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(12) # EUROPEAN PATENT SPECIFICATION

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(54) **Ski boot and ski binding combination.**

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DE-A-2 162 336
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FR-A-2 051 109
FR-A-2 091 429

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Description

The present invention relates to a ski boot structure particularly for downhill skiing.

Known are ski boots which incorporate, internally of their soles or externally thereof, devices adapted for engagement with one or two binding members provided on the ski body.

Such prior devices usually comprise movable elements which engage with a snap action in recesses formed in the binding members owing to a pressure force exerted on said elements by elastic means, and specifically by spring means.

More in detail, the binding member's recesses wherein such movable elements engage, are provided on two opposed faces or areas of the binding member, and consequently, the movable members are located on opposed sides with respect to each other on the binding member itself.

From DE—A—2329880 is known a ski binding and footwear combination particularly for cross-country skiing and convertible to downhill skiing, having a binding structure of the above type.

With this known binding structure, the binding member engages at a substantially central region of the boot and creates inherent problems due to the fact that all of the stresses resulting from the movements imparted to the ski by the skier while skiing are transferred through a single member, which makes it very difficult to calibrate the springs according to the skier's weight and skiing style or action, and according to the force required to release the ski from the boot in an optimum fashion in the event of the skier falling.

To compensate for these problems, bindings have been developed which have two binding members rigidly attached to the ski body, see for example FR—A—2 051 109 wherein the recesses to be engaged by the movable elements are arranged to confront one another in spaced apart relationship such that the forces brought about to control the skis directionally are divided between both binding members and the moment of force which resists the force tending to release the ski from the boot can be made greater, thereby the springs of the movable elements do not require to be calibrated for maximum values, which reflects favourably on the reliable release of the ski from the boot in the event of a fall.

However, the latter binding types, while improving considerably the possibility of meeting at one time both of the primary prerequisites of a ski binding for downhill skiing, namely a reliable release combined with a good ability to transfer the commands imparted to the skis by the skier, have the drawback that they cannot differentiate the forces imparted by the skier while skiing between the binding member which is closest to the boot toe end and the binding member closest to the boot heel region.

The aim underlying this invention is to obviate such prior drawbacks by providing a ski boot structure particularly for downhill skiing which can split the forces involved in securing the boot on a ski body in a different fashion.

Within the above aim it is an important object of the invention to provide a ski boot structure whose members for hooking to a ski body provide an increased binding force close to the heel and a lesser one close to the boot toe.

Another object of the invention is to provide a ski boot structure which affords reliable releasing from a ski body in the event of the skier falling.

A not least object of the invention is to provide a ski boot structure having a sole which can be made shorter than the longitudinal extension of the boot shell in order to afford an improved ease of walking for the wearer.

The above aim, and these and other objects are achieved by a ski boot and ski binding combination as claimed in claim 1.

Further features and advantages of the invention will become apparent from the following description of a preferred though not exclusive embodiment of the boot structure according to this invention, to be read in conjunction with the accompanying illustrative and not limitative drawings, where:

Figure 1 is a partly sectional side elevation view of the boot structure showing the binding members of this invention inside the sole;

Figure 2 is a partly sectional plan view of the sole of the boot structure according to the invention showing the inventive binding members;

Figure 3 is a bottom plan view of the cover element for the sole of the boot structure according to the invention; and

Figure 4 is a plan view of the binding blocks associated with a ski body, according to the invention.

With reference to the drawing figures, a boot structure according to the invention, as generally designated with the reference numeral 1, comprises a shell 2 whereto a sole 3 is rigidly attached and an inclinable leg part associated oscillably with the shell 2.

Advantageously, the sole 3 has internally mounted binding members, generally indicated at 5, which comprise at least three small plungers 6, 7 and 8 arranged to move coaxially with respect to each other within a guide 9 against and by the action of elastic means, specifically springs 10, accommodated in housings 5*a*, 5*b*, 5*c*.

The heads of the plungers are adapted for snap engagement with first and second binding blocks 11 and 12 respectively which are conveniently associated with the body of a ski 13.

The first plunger 7 and second plunger 8 are arranged such that their end heads confront each other and have a rounded shape to snap engage in seats 14 provided in the binding element 12.

Likewise, the third plunger 6 has a rounded terminating head adapted to engage in a seat 15 provided in the binding element 11.

It should be also pointed out that said small plungers 6, 7 and 8 each have a tubular adjustment element 16, comprising an externally threaded stem 16*a*, threadably engaging a correspondingly threaded seat 16*b*, provided in the housings 5*a*—*c*, and having an enlarged extremity or thumb-wheel

16*c*, the rotation whereof causes the threaded portion to move the end of the spring 10 towards or away from the plunger 5, 6, 7 and is thus effective to calibrate the force exerted by the springs 10 according to the skier's requirements.

The binding members 5 also have associated therewith a lever system for moving the plungers 6, 7 and 8 manually, and which specifically comprises a first rod 17 passing through a tubular adjustment element 16 and being rigidly associated with the first plunger 7 and a second rod 18, rigidly associated with the second plunger 8, passing through an adjustment element 16 and having the opposed end thereof pivotally associated with a release lever 19 connected pivotally to the sole 2 approximately to the skier's heel.

Obviously, calibration of the force exerted by the springs 10 in the housings 5b, 5c could also be achieved by providing a thread engagement relationship between the rods 17, 18 and the interior of the stem 16*a* of the adjustment element 16, and permitting the latter to slide in the seat 16*b* provided in the housings.

The first rod 17 has its free end journalled to one end of a small plate or link 20, in turn journalled to the sole 3, the opposed end of said plate being journalled to a first end of a bar 21 the other end whereof is pivotally connected to said release lever 19, so as to produce, on turning the release lever 19, simultaneous displacements of the plungers 7 and 8 in opposite directions and hence disengage the heads of the plungers from the binding element 12 and allow, therefore, the boot and accordingly the binding members associated therewith, to be separated from the ski body.

In order to prevent the binding members from suffering damage due to dirt or foreign matter as the skier walks over snow-covered or clear ground, the sole 2 is advantageously provided with a cover element 22 having a circular opening 23 at the heads of the plungers 7 and 8 and a semicircular opening 24 at the plunger 6, adapted to define areas wherein the binding elements 11 and 12 are insertable.

Merely by way of example, it is further pointed out that the seats 14 of the binding element 12 are located diametrically opposed to each other and coaxial with the seat 15 in the binding element 11.

In order then that any snow deposits may not hinder hooking on the binding blocks 11 and 12, the latter have on their surfaces small channels 25 effective to eject such deposits during their insertion through the respective circular and semicircular openings, since the latter have substantially the same size as the binding block 11 and 12.

Conveniently, the binding block 12 is slideably movable along a guide 30, such that it can be moved towards and away from the binding block 11 according to the boot's size and therefore, the sizes of the hooking members provided in the sole.

It has been ascertained in practice that the ski boot structure according to the invention is particularly advantageous in that it provides the skier with hooking members which have three small plungers, two of which, namely the plunger 7 and plunger 8, are in practice located close to the heel region of the skier's foot, in which region the greatest stresses are transferred between the boot and ski body, while providing on the binding block 11, i.e. close to the toe of the boot where stresses are much lower, a lower binding force effective to facilitate a possible release of the boot from the ski body in the event of the skier falling.

Claims

1. A ski boot and ski binding combination, particularly suitable for downhill skiing, said ski boot comprising a substantially elongate shell (2), a boot sole (3) and a leg part oscillably associated with said shell (2), said boot sole comprising binding means for releasable engagement with at least one first binding block (12) securable on a ski body (13), said binding means comprising a plurality of clamping plungers (6, 7, 8) slidingly accommodated in longitudinal guide means (9) formed in the bottom of said boot sole (3), spring means (10) being provided in said guide means (9) for urging each plunger of said plurality in a clamping position, at least one first and one second plunger of said plurality being located in said guide means (9) longitudinally spaced apart at a clamping distance from each other and with their heads reciprocally facing such as to form a pair (7, 8) of oppositely cooperating clamping members arranged for releasable snap engagement with said at least one first binding block (12), at least one third plunger (6) of said plurality being located in said guide means (9) longitudinally spaced from said first and second plungers (7, 8), characterized in that all of the plungers of said plurality (6, 7, 8) are aligned substantially coaxially of each other, there being provided at least one second binding block (11) rigidly and directly secured on said ski body (13) in a location longitudinally spaced apart from said first binding block (12) the head of said at least one third plunger (6) being arranged for releasable snap engagement with said at least one second binding block (11), said first and said second plungers forming said pair of oppositely arranged plungers (7, 8) being located in said guide means (9) proximate the heel portion of said ski boot while said third plunger (6) is located in said guide means (9) proximate the toe portion of said ski boot, whereby the securing forces holding said ski boot to said ski body (13) are splitted between the heel portion and the toe portion of said ski boot with a higher force concentration towards said heel portion of said ski boot and whereby engagement and disengagement of said ski boot with respect to said ski body (13) can be operated by any transverse force to the longitudinal direction of said ski boot.

2. A combination according to Claim 1, characterized in that said ski boot comprises release means (17—20) for manually disengaging said at

least one first and said second plungers (7, 8) from said at least one first binding block (12).

3. A combination according to Claim 2, characterized in that said release means comprises a release lever (19) pivotally mounted on said sole and accessible from the outside thereof, said release lever being hingedly connected with linkage means operatively connected with said first and said second plungers (7, 8) for movement of said plungers away from each other.

4. A combination according to Claim 3, characterized in that said linkage means comprises a first rod (17) and a second rod (18) each having one end rigidly associated with said respective first plunger (7) and second plunger (8), the other end of said first rod (17) being hingedly connected to a first end of a transverse connecting bar (20) pivotally mounted on said sole, the second end of said transverse bar (20) being hingedly connected to one end of a longitudinal connecting bar (21), the other end of said longitudinal connecting bar being journalled to said release lever (19), the other end of said second rod (18) being directly journalled to said release lever (19).

5. A combination according to Claim 1, characterized in that there are provided adjusting means (16) for calibrating the clamping force exerted by said spring means (10) on said respective plungers (6, 7, 8).

6. A combination according to Claim 5, characterized in that said boot sole (3) comprises a cover plate (22) extending substantially over the whole bottom surface of said boot sole, said cover plate having a first circular opening (23) adjacent the heads of said first and second plungers (7, 8) and a second opening adjacent the head of said third plunger (6).

7. A combination according to Claim 1, characterized in that said at least one first binding block (12) has a pair of seat formations (14) provided on the lateral wall thereof in substantially diametrically opposed locations for receiving said head of at least one first and one second plungers (7, 8).

8. A combination according to Claim 1, characterized in that said at least one second binding block (11) has one single seat formation (14) for the head of said at least one third plunger (6).

9. A combination according to Claim 1, characterized in that said at least first and second binding blocks (11, 12) are further provided with channel formations on the outer surface thereof for facilitating removal of snow.

10. A combination according to any preceding claims, characterized in that said at least one first binding block (12) is securable on a guide member (30) in selected positions longitudinally thereof for adjustment of the distance between said first and said second binding block, said guide member being rigibly associated with said ski body.

Patentansprüche

1. Kombination von Skischuh und Skibindung, insbesondere geeignet für das Alpinskifahren, wobei der Skischuh aus einer im wesentlichen langgestreckten Schale (2), einer Schuhsohle (3) und einem der Schale (2) schwenkbar zugeordneten Beinteil besteht, welche Sohle Bindungseinrichtungen für den lösbaren Eingriff mit wenigstens einem ersten, an einem Skikörper (13) befestigbaren Bindungsblock (12) aufweist, und die Bindungseinrichtungen aus einer Vielzahl von Klemmkolben (6, 7, 8), die verschiebbar in im Boden der Schuhsohle (3) ausgebildeten Längsführungen (9) untergebracht sind, bestehen, wobei Federeinrichtungen (10) in den Führungseinrichtungen (9) vorgesehen sind, um jeden Kolben der genannten Vielzahl von Kolben in eine Klemmstellung zu drücken, wenigstens ein erster und ein zweiter Kolben der genannten Vielzahl von Kolben in den Führungseinrichtungen (9) in Längsrichtung in einem Klemmabstand voneinander entfernt und mit ihren Köpfen einander gegenüberliegend angeordnet sind, um ein Paar (7, 8) entgegengesetzt zusammenwirkender Klemmorgane für einen lösbaren Rasteingriff mit dem genannten wenigstens einen ersten Bindungsblock (12) zu bilden, und wenigstens ein dritter Kolben (6) der genannten Vielzahl von Kolben in den Führungen (9) in Längsrichtung im Abstand zum ersten und zweiten Kolben (7, 8) angeordnet ist, dadurch gekennzeichnet, daß alle Kolben der genannten Vielzahl von Kolben (6, 7, 8) im wesentlichen koaxial zueinander ausgerichtet sind und wenigstens ein zweiter Bindungsblock (11) vorgesehen ist, der starr und direkt am Skikörper (13) an einer in Längsrichtung zum ersten Bindungsblock (12) im abstand liegenden Stelle befestigt ist, wobei der Kopf des genannten wenigstens einen dritten Kolbens (6) für den lösbaren Rasteingriff mit dem wenigstens einen zweiten Bindungsblock (11) ausgebildet ist, der das Paar entgegengesetzt angeordneter Kolben (7, 8) bildende erste und zweite Kolben in der Führung (9) in der Nähe des Fersenteiles des Skischuhes, hingegen der dritte Kolben (6) in der Führung (9) in der Nähe der Spitze des Skischuhes liegt, wobei die Feststellkräfte, welche den Skischuh gegen den Skikörper (13) halten, zwischen dem Fersenteil und dem Schuhspitzenteil des Skischuhes aufgeteilt sind, wobei eine höhere Kraftkonzentration gegen den Fersenteil gerichtet ist, und der Eingriff und die Lösung des Eingriffes des Skischuhes in bezug auf den Skikörper (13) durch jedwede Querkraft zur Längsrichtung des Skischuhes getätigt werden können.

2. Kombination nach Anspruch 1, dadurch gekennzeichnet, daß der Skischuh Entriegelungseinrichtungen (17—20) für die manuelle Ausrastung des wenigstens einen ersten und zweiten Kolbens (7, 8) aus dem wenigstens einen ersten Bindungsblock (12) aufweist.

3. Kombination nach Anspruch 2, dadurch gekennzeichnet, daß die Entriegelungseinrichtung aus einem Entriegelungshebel (19) besteht, der schwenkbar an der Sohle montiert und von deren außenseite aus zugänglich ist, wobei der Entriegelungshebel drehbar mit Gestängeeinrichtungen verbunden ist, die operativ mit dem ersten

und mit dem zweiten Kolben (7, 8), um die Kolben voneinander wegzubewegen, verbunden sind.

4. Kombination nach Anspruch 3, dadurch gekennzeichnet, daß die Gestängeeinrichtung aus einer ersten Stange (17) und einer zweiten Stange (18) besteht, von denen jeweils ein Ende starr dem betreffenden ersten Kolben (7) und zweiten Kolben (8) zugeordnet ist und das andere Ende der ersten Stange (17) drehbar mit dem ersten Ende einer schwenkbar an der Sohle montierten Verbindungsquerstange (20) verbunden ist, wobei das zweite Ende der Querstange (20) drehbar mit einem Ende einer Längsverbindungsstange (21) verbunden, das andere Ende der Längsverbindungsstange an den Entriegelungshebel (19) angelenkt, und das andere Ende der Stange (18) direkt an den Entriegelungshebel (19) angelenkt ist.

5. Kombination nach Anspruch 1, dadurch gekennzeichnet, daß Einstelleinrichtungen (16) für die Regelung der durch die Federeinrichtungen (10) auf die betreffenden Kolben (6, 7, 8) ausgeübten Klemmkraft vorgesehen sind.

6. Kombination nach Anspruch 5, dadurch gekennzeichnet, daß die Schuhsohle (3) eine Abdeckplatte (22) besitzt, die sich im wesentlichen über die gesamte Bodenfläche der Schuhsohle erstreckt und die eine erste kreisförmige Öffnung (23) neben den Köpfen des ersten und zweiten Kolbens (7, 8) und eine zweite Öffnung neben dem Kopf des dritten Kolbens (6) besitzt.

7. Kombination nach Anspruch 1, dadurch gekennzeichnet, daß der wenigstens eine erste Bindungsblock (12) ein Paar von Sitzausbildungen (14) aufweist, die an seiner Seitenwand an im wesentlichen diametral gegenüberliegenden Stellen für die Aufnahme des Kopfes wenigstens eines ersten und eines zweiten Kolbens (7, 8) vorgesehen sind.

8. Kombination nach Anspruch 1, dadurch gekennzeichnet, daß der wenigstens eine Bindungsblock (11) eine einzige Sitzausbildung (14) für den Kopf des wenigstens einen dritten Kolbens (6) aufweist.

9. Kombination nach Anspruch 1, dadurch gekennzeichnet, daß der wenigstens erste und zweite Bindungsblock (11, 12) weiters mit Kanalausbildungen an der Außenfläche für die Erleichterung der Entfernung von Schnee versehen sind.

10. Kombination nach einem der vorhergehenden Ansprüche, dadurch gekennzeichnet, daß der wenigstens eine erste Bindungsblock (12) an einem Führungsteil (30) in wählbaren Positionen in Längsrichtung desselben für die Einstellung des Abstandes zwischen dem ersten und dem zweiten Bindungsblock feststellbar ist, welcher Führungsteil dem Skikörper starr zugeordnet ist.

Revendications

1. Combinaison de chaussure de ski et de fixation de ski, convenant en particulier pour le ski de descente, ladite chaussure de ski comportant une coquille (2) essentiellement allongée, une semelle (3) et une partie de jambe associée de manière oscillante à ladite coquille (2), ladite semelle comportant des moyens de fixation pour un engagement amovible avec au moins un premier bloc de fixation (12) pouvant être fixé sur un corps de ski (13), lesdits moyens de fixation comportant une pluralité de plongeurs de blocage (6, 7, 8) reçus à coulissement dans des moyens de guidage longitudinaux (9) formés dans le fond de ladite semelle (3), des moyens élastiques (10) étant prévus dans lesdits moyens de guidage (9) pour pousser chaque plongeur de ladite pluralité dans une position de blocage, au moins un premier et un second plongeurs de ladite pluralité étant disposés dans lesdits moyens de guidage (9) longitudinalement espacés à une distance de blocage l'un de l'autre et avec leurs têtes se faisant face mutuellement de manière à former une paire (7, 8) d'éléments de blocage coopérant de manière opposée pour un engagement par encliquetage amovible avec au moins ledit premier bloc de fixation (12), au moins un troisième plongeur (6) de ladite pluralité étant disposé dans lesdits moyens de guidage (9) longitudinalement espacé desdits premier et second plongeurs (7, 8), caractérisée en ce que la totalité des plongeurs de ladite pluralité (6, 7, 8) sont alignés sensiblement coaxialement entre eux, au moins un second bloc de fixation (11) étant prévu fixé de façon rigide et directement sur ledit corps de ski (13) dans une position longitudinalement espacée dudit premier bloc de fixation (10), la tête dudit au moins troisième plongeur (6) étant disposée pour un engagement par encliquetage amovible avec ledit au moins second bloc de fixation (11), lesdits premier et second plongeurs formant ladite paire plongeurs disposés en opposition (7, 8) étant situés dans lesdits moyens de guidage (9) à proximité de la partie de talon de ladite chaussure de ski, tandis que ledit troisième plongeur (6) est situé dans lesdits moyens de guidage (9) à proximité de la partie d'orteil de ladite chaussure de ski, de telle sorte que les forces de fixation maintenant ladite chaussure de ski sur ledit corps de ski (13) sont divisées entre la partie de talon et la partie d'orteil de ladite chaussure de ski avec une concentration de force plus élevée vers ladite partie de talon de ladite chaussure de ski et de telle sorte qu'un engagement et un dégagement de ladite chaussure de ski par rapport audit corps de ski (13) puissent être opérés par une force transversale quelconque à la direction longitudinale de ladite chaussure de ski.

2. Combinaison selon la revendication 1, caractérisée en ce que ladite chaussure de ski comporte des moyens de libération (17—20) pour dégager manuellement lesdits premier et second plongeurs (7, 8) dudit premier bloc de fixation (12).

3. Combinaison selon la revendication 2, caractérisée en ce que lesdits moyens de libération comportent un levier de libération (19) monté à pivotement sur ladite semelle et accessible de l'extérieur de celle-ci, ledit levier de libération étant relié de façon articulée à des moyens d'articulation reliés fonctionnellement auxdits premier

et second plongeurs (7, 8) pour en écartement desdits plongeurs l'un de l'autre.

4. Combinaison selon la revendication 3, caractérisée en ce que lesdits moyens d'articulation comportent une première tige (17) et une seconde tige (18) possédant chacune une extrémité associée de façon rigide auxdits premier plongeur (7) et second plongeur (8) respectifs, l'autre extrémité de ladite première tige (17) étant articulée à une première extrémité d'une barre de liaison transversale (20) montée à pivotement sur ladite semelle, la seconde extrémité de ladite barre transversale (20) étant articulée à une extrémité d'une barre de liaison longitudinale (21), l'autre extrémité de ladite barre de liaison longitudinale tourillonnant par rapport audit levier de libération (19), l'autre extrémité de ladite seconde tige (18) tourillonnant directement sur ledit levier de libération (19).

5. Combinaison selon la revendication 1, caractérisée en ce que des moyens de réglage (16) sont prévus pour calibrer la force de blocage exercée par lesdits moyens élastiques (10) sur lesdits plongeurs respectifs (6, 7, 8).

6. Combinaison selon la revendication 5, caractérisée en ce que ladite semelle (3) comporte une plaque de de protection (22) s'étendant sensiblement sur toute la surface inférieure de ladite semelle, ladite plaque de protection possédant une première ouverture circulaire (23) adjacente aux têtes desdits premier et second plongeurs (7, 8) et une seconde ouverture adjacente à la tête dudit troisième plongeur (6).

7. Combinaison selon la revendication 1, caractérisée en ce que ledit au moins premier bloc de fixation (12) possède une paire de formations de siège (14) prévues sur sa surface latérale dans des emplacements sensiblement diamétralement opposés pour recevoir ladite tête d'au moins un premier et second plongeurs (7, 8).

8. Combinaison selon la revendication 4, caractérisée en ce que ledit au moins second bloc de fixation (11) possède une unique formation de siège (14) pour la tête dudit au moins troisième plongeur (6).

9. Combinaison selon la revendication 1, caractérisée en ce que lesdits au moins premier et second blocs de fixation (11, 12) sont en outre munis de cauaux sur leur surface extérieure pour faciliter l'élimination de la neige.

10. Combinaison selon l'une quelconque des revendications précédentes, caractérisée en ce que ledit au moins premier bloc de fixation (12) peut être fixé sur un élément de guidage (30) dans des positions choisies longitudinalement à celui-ci pour un réglage de la distance entre lesdits premier et second blocs de fixation, ledit élément de guidage étant associé de façon rigide audit corps de ski.

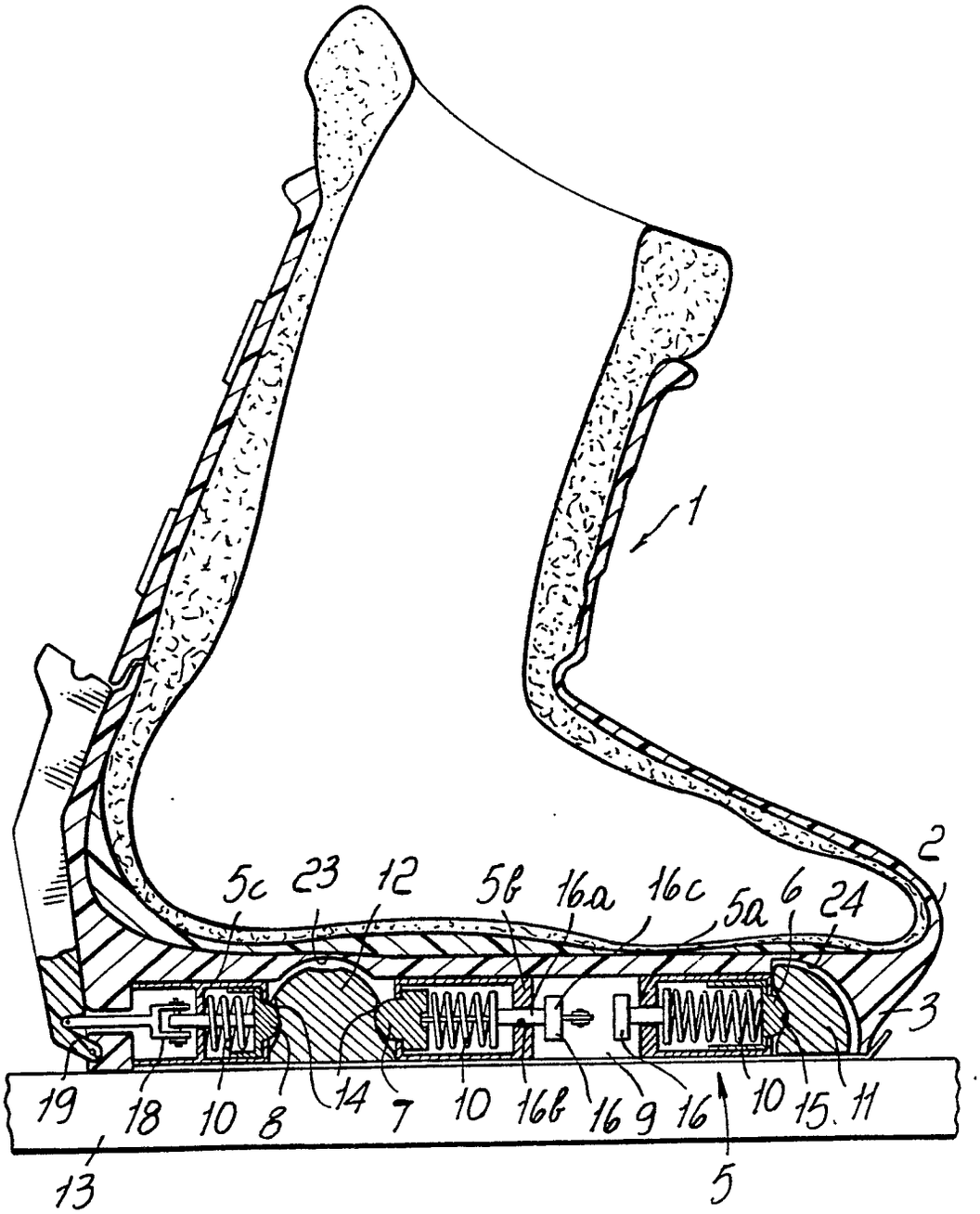

1
2
3
5c
23
12
5b
16a
16c
5a
6
24
19
18
10
8
14
7
10
16b
16
9
16
10
15
11
13
5

Fig. 1

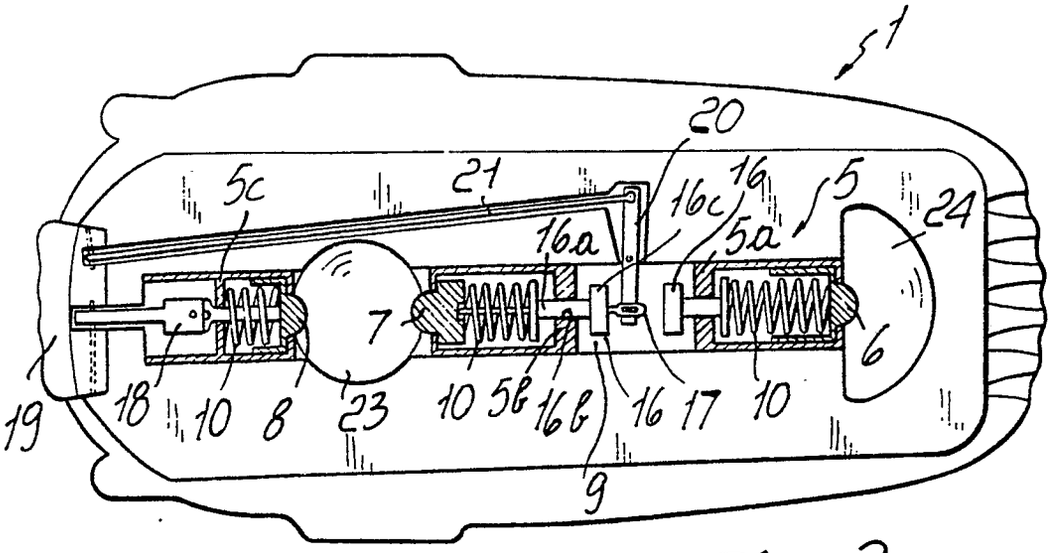


Fig. 2

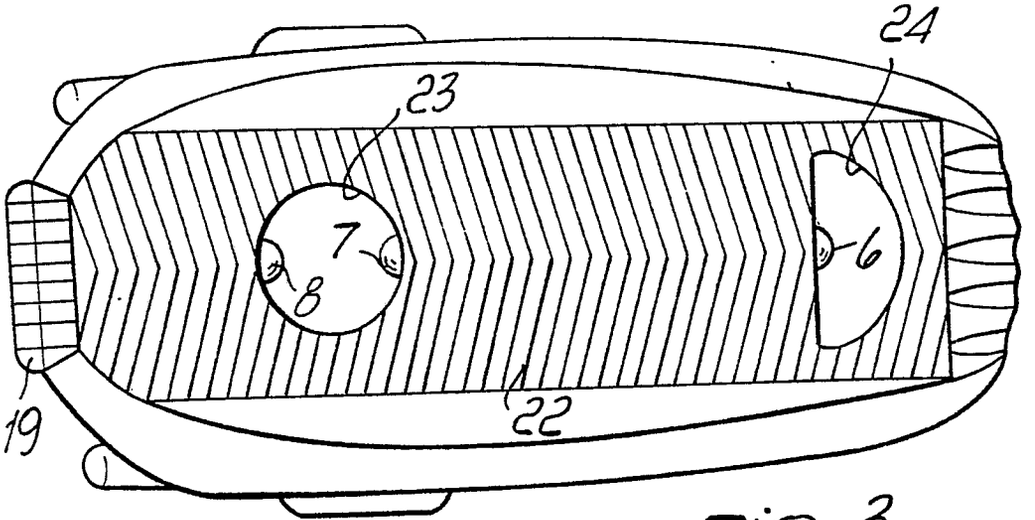


Fig. 3

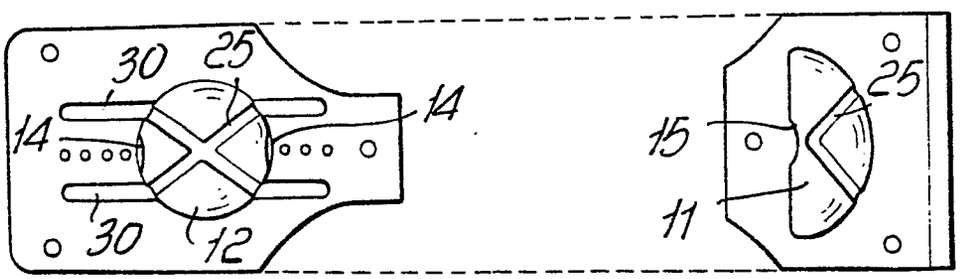


Fig. 4