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(54) **Sports shoe**

(57) A sports shoe (1) of the type comprising a rigid shell (2) provided with a sole (3), which is also rigid.

Transversely to the sole (3), in the toe region and in the heel region, at least one rigid insert (8a, 8b) is inter-

posed, which is of the removable type and is supported on elastically compressible elements (25a, 25b) in order to enable an optimal shock absorption during the practice of sports and an optimal transmission of effort to the sports equipment.

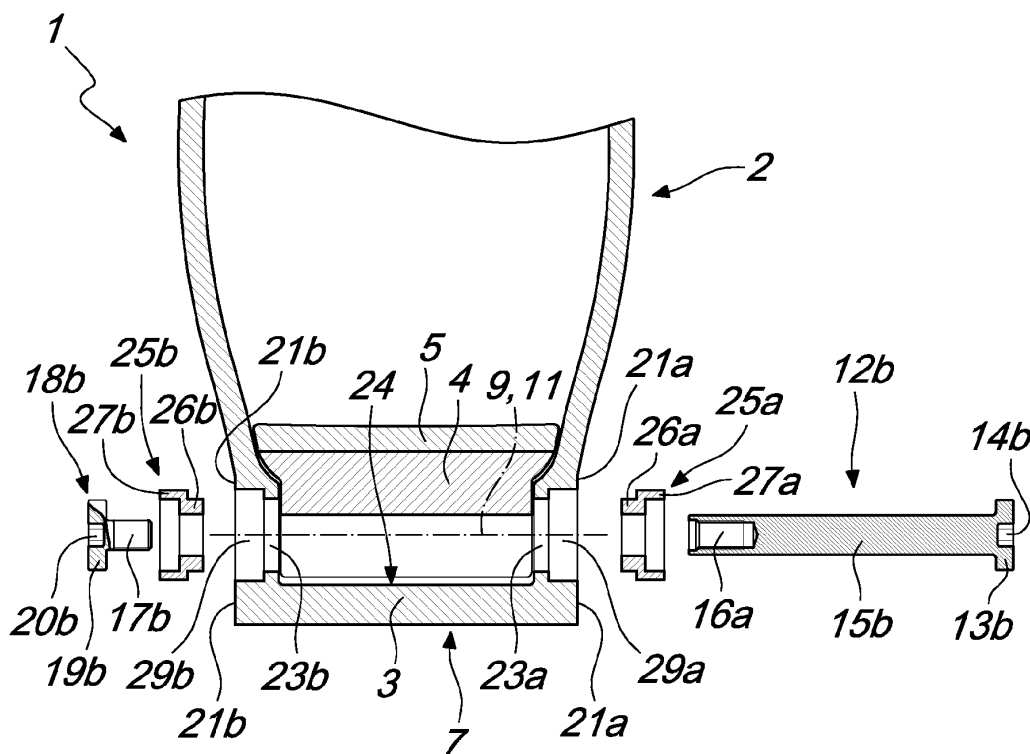


Fig. 9

Description

[0001] The present invention relates to a sports shoe.

[0002] Nowadays shoes are known, particularly sports shoes, which are constituted by a sole and by a shell, both made of plastics which is substantially rigid so as to enable the optimal transmission of the efforts from the foot of the user to the sports equipment, such as a ski, or a supporting frame for inline wheels or paired wheels, or an ice skating blade.

[0003] The rigidity of the plastics that constitutes the shoe limits the comfort of the foot during wear owing to the fact that all the stresses to which, for example, the ski or the wheels or blade of the skate is subjected are transmitted to the foot, so creating localized regions of pressure with consequent considerable annoyance during wear.

[0004] A partial solution to this drawback is known from EP 0570048 in which a ski boot is disclosed which comprises a rigid shell with which a sole and a rigid mid-sole integrated with the shell are associated.

[0005] Such shell has a first and a second non-rigid element interposed between the sole and the mid-sole.

[0006] Such non-rigid elements each have a lower surface and an upper surface which extend above at least most of the thickness of the sole.

[0007] The first non-rigid element is arranged in such a way that its lower surface is brought into contact with a separate region of the foot and the upper surface is brought into contact with the mid-sole.

[0008] The second non-rigid element is arranged in such a way that the lower surface is brought into contact with a separate region of the heel which is connected to the lower part of the sole and the upper surface is brought into contact with the mid-sole so that both the toe end and the heel end are spaced, on one side by the mid-sole, and on the other side by a non-rigid element between them.

[0009] This solution has drawbacks, however: the arrangement of the non-rigid elements in fact is such that they potentially non-selectively absorb the stresses imposed by the ski owing to their extent which affects substantially all of the region of the heel and foreleg.

[0010] Moreover, the presence of such non-rigid elements does not allow, again owing to their extent, the optimal transmission of the efforts from the foot to the sports equipment, and hence does not allow optimal control of such sports equipment by the user.

[0011] Lastly, such non-rigid elements cannot in any way take account of the specific nature of the athlete or of the user who is wearing the boot and therefore they cannot take account of information such as weight, capacity and ability in the ski run.

[0012] The aim of the present invention is to solve the above mentioned technical problems, eliminating the drawbacks in the cited background art, by devising a sports shoe that makes it possible to achieve an optimal absorption of stresses during the practice of sport as a

function of the specific abilities or characteristics of the user.

[0013] Within this aim, an object of the invention is to provide a sports shoe that at the same time allows an optimal transmission of the efforts from the foot to the shoe itself and thence to a ski or to the wheels of a rollerskate or to the blade of an ice skate.

[0014] Another object is to provide a sports shoe that allows the user greater rapidity of movement and better control/performance of the sports equipment.

[0015] Another object is to obtain a sports shoe that in addition to the previous characteristics is structurally simple and has low cost.

[0016] This aim and these and other objects, which will become better evident hereinafter, are achieved by a sports shoe, comprising a rigid shell, provided with a sole, characterized in that at least one removable rigid insert is interposed, in the toe region and in the heel region, transversely to said sole, and is supported on at least one elastically compressible element.

[0017] Advantageously, the rigid insert is arranged according to a perpendicular axis or is inclined to the longitudinal central axis of the sole.

[0018] Further characteristics and advantages of the invention will become better apparent from the following detailed description of a particular, but not exclusive, embodiment thereof, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a partially sectional side view of a ski boot; Figure 2 is a sectional view, taken along a longitudinal central plane of the sole;

Figures 3 and 4 are partially sectional views, taken along a plane that is transverse to the shell, of the arrangement of the rigid insert;

Figure 5 is a sectional view, taken along the line V-V of Figure 2;

Figure 6 is a sectional view, taken along the line VI-VI of Figure 2;

Figure 7 shows, in a view similar to the previous one, the condition in which a load is applied at the platform inside the shell or an equal load at the sole;

Figure 8 shows, in a view similar to the previous one, a different type of embodiment for the elastically compressible element;

Figure 9 is an exploded view of the components of Figure 6;

Figure 10 is an exploded view of the components of Figure 5;

Figure 11 shows, in a view similar to Figure 6, a different embodiment of the elastically compressible element.

[0019] In the embodiments that follow, individual characteristics shown in relation to specific examples may in reality be interchanged with other, different characteristics, existing in other embodiments.

[0020] Moreover, it should be noted that anything

found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

[0021] With reference to the figures, the reference numeral 1 generally indicates a sports shoe such as a ski boot, a roller skate or an ice skate.

[0022] The shoe 1 is, in the specific preferred embodiment shown, constituted by a ski boot comprising a shell 2 with which a sole 3 is associated underneath, both made of plastics.

[0023] A platform 4 is arrangeable inside the shell 2, a mid-sole 5 being optionally superimposable thereon, and rigid inserts 8a, 8b are arranged transversely to the sole 3 at the toe region 6 and at the heel region 7, such inserts being arranged along a first axis 9, which lies transversely to a second central axis 10 which is longitudinal to the sole 3, or along a third axis 11, which is inclined with respect to the second axis 10.

[0024] Each one of the rigid inserts 8a, 8b is constituted by a rigid pin 12a, 12b, which has a first head 13a, 13b provided with a first axial seat 14a, 14b for interconnection to a hex key, and a first stem 15a, 15b at the tip of which there is a second axial seat 16a, 16b, which is internally threaded complementarily with respect to a second stem 17a, 17b of a screw 18a, 18b, which also has a second head 19a, 19b which has a third axial seat 20a, 20b for interconnection to a hex key.

[0025] The platform 4 can have a full shape, as shown in the accompanying figures, or a lower surface which faces towards the rigid inserts 8a, 8b having a concave shape so as to define two limited regions of overlap in proximity to the ends of the respective pins 12a, 12b.

[0026] At the lateral surface 21a, 21b of the sole 3, an adapted pair of first and second holes 22a, 22b, 23a, 23b is provided, such holes having, in pairs, the same axis, which corresponds to the first axis 9 or to the third axis 11.

[0027] The arrangement of the first and second holes is such that once the first stems 15a, 15b of the pins 12a, 12b have been inserted in the rigid inserts 8a, 8b, such stems are spaced from the underlying internal surface 24 of the sole 3, which is optionally partially recessed thereat, as shown in Figure 2 in the toe region 6.

[0028] Each one of the pins 12a, 12b is supported on a pair of elastically compressible elements 25a, 25b, each of which is substantially T-shaped in cross-section so as to define a third stem 26a, 26b, which can be accommodated within the first holes 22a, 22b and is axially hollow for the insertion of the complementarily shaped pin 12a, 12b.

[0029] Each one of the elastically compressible elements 25a, 25b has furthermore a third head 27a, 27b, which can be accommodated at two pairs of complementarily shaped fourth seats 28a, 28b and fifth seats 29a, 29b, which are contiguous to the first and second holes 22a, 22b, 23a, 23b.

[0030] Each third head 27a, 27b can be accommodated in the complementarily shaped first head 13a, 13b of the pins 12a, 12b.

[0031] The shape of the elastically compressible elements 25a, 25b can be such as to have, at the respective third stems 26a, 26b and at the third heads 27a, 27b, a constant radial thickness A, B or a differentiated radial thickness A1, B1, A2, B2.

[0032] Such uniformity or difference in thickness also applies both to the heads 27a, 27b and to the third stems 26a, 26b.

[0033] At the lower surface 30 of the platform 4 there can also be, at the pins 12a, 12b, recesses or sixth seats 31a, 31b.

[0034] A rib or protrusion 32 protrudes transversely, preferably in a region which is adjacent to the arch region or to the plantar arch, from the lower surface 30 of the platform 4, such rib or protrusion being slidably insertable within a receptacle 33 provided in the overlying region of the lower surface 30 of the platform 4.

[0035] The fourth seats 28a, 28b can also partially affect the shell 3, just as the fifth seats 29a, 29b can have a shape, and therefore for example a diameter, which is greater than that of the third head 27a, 27b of the elastically compressible elements 25a, 25b.

[0036] The compression of the elastically compressible elements 25a, 25b can therefore occur only at the third head 27a, 27b, or only at the third stem 26a, 26b, or at both of them.

[0037] Moreover, as shown in Figure 11, the elastically compressible elements 25a, 25b can be constituted in two parts which can be mutually associated and therefore constituted by a first bush or ring 34a, 34b, which has a T-shaped cross-section and is arranged coaxially to the pins 12a, 12b and acts with the fourth head 35a, 35b within the first or second holes 22a, 22b, 23a, 23b, and by a fourth stem 36a, 36b, which is directed toward the outside of the shoe and on which a second cup-shaped ring or bush 37a, 37b rests which has a U-shaped cross-section and thus partially wraps around the first head 13a, 13b and the second head 19a, 19b.

[0038] The use of the invention is as follows: initially the user preselects the elastically compressible elements 25a, 25b which can be positioned at the rigid inserts 8a, 8b and therefore coaxially with the first and second stems 15a, 15b, 17a, 17b and so as to affect the first and second heads 13a, 13b, 19a, 19b.

[0039] The choice of the type of elastically compressible elements 25a, 25b, as well as their structure, and therefore of whether they are made monolithically or in two elements, is made as a function of the type of terrain over which the sports equipment attached to the shoe is made to travel or as a function of the physique of the user or of the degree of rigidity that the user wishes to achieve in the transmission of the efforts from the foot to the sports equipment.

[0040] The shape of the elastically compressible elements 25a, 25b can vary widely, as can their degree of hardness.

[0041] In the condition for example shown in Figure 6, the first and second heads 13a, 13b, 19a, 19b have the

same radial thickness, indicated with the initials A, B. For example, with a compression applied at the sole 5, as shown in Figure 7, there will be a compression of the first heads 13a, 13b which will cause the modification of the first and second heads 13a, 13b, 19a, 19b which will also be compressed in the part adjacent to the toe 6 and the heel 7, so varying their thickness from B to B1, with the thickness A having the option of remaining unaltered or being modified, in the elongated sense, to A1.

[0042] Figure 8 shows a different embodiment for the elastically compressible elements 25a, 25b wherein the thicknesses of such elements are different, at rest, in a region which is adjacent to the toe 6 and the heel 7 and less in the remaining region facing in the direction of the mid-sole 5, in this case defining a thickness B2 which is greater than the thickness A2.

[0043] It should be noted, furthermore, that the presence of the elastically compressible elements 25a, 25b makes it possible to obtain a further advantage during the ski run. Indeed, particularly during the taking of a curve, it happens that the elastically compressible elements 25a or 25b compress, for example as shown in Figure 7, to an extent that is such as to assume the shape B1. In this way "energy" is accumulated which will then be returned in the step wherein the inclination is changed, thus allowing the skier greater rapidity of movements and better control/performance of the ski, since he or she will have a better grip.

[0044] Naturally the elastically compressible elements 25a, 25b are also activated as a function of the terrain over which the sports equipment applied to the shoe travels, thus varying their shape and therefore absorbing the stresses which otherwise would be directly transmitted from the terrain to the shoe and therefore to the foot of the user.

[0045] In practice it has been found that the invention fully achieves the above mentioned aim and objects, a sports shoe being obtained that makes it possible to achieve an optimal absorption of stresses during the practice of sport as a function of the specific abilities or characteristics of the user, such shoe at the same time making it possible to achieve an optimal transmission of the efforts from the foot to a ski or to the wheels of a skate or to a blade of an ice skate.

[0046] Obviously the materials used as well as the dimensions constituting the individual components of the invention can be more relevant according to specific requirements.

[0047] The various different means for effecting certain different functions shall not in any way coexist only in the illustrated embodiment, but may be present in many embodiments per se, even if not illustrated.

[0048] The characteristics indicated as advantageous, advisable or similar may also be lacking or be substituted by equivalent characteristics.

[0049] The disclosures in Italian Patent Application No. TV2010A000001 from which this application claims priority are incorporated herein by reference.

[0050] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

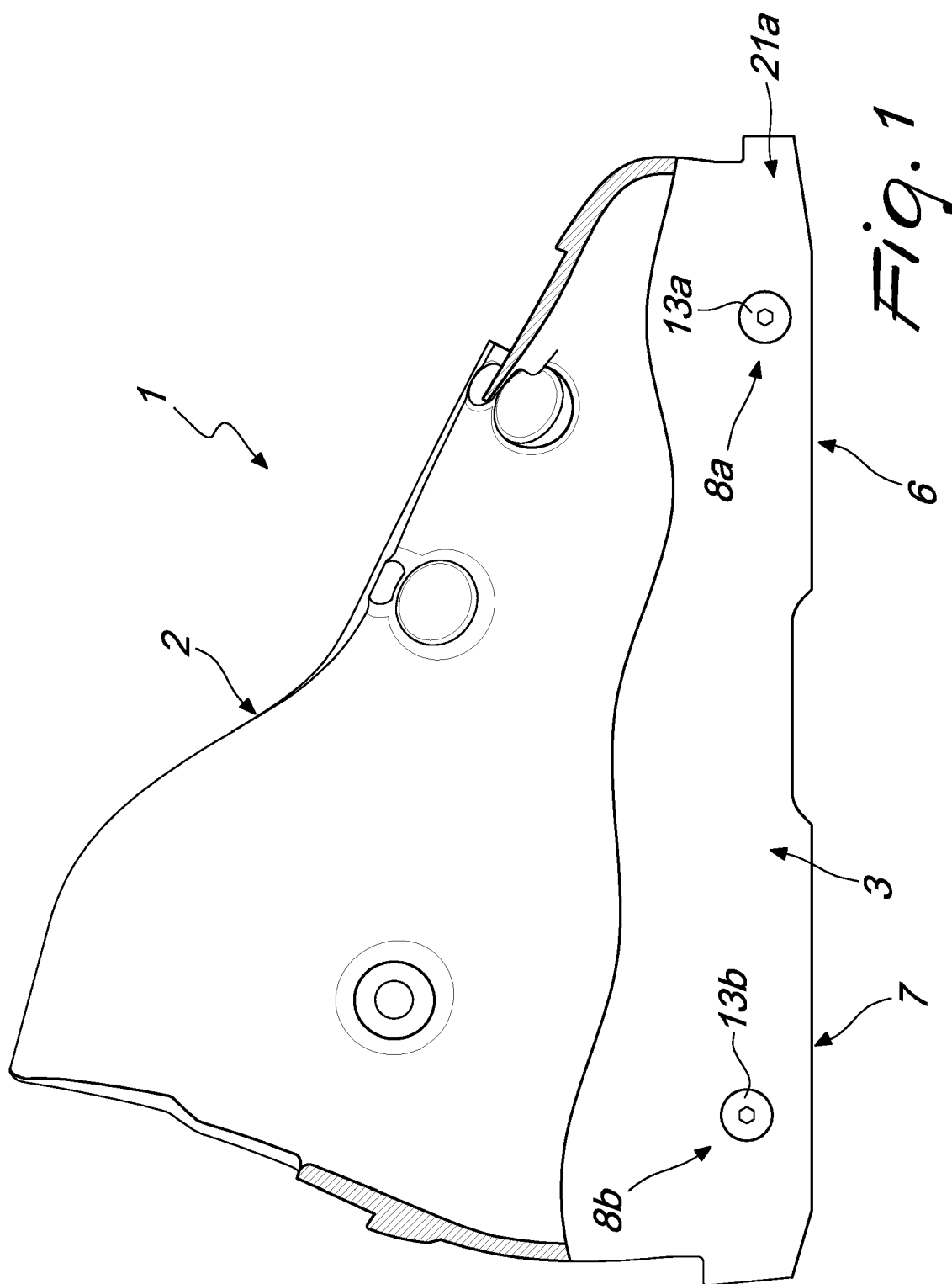
10 Claims

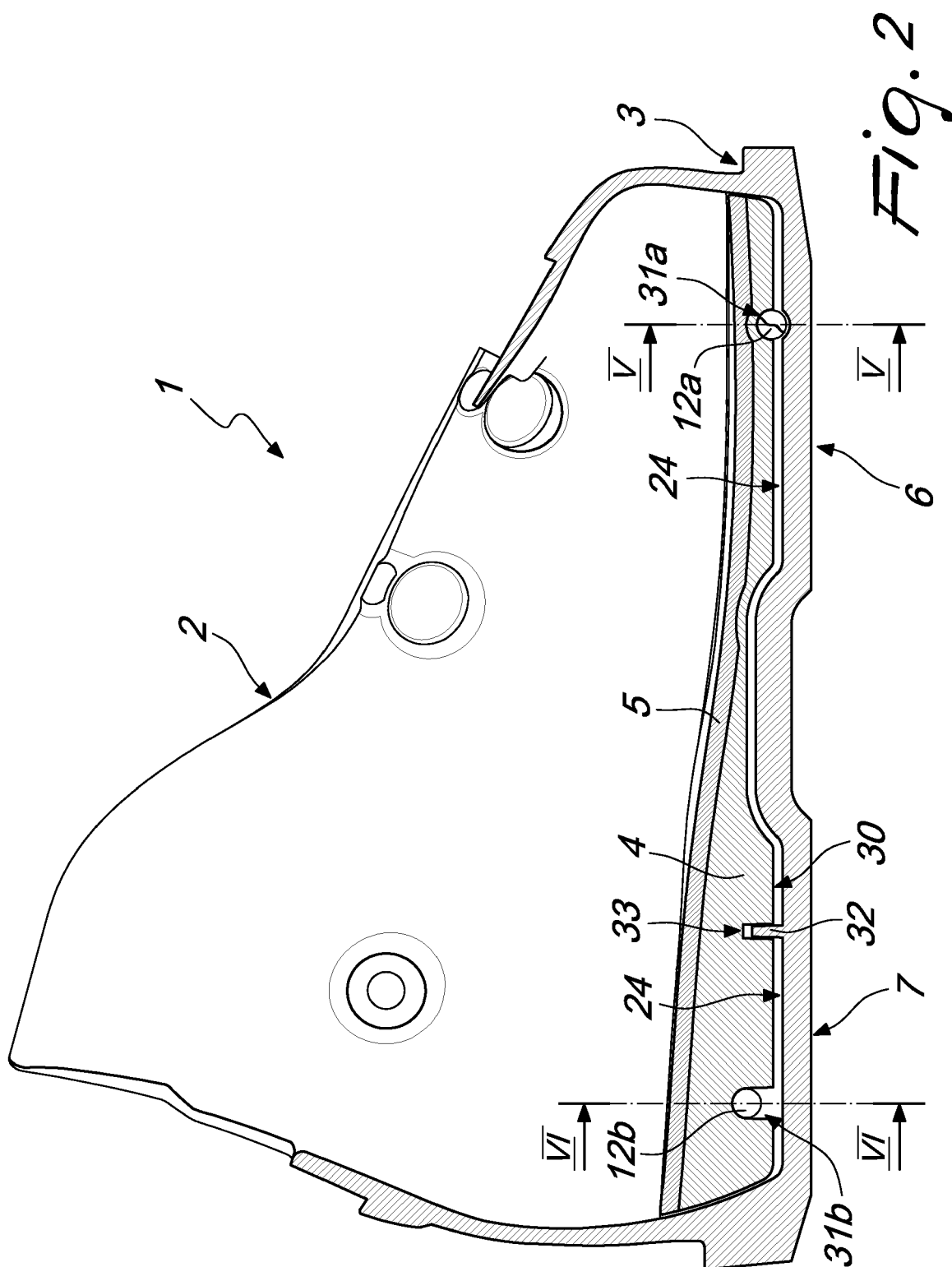
1. A sports shoe (1), comprising a rigid shell (2), provided with a sole (3), **characterized in that** at least one removable rigid insert (8a, 8b) is interposed, in the toe region and in the heel region, transversely to said sole (3), and is supported on at least one elastically compressible element (25a, 25b).
2. The shoe according to claim 1, **characterized in that** a sole (3) is associated below said shell, said sole and said shell being made of plastics, a platform (4) being arrangeable inside said shell (2), a mid-sole (5) being optionally superimposable thereon, said at least one rigid insert (8a, 8b) being arranged along a first axis (9), which lies transversely to a second central axis (10) which is longitudinal to said sole (3), or along a third axis (11), which is inclined with respect to said second axis (10).
3. The shoe according to claims 1 and 2, **characterized in that** said at least one rigid insert (8a, 8b) is constituted by a rigid pin (12a, 12b), which has a first head (13a, 13b) provided with a first axial seat (14a, 14b) for interconnection to a hex key, and a first stem (15a, 15b) at the tip of which there is a second axial seat (16a, 16b), which is internally threaded complementarily with respect to a second stem (17a, 17b) of a screw (18a, 18b), which also has a second head (19a, 19b) which has a third axial seat (20a, 20b) for interconnection to a hex key.
4. The shoe according to claims 1 and 3, **characterized in that** an adapted pair of first and second holes (22a, 22b, 23a, 23b) is provided at the lateral surface (21a, 21b) of said sole (3), said holes having, in pairs, the same axis, which corresponds to said first axis (9) or to said third axis (11), the arrangement of said first and second holes being such that once said at least one rigid insert (8a, 8b) has been inserted in them, said first stems (15a, 15b) of said pins (12a, 12b) are spaced from the underlying internal surface (24) of said sole (3), which is optionally partially recessed thereat.
5. The shoe according to claims 1 and 4, **characterized in that** each one of said pins (12a, 12b) is supported on a pair of elastically compressible elements (25a, 25b), each of which is substantially T-shaped

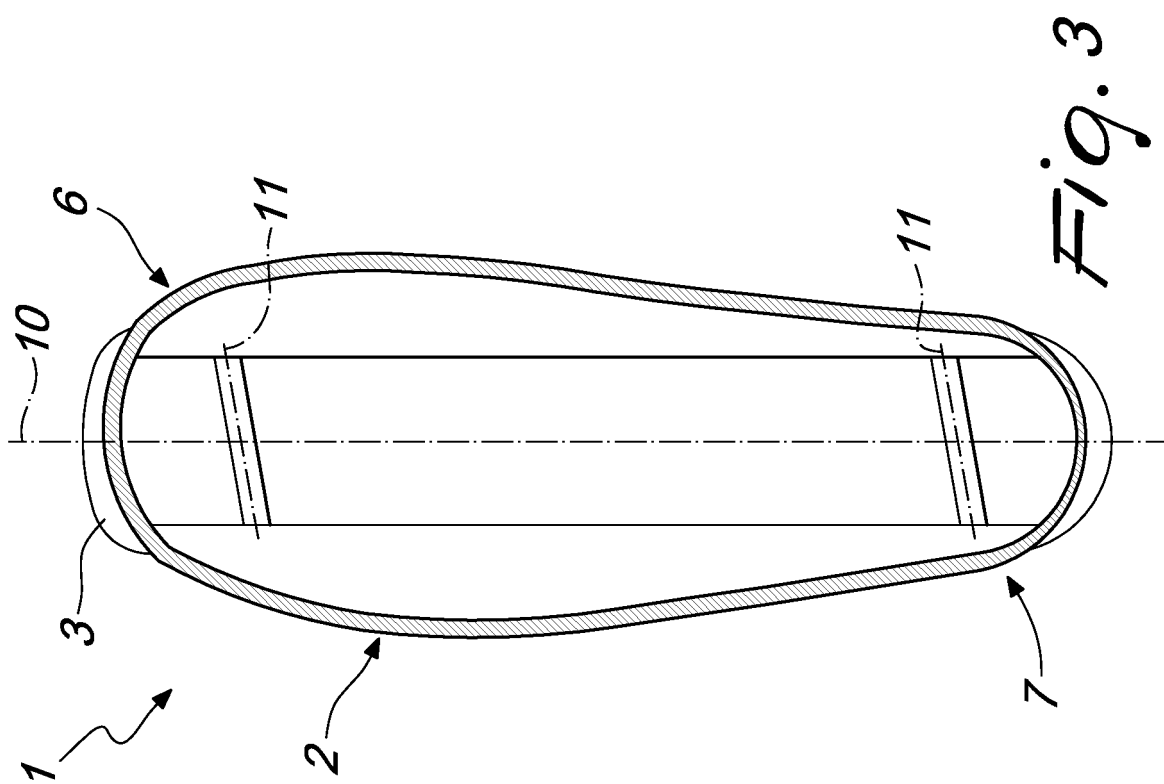
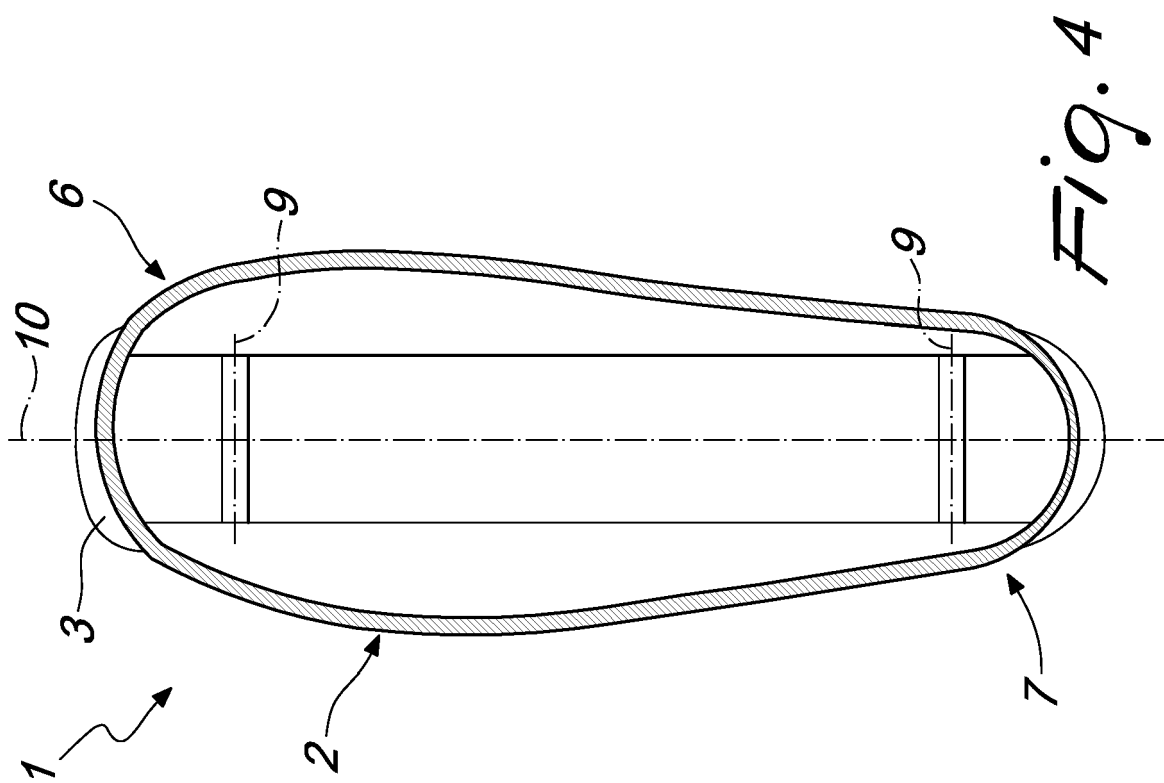
in cross-section so as to form a third stem (26a, 26b), which can be accommodated within said first holes (22a, 22b) and is axially hollow for the insertion of the complementarily shaped pin (12a, 12b).

6. The shoe according to claims 1 and 3, **characterized in that** each one of said elastically compressible elements (25a, 25b) has a third head (27a, 27b), which can be accommodated at two pairs of complementarily shaped fourth seats (28a, 28b) and fifth seats (29a, 29b), which are contiguous to said first and second holes (22a, 22b, 23a, 23b). 5
7. The shoe according to claims 1 and 6, **characterized in that** each third head (27a, 27b) accommodates said complementarily shaped first head (13a, 13b) of said pins (12a, 12b). 10
8. The shoe according to one or more of the preceding claims, **characterized in that** the shape of said elastically compressible elements (25a, 25b) is such as to have, at the respective third stems (26a, 26b) and at the third heads (27a, 27b), a constant radial thickness (A, B) or a differentiated radial thickness (A1, B1, A2, B2), said uniformity or difference in thickness being due also to said third heads (27a, 27b) and said third stems (26a, 26b). 15
9. The shoe according to claims 1 and 8, **characterized in that** at the lower surface (30) of said platform (4) there are, at said pins (12a, 12b), recesses or sixth seats (31a, 31b). 20
10. The shoe according to claims 1 and 9, **characterized in that** a rib or protrusion (32) protrudes transversely, in a region which is adjacent to the arch region or to the plantar arch, from the lower surface (30) of said platform (4), which has a flat or concave shape, said rib or protrusion (32) being insertable slidingly within a receptacle (33) provided in the overlying region of the lower surface (30) of said platform (4). 25
11. The shoe according to claims 1 and 10, **characterized in that** said fourth seats (28a, 28b) partially affect said shell (3), said fifth seats (29a, 29b) having a shape, and therefore a diameter, which is greater than those of said third head (27a, 27b) of said elastically compressible elements (25a, 25b). 30
12. The shoe according to claims 1 and 11, **characterized in that** the compression of said elastically compressible elements (25a, 25b) occurs at said third head (27a, 27b) and/or at said third stem (26a, 26b). 35
13. The shoe according to claims 1 and 12, **characterized in that** said elastically compressible elements (25a, 25b) are constituted in two parts which can be 40

mutually associated and therefore by a first bush or ring (34a, 34b), which has a T-shaped cross-section and is arranged coaxially to said pins (12a, 12b) and acts with the fourth head (35a, 35b) within said first or second holes (22a, 22b, 23a, 23b), and by a fourth stem (36a, 36b), which is directed toward the outside of the shoe and on which a second cup-shaped ring or bush (37a, 37b) rests which has a U-shaped cross-section and thus partially wraps around said first head (13a, 13b) and said second head (19a, 19b). 45







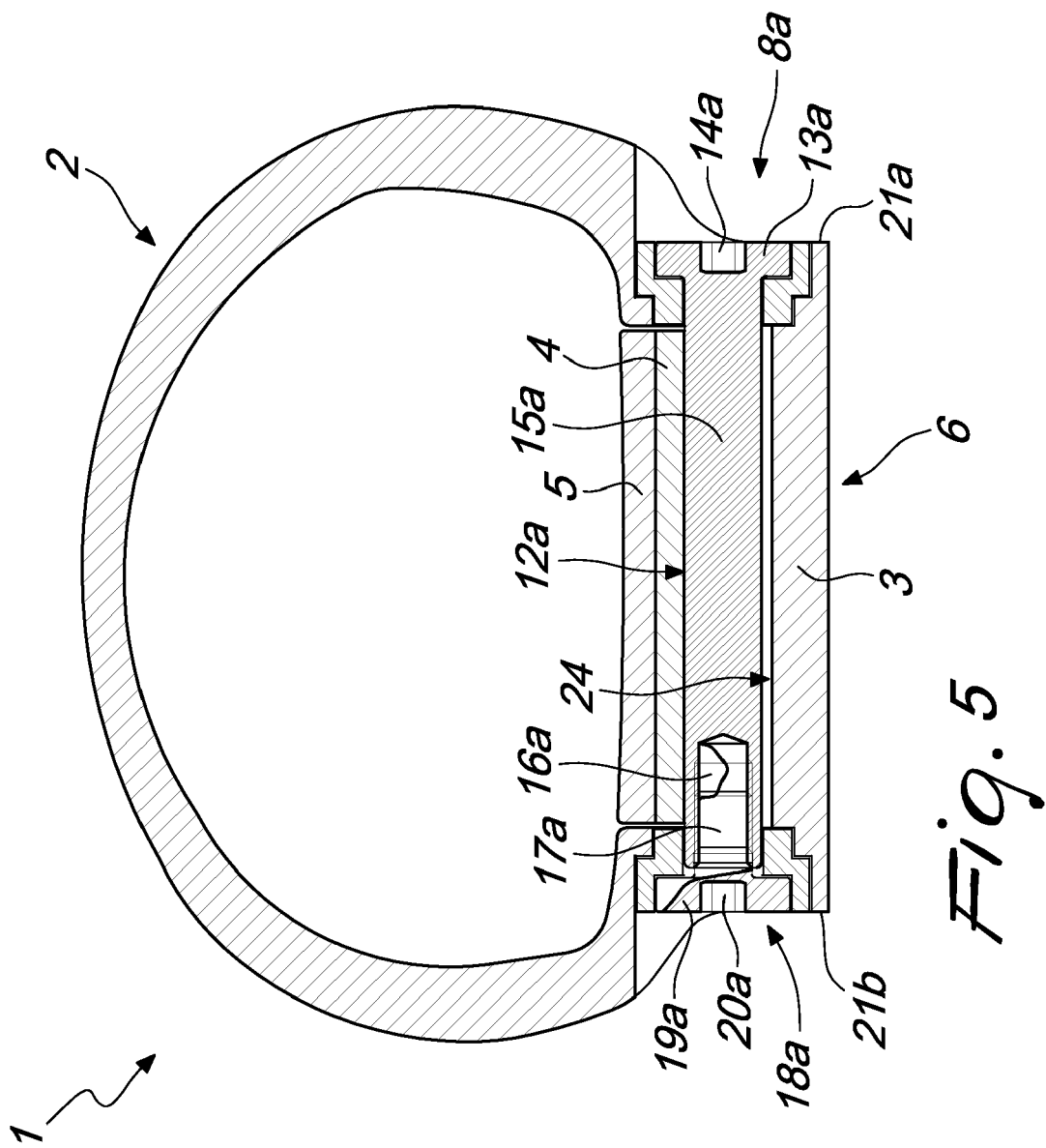
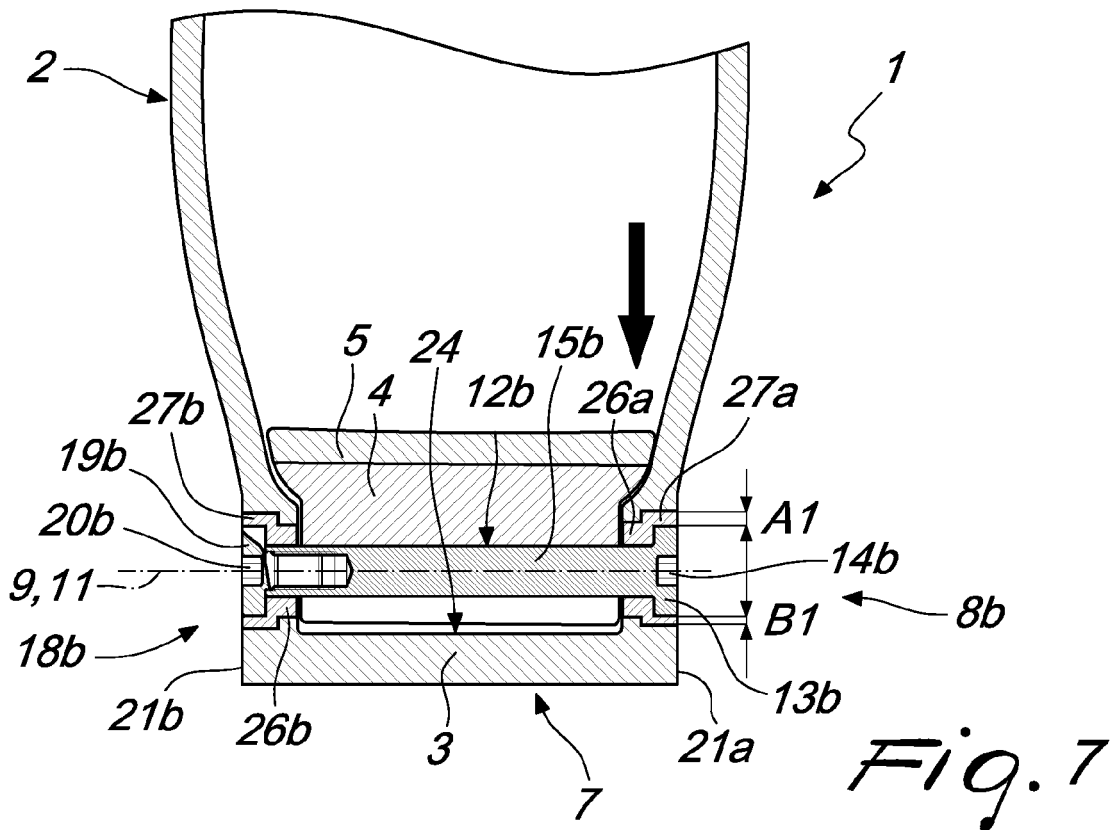
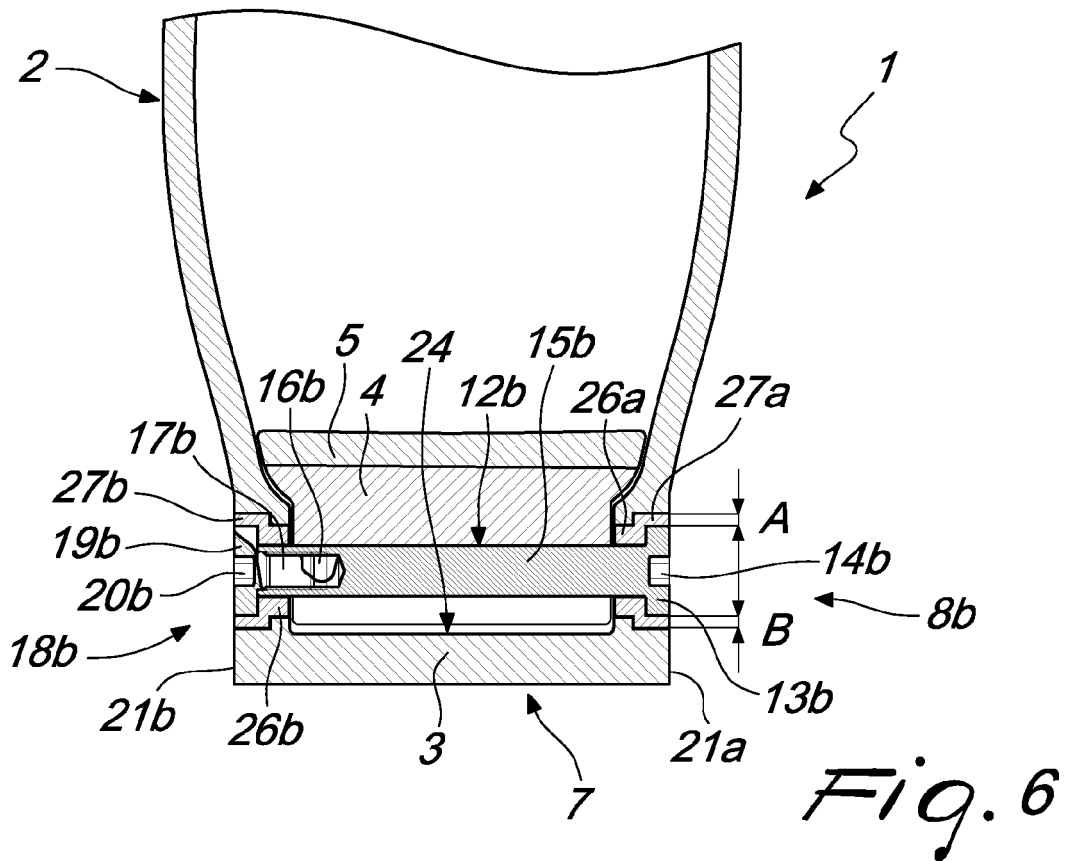
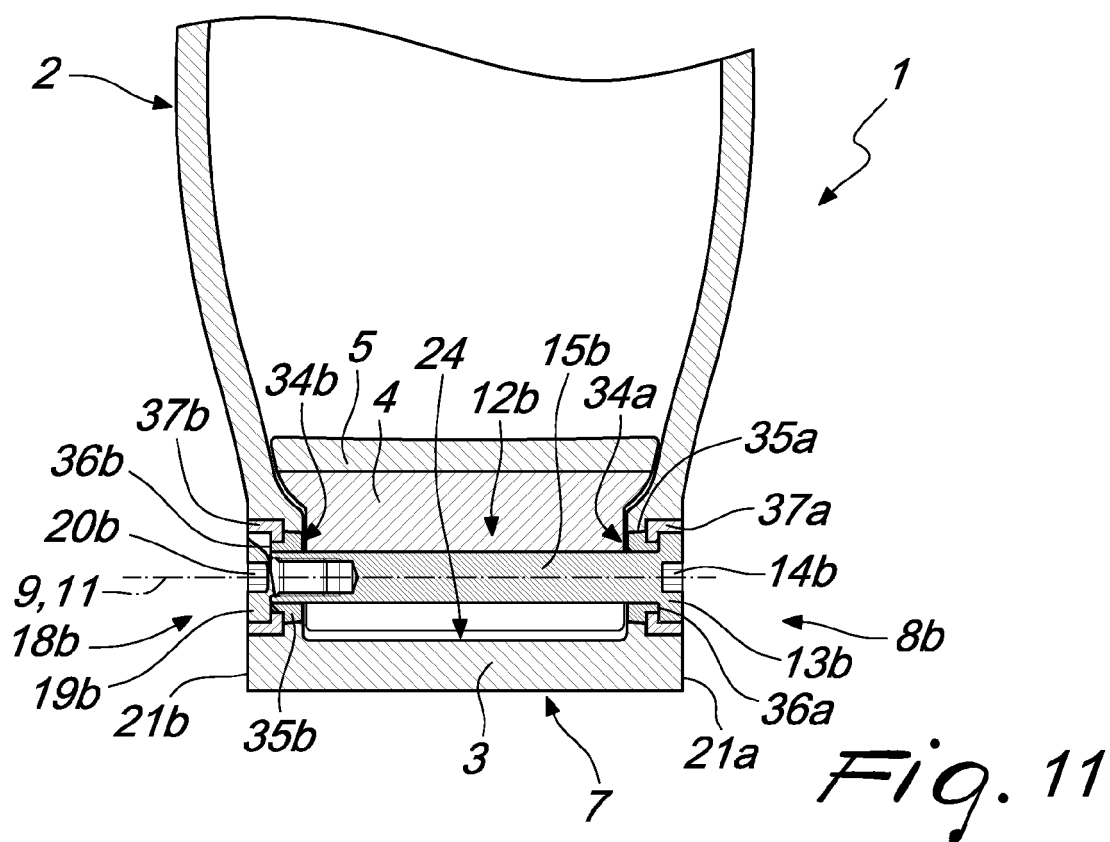
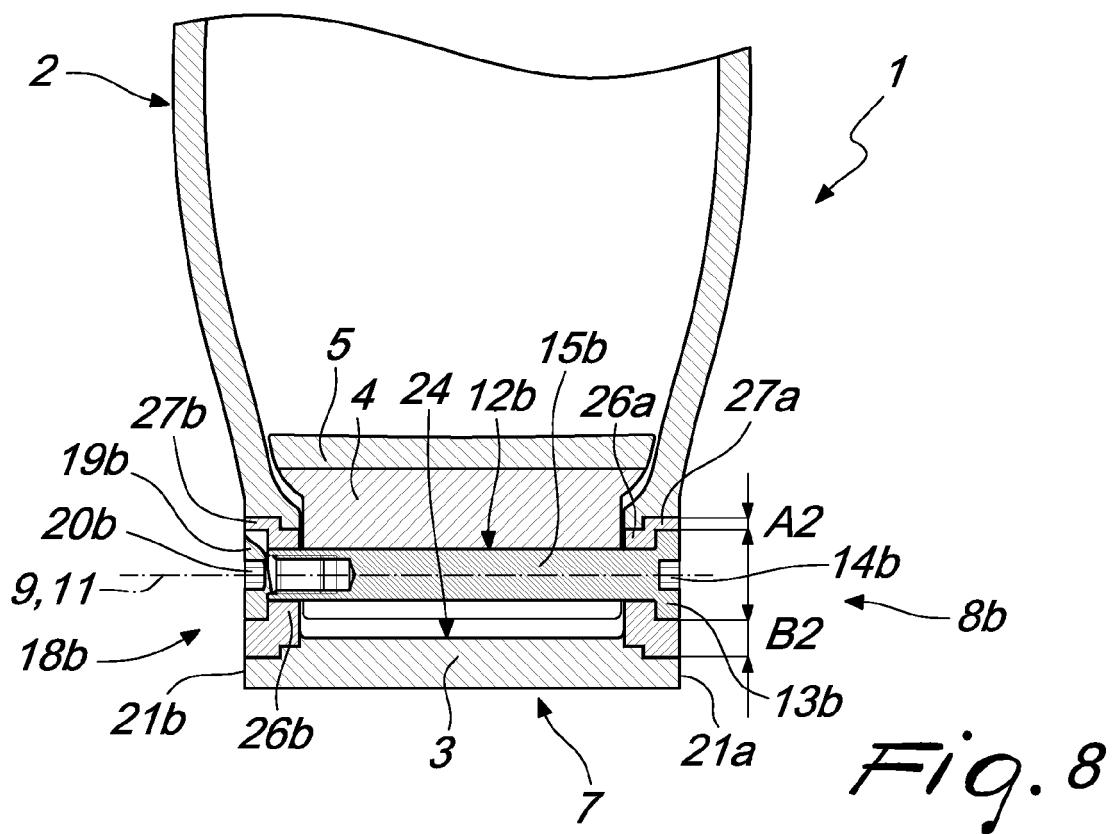


Fig. 5





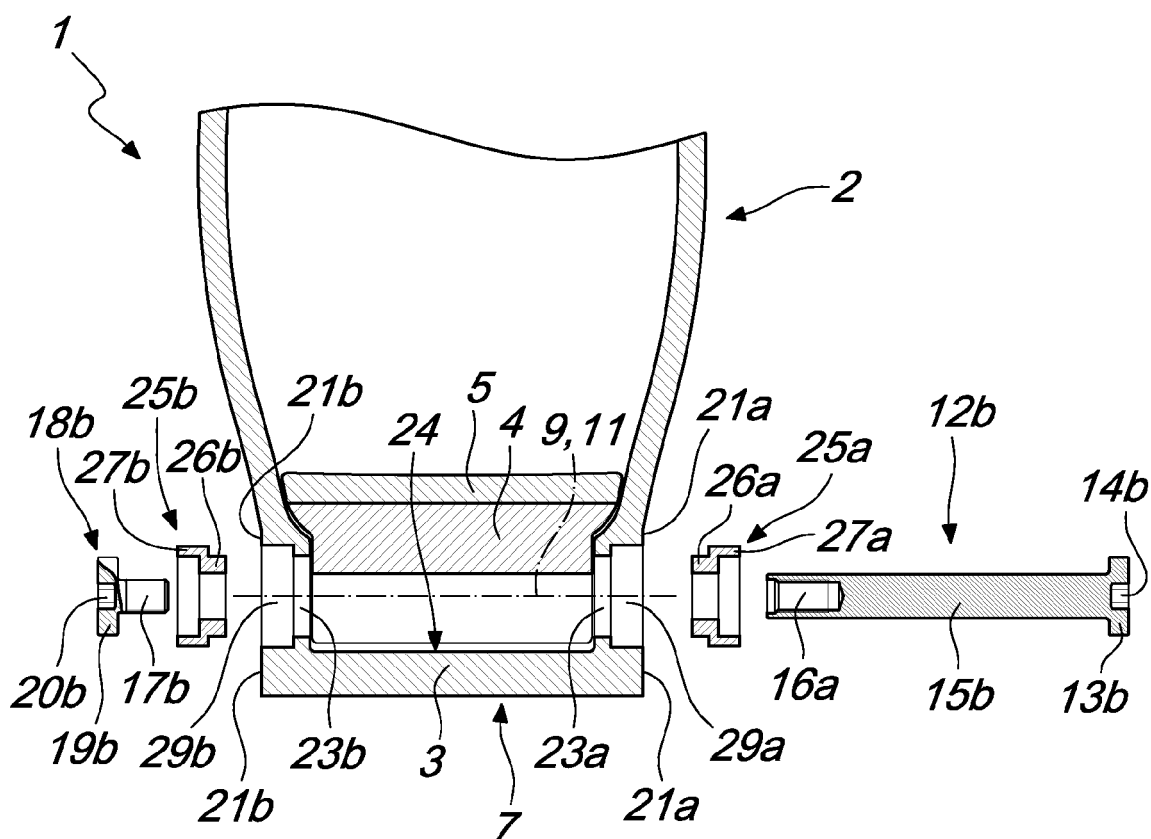


Fig. 9

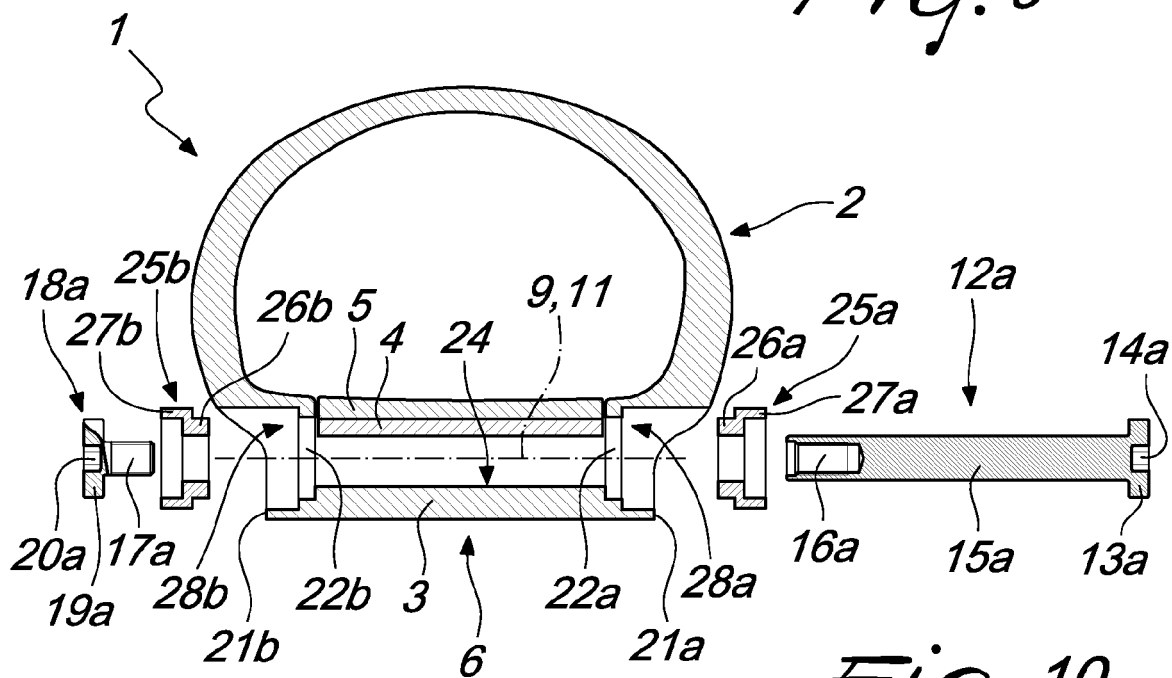


Fig. 10



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Application Number
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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 21 April 2011	Examiner Herry, Manuel
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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