüche

1. Verbindungsvorrichtung zum Verbinden eines Fußbekleidungsstücks mit einem Sportausrüstungsgegenstand, der bei Nichtgebrauch weggenommen werden kann, mit einem ersten Körper (1), der an der Sohle (1a) der Fußbekleidung befestigt ist und einen Satz von Formvorsprüngen (7) an seiner sichtbaren Seite aufweist, und einen zweiten Körper (2), der an der Sportausrüstung (2a) befestigt ist und einen Satz von Löchern (10) aufweist, deren Anordnung und Anzahl gleich wie bei den Vorsprüngen (7) sind und in die sich die Vorsprünge (7) erstrecken können, **dadurch gekennzeichnet, dass** ein Zwischenelement (3) vorgesehen ist, das

- drehbar relativ zum zweiten Körper (2) ist und einen Satz von Löchern (14) aufweist, deren Anordnung und Anzahl gleich wie bei den Vorsprüngen (7) des ersten Körpers (1) sind, und
- zwischen einer ersten Stellung, in der die Löcher (10, 14) nicht fluchtend zueinander angeordnet sind und durch Federmittel (16) gehalten werden, und einer zweiten Stellung, die entgegen den Federmitteln (16) erreicht werden kann und in der die Löcher (10, 14) koaxial zueinander sind, bewegbar ist.

2. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Stellung, in der die Löcher (10, 14) nicht fluchtend sind, die Stellung ist, in der die Fußbekleidung (1a) mit der Ausrüstung (2a) verbunden ist.

3. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die zweite Stellung, in der die Löcher (10, 14) koaxial zueinander sind, die Stellung ist, in der die Fußbekleidung durch Herausziehen der Vorsprünge (7) aus den Löchern (10, 14) von der Ausrüstung (2a) gelöst werden kann.

4. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass**, ausgehend von der sichtbaren Seite des ersten Körpers (1), jeder Vorsprung (7) einen im wesentlichen zylindrischen Bereich (7a) sowie einen im wesentlichen konvexen und abgerundeten Endbereich (7c) aufweist, wobei die Bereiche (7a, 7c) durch eine Umfangsnut (7b) miteinander verbunden sind.

5. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** jedes Loch (14) des Zwischenelements (3) an der Seite, von der aus der Vorsprung (7) eingesetzt wird, einen erweiterten Rand (26)

aufweist, der eine Einführöffnung für das Einsetzen des Vorsprungs (7) bildet.

6. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der erste Körper (1) an der die Vorsprünge (7) aufweisenden Seite einen Satz von vorstehenden Partien (28) aufweist, die Mittel zum Lokalisieren des Körpers (1) relativ zum zweiten Körper (2) bilden.

7. Vorrichtung nach Anspruch 6, **dadurch gekennzeichnet, dass** die vorstehenden Partien (28) des ersten Körpers (1) im wesentlichen an seinem Umfang angeordnet sind.

8. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** die Federmittel im wesentlichen von einer Feder (16) gebildet werden, die einen auf einen Stift des zweiten Körpers (2) gewickelten zentralen Bereich aufweist, wobei die Enden (16a, 16b) der Feder mit dem Zwischenkörper (3) in Verbindung stehen.

9. Vorrichtung nach Anspruch 1, **dadurch gekennzeichnet, dass** der Zwischenkörper (3) eine vorstehende Partie (24) aufweist, so dass er von außerhalb der Vorrichtung her verdreht werden kann.

10. Vorrichtung nach Anspruch 8, **dadurch gekennzeichnet, dass** die Enden (16a, 16b) der Feder (16) in jeweilige Sitze (18a, 18b) des Zwischenkörpers (3) eingesetzt sind.

Revendications

1. Dispositif de liaison pour accoupler un article de chaussure à un article d'équipement de sport et pour permettre à l'équipement de sport d'être détaché lorsqu'il n'est pas utilisé, comprenant un premier corps (1) fixé à la semelle (1a) de la chaussure et comportant un ensemble de saillies mises en forme (7) sur sa face visible, ainsi qu'un second corps (2) fixé à l'équipement de sport (2a) et comportant un ensemble de trous (10) dont la disposition et le nombre sont les mêmes que ceux des saillies (7) et dans lesquels les saillies (7) peuvent pénétrer, **caractérisé en ce qu'** on prévoit un élément intermédiaire (3) qui :

peut tourner par rapport au second corps (2) et comporte un ensemble de trous (14) dont la disposition et le nombre sont les mêmes que ceux des saillies (7) du premier corps (1), et peut se déplacer entre une première position dans laquelle les trous (10, 14) sont désalignés les uns par rapport aux autres et sont retenus par des moyens élastiques (16), et une secon-

de position qui peut être atteinte en s'opposant aux moyens élastiques (16) et dans laquelle on a rendu les trous (10, 14) coaxiaux les uns avec les autres.

2. Dispositif selon la revendication 1,
caractérisé en ce que
la position dans laquelle les trous (10, 14) sont désalignés est la position dans laquelle la chaussure (1a) est accouplée à l'équipement de sport (2a). 10

3. Dispositif selon la revendication 1,
caractérisé en ce que
la seconde position dans laquelle les trous (10, 14) sont coaxiaux les uns avec les autres est la position dans laquelle la chaussure (1a) peut être libérée de l'équipement (2a) par l'extraction des saillies (7) des trous (10, 14). 15

4. Dispositif selon la revendication 1, 20
caractérisé en ce qu'
en partant de la face visible du premier corps (1), chaque saillie (7) comporte une partie essentiellement cylindrique (7a) ainsi qu'une partie d'extrémité essentiellement convexe et arrondie (7c), les parties (7a, 7c) étant reliées l'une à l'autre par une rainure périphérique (7b). 25

5. Dispositif selon la revendication 1, 30
caractérisé en ce que
chaque trou (14) de l'élément intermédiaire (3) comporte, du côté par lequel la saillie (7) est introduite, un bord évasé (26) constituant une entrée pour l'introduction de la saillie (7). 35

6. Dispositif selon la revendication 1,
caractérisé en ce que
le premier corps (1) comporte, du côté muni des saillies (7), un ensemble de parties en saillie (28) constituant des moyens de positionnement du premier corps (1) par rapport au second corps (2). 40

7. Dispositif selon la revendication 6,
caractérisé en ce que
les parties en saillie (28) du premier corps (1) sont disposées essentiellement sur sa périphérie. 45

8. Dispositif selon la revendication 1,
caractérisé en ce que
les moyens élastiques sont constitués essentiellement par un ressort (16) comportant une partie centrale enroulée sur une broche (18) du second corps (2), les extrémités (16a, 16b) du ressort étant accouplées au corps intermédiaire (3). 50

9. Dispositif selon la revendication 1,
caractérisé en ce que
le corps intermédiaire (3) comporte une partie en 55

saillie (24) pour permettre à ses rotations de se faire de l'extérieur du dispositif.

10. Dispositif selon la revendication 8,
caractérisé en ce que
les extrémités (16a, 16b) du ressort (16) sont introduites dans des sièges respectifs (18a, 18b) du corps intermédiaire (3).

Fig. 1

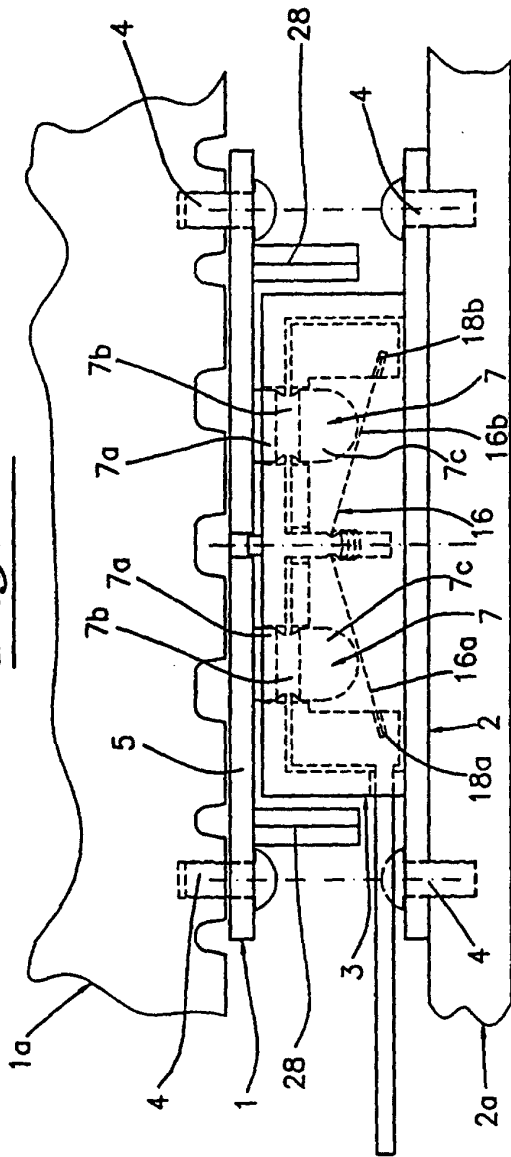


Fig. 2

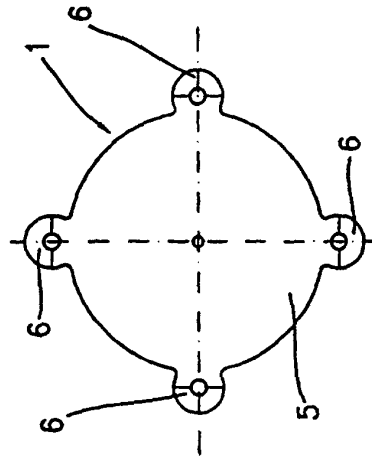


Fig. 3

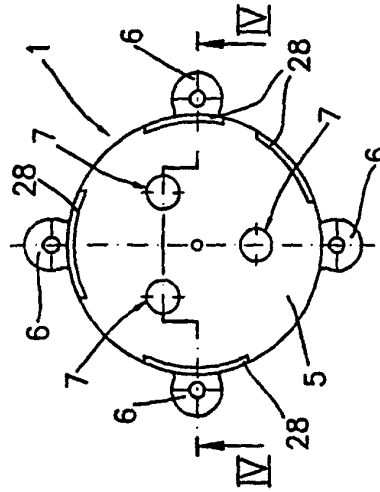


Fig. 4

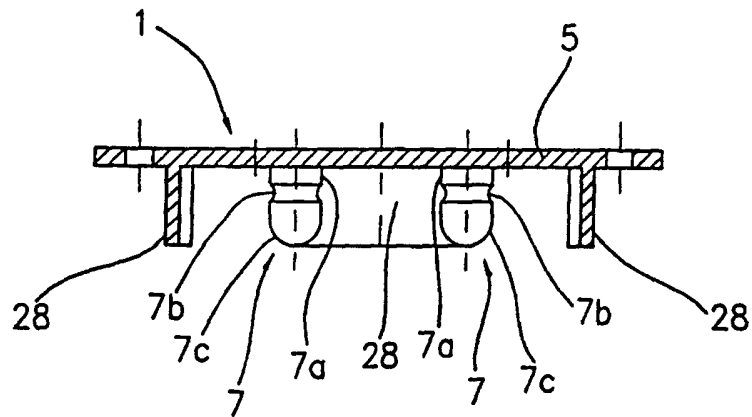


Fig. 5

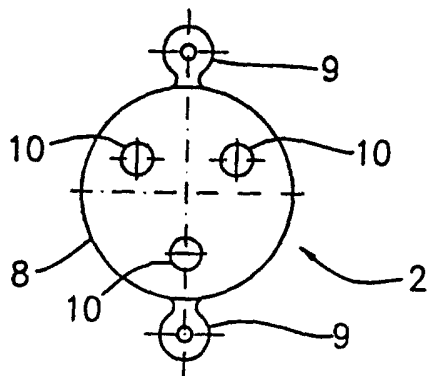


Fig. 6

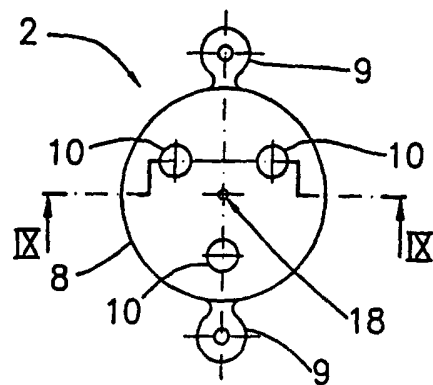


Fig. 7

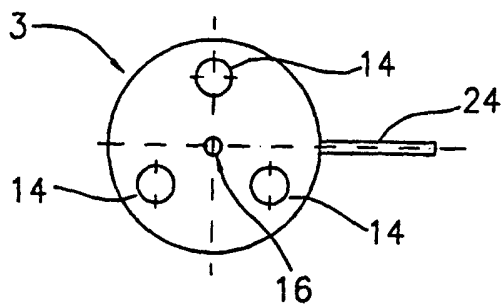


Fig. 8

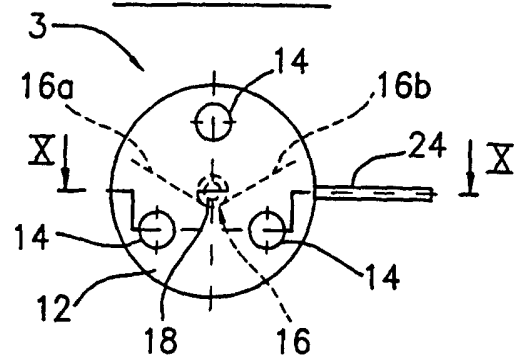


Fig. 9

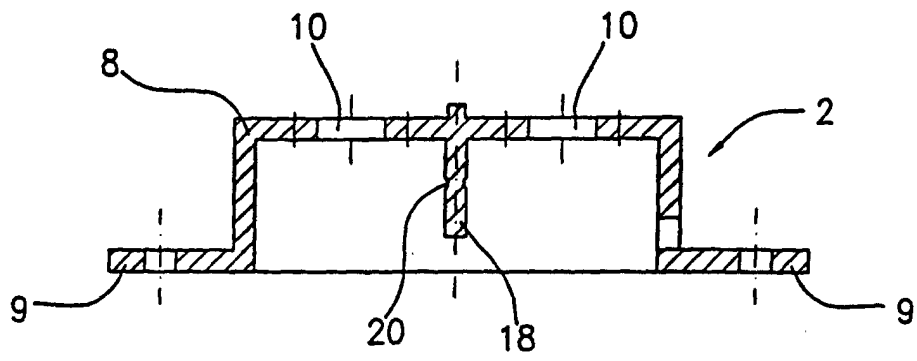


Fig. 10

