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(54) Ski boot with device for varying the flexibility.

(57) Ski boot with device for varying the flexibility, which comprises a shell (302) to which at least one quarter (303) is articulated. The peculiarity of the invention resides in the fact that it comprises, between two mutually movable parts (302,303) of a boot, a body (310) with variable elasticity. According to one aspect of the invention, the variable-elasticity body (310) defines in its interior at least one cavity (311) in which a filling body is removably insertable to vary the elastic deformability characteristics of the body (310), which is deformable at least in the direction of mutual movement of the two mutually movable parts (302,303).

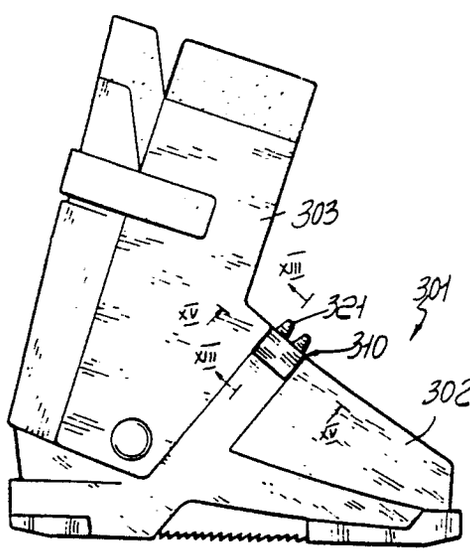

Fig. 11

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SKI BOOT WITH DEVICE FOR VARYING THE FLEXIBILITY

The present invention relates to a ski boot with a device for varying the flexibility.

As is known, ski boots are currently available on the market, both of the front-entry and of the rear-entry type, which are provided with devices which allow variation of the flexibility, that is the action opposed to the possibility of oscillation of the quarter or of the quarters, about an axis which is substantially horizontal and perpendicular to the longitudinal extension of the sole.

The known devices for varying the flexibility are based on a wide variety of functional criteria, such as, e.g., those which achieve the variation of the flexibility by varying the conditions of interference between the quarter and the shell by means of mutually slideable friction elements or by means of shimming elements which interpose between the shell and the quarter, so as to create a greater or smaller resistance to the possibility of oscillation.

Other known devices entail the interposition, between the shell and the quarter, of elastic elements which are interchangeable with elements having different characteristics of elasticity, so as to achieve the required adjustment of the flexibility.

These types of devices, such as e.g. the one illustrated in the patent application of the same applicant (Italian application no. 21626 B/81) are not always able to fully meet the requirements of the user, since they do not offer a range of flexibility which is selectable by the user without the removal or modification of the component parts.

Moreover, in such devices bulges occur on the outside of the boot which, besides spoiling its aesthetical features, can cause hindrance while skiing.

The aim proposed by the present invention is indeed to eliminate the above described disadvantages by providing a ski boot with a device for varying the flexibility, wherein the user has the possibility of adjusting various presettable values of flexibility without adding or removing component elements.

Within the scope of the above described aim, a particular object of the invention is to provide a ski boot, both of the front-entry and of the rear-entry type, wherein the variation device is applicable without thereby requiring substantial modifications of the conventional methods of manufacture of ski boots.

Still another object of the present invention is to provide a ski boot, wherein the device for adjusting the flexibility does not significantly affect the conventional outer aesthetical features of a boot, and which furthermore is not bulky or particularly protruding with respect to the profile of the same boot.

Not least object of the present invention is to provide a ski boot which, by virtue of its peculiar constructive characteristics, is capable of giving the greatest assurances of reliability and safety in use.

This aim, and the above mentioned objects, as well as others which will become apparent hereinafter, are achieved by a ski boot with a device for varying the flexibility, comprising a shell, whereto is connected at least one quarter, characterized in that it comprises an elastically deformable body acting between two mutually movable parts of said boot, means being furthermore provided for varying the elastic deformability of at least the portion of said elastically deformable body interposed between said two mutually movable parts.

Further characteristics and advantages will become apparent from the description of a preferred, but not exclusive, embodiment of a ski boot with a device for varying the flexibility, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Fig. 1 is a partially cut-away perspective view of a ski boot with a cursor device for varying the flexibility;

Fig. 2 is a partially cut-away perspective view of a ski boot with a cylindrical device for varying the flexibility;

Fig. 3 is a schematic partially cut-away side elevation view of the device arranged between the rear part of the shell and the quarter in a front-entry boot;

Fig. 4 is a schematic partially cut-away side elevation view of a rear-entry boot with the device interposed between the shell and the front quarter;

Fig. 5 is a cross section view taken along the line V-V of Fig. 1 of the cursor device;

Fig. 6 is a cross section view, taken along the line VI-VI of Fig. 2, of the cylindrical device;

Fig. 7 is a schematic perspective view of the cursor element of the device of Fig. 1;

Fig. 8 is an exploded view of the cylindrical element of the device of Fig. 2;

Fig. 9 is a schematic cross section view of a means for locking the device;

Fig. 10 is a cross section view, taken along the longitudinal mid-plane of a boot, of a cylindrical device for varying the flexibility associated with the boot at the region of the foot instep;

Fig. 11 is a schematic side elevation view of a rear-entry ski boot with the device interposed between the shell and the front quarter;

Fig. 12 is a schematic and partially cut-away view of a front-entry ski boot, with the device arranged between the rear part of the shell and the quarter;

Figs. 13 and 14 are cross section views taken along the line XIII-XIII of Figs. 11 and 12 with two different positions of the filler body;

Figs. 15, 16 and 17 are cross section views taken along the line XV-XV of Fig. 11 and 12 with the various possible positions of the filler body for varying the values of flexibility.

With reference to the above described figures, the ski boot 1 is composed of a shell 2 to which is pivoted, in a per se known manner, a front quarter 3, and comprises a rigid body 4 slideably associated with a seat 5 provided transversely relatively to the front quarter 3 approximately at the region of the foot instep.

Said rigid body 4 is constituted by a flat base 6, arranged longitudinally relatively to the seat 5, which is downwardly provided with a plurality of transverse dividing walls, indicated by the reference numeral 7, which define seats 8 for a correspondingly shaped elastically deformable means accommodatable therein, preferably in an interchangeable manner.

Each of said elastically deformable means comprises a small block 9 correspondingly shaped with respect to each of the seats 8.

Each of said small blocks 9, mutually arranged side by side, is provided with a differentiated elasticity due, for example, to the use of different materials, shapes and dimensions or to a combination of these possibilities.

At the seat 5 and at the mid-longitudinal axis of the shell 2, an abutment element protrudes which is rigidly associated therewith and which is constituted by a tab 10 having a tooth 11 projecting in the direction of the rigid body 4.

Said tooth 11 has a length approximately equal to the length of each block 9, the body 4 being positionable inside the seat 5 so as to always and in any case provide a block facing the tooth 11.

Upwardly, the base 6 is provided with a cylindrical tab 12, accommodated in a slot 13 formed on the upper surface of the quarter 3 at the seat 5. A grip element 14 is associated with the cylindrical tab 12, and is located externally of the quarter to allow one to act on the rigid body 4 to make it slide within the seat 5.

Advantageously, locking means are provided for locking the rigid body 4 in the desired position, for example for the type illustrated in detail in Fig. 9, composed of the pegs 15 accommodated inside the grip element 14 in cylindrical seats 16. The peg 15 projects, downwardly relatively to the grip element 14, from the seat 16 and has a rounded head 17 which is accommodatable in one of the hemispherical seats 18 provided on the outer surface of the shell or quarter.

A helical spring 19 is arranged coaxially to the peg 15 within the cylindrical seat 16 and acts on the head 17 forcing it into the complementary hemispherical seat 18.

Naturally, the number of hemispherical seats 18 formed on the surface of the shell depends on the number of positions which the rigid body 4 can assume; for example in Fig. 1 a device with three positions, corresponding to the three illustrated blocks 9, is illustrated, provided with three pairs of hemispherical seats 18 for a matching pair of pegs 15 provided on the grip element 14.

The use of the device is as follows: first the skier acts on the body 4 so as to position the block 9 having the desired characteristics of elasticity in front of the tooth 11.

During the flexing phase, there occurs the forward sliding of the front quarter 3 with respect to the shell 2 and thus the block 9 and the tooth 11 make contact, the latter subjecting the affected block to compression.

Naturally, the number of dividing walls, as well as the number of the seats provided at said rigid body may be any according to specific requirements.

The user can moreover provide a plurality of rigid bodies 4, each of which has a plurality of blocks having different characteristics of deformability.

If the ski boot is of the front-entry type, that is, it is again composed of a shell 2 pivotably coupled to a single front-opening quarter 12, the rigid body 4 is again slideably associable with a seat 5 provided transversely relatively to said quarter 12 proximate to the end thereof which is adjacent to the heel 13 of the boot 1.

Also in this case, the various blocks provided at the seats provided on the rigid body 4 interact, on the surface facing the upper end of the quarter 12, with the tooth 11 of a tab 10 which projects from and is rigidly coupled to the end of the shell 2 facing the direction of the upper end of said boot.

Figs. 2, 6 and 8 illustrate another aspect of the invention, in which the device for varying the flexibility is of the cylindrical type: on the front quarter 103 of the rear-entry boot, at the region of the foot instep above the shell 102, an essentially cylindrically shaped seat 105 is provided for a rigid

body 104. The latter advantageously comprises a circular plane base 106, from which a cylindrical tab or lug 114 projects axially and downwardly, from which tab three dividing walls 107 radially project which are equally mutually spaced by an angle of approximately 120°.

Said dividing walls 107 define seats 108 for correspondingly shaped blocks 109 having thus essentially the shape of a cylindrical sector.

Naturally, also in this case the blocks 109 each have different characteristics of elasticity with respect to each other, according to the materials, the forms and the dimensions used.

The rigid body 104 is rotatably associated with the quarter 103 by means of a tang 110, accommodated in a through hole formed in the quarter at the seat 105, and the knob 111 is positioned at the exterior of the quarter and fixed to the tang 110 so that it rigidly couples the rigid body 104 to the quarter 103, allowing at the same time the rotation thereof.

At the mid-longitudinal axis of the shell 102, an abutment element projects, which is composed of a tab 112 and which is accommodated in a longitudinal seat 113 provided inside the quarter 103 facing the cylindrical seat 105 and connected thereto. The operation of the cylindrical device is similar to the operation of the preceding device: a forward sliding movement of the quarter 103 is followed by an interaction between the tab 112 and the facing block 109, the degree of flexibility of the quarter thus depending on the characteristics of elasticity of the material of which the block is made. In order to vary the flexibility,it will be sufficient, by acting on the knob 111, to rotate the rigid body 104 placing a different block facing the tab 112.

Also in this case, means are provided for locking the rotation of the body 104 in the desired position, comprising, for example, of the hemispherical seat and peg system 133 similar to that described above.

Fig. 10 illustrates a different aspect of the cylindrical device, wherein a rigid body 204 is composed of a circular plane base 206 which has a cylindrical tab or lug 214 projecting axially, and dividing walls 207 mutually equally spaced by an angle of 120°; the dividing walls 207 define seats 208 for correspondingly shaped blocks 209, in a manner similar to what has been described above. In this case, however, the rigid body 204 is rotatably associated with the shell 202, in a seat 205 in the shape of a half cylinder, by means of a pin 210.

Upwardly with respect to the rigid body 204, a knob 211 is rigidly coupled in rotation to the body 204 and axially locked by the pin 210. Means are furthermore provided for locking the rotation of the rigid body 204 in the desired position, comprising the pin and hemispherical seat system 213 arranged between the base 206 and the facing surface of the shell 202. In this case, upon a forward sliding of the quarter 203, the edge 203a of the same quarter interacts with one of the blocks 209 of the rigid body 204, the variation of the degree of flexibility being performed by rotating the body 204 by means of the knob 211.

Naturally, also with the cylindrical device the number of usable blocks, as well as the type of material used for their manufacture, may be any according to requirements. Also the cylindrical device, in both of the described aspects of the invention, can be used in front-entry boots, where it would act between the quarter and the rear portion of the shell, similarly to what has been described for the device of Fig. 3.

With reference to Figs. 11-17, another aspect of the device is illustrated of the device for varying the flexibility, which can be applied both to a rear-entry boot 301 (fig. 11) and to a front-entry boot 305 (Fig. 12).

According to what is illustrated in the drawings, in the case of a rear-entry boot the device is interposed between the shell 302 and the front edge of the front quarter 303, while in the case of the front-entry boot 305 the device for varying the flexibility is interposed between the rear part of the shell 302 and the lower edge of the single quarter 307.

Obviously, the device can be positioned at any other point of the boot, the concept remaining unchanged that it must be positioned between two mutually movable parts of the boot.

Said device for varying the flexibility is constituted by an elastically deformable body 310 which, according to a preferred aspect of the invention, comprises a rubber pad of selectable hardness and having a shape which is also modifiable but preferably substantially parallelepipedal.

Inside said pad 310, two cavities 311 are defined, separated from one another by dividing walls 312 made substantially enbloc with the pad 310.

Said cavities 311 are preferably provided with a substantially truncated-cone shape open at the larger base.

In said cavities 311 a filler body 320 is removably insertable, made rigid material such as metal, plastic or other materials.

Each filler body is provided with a lug 321 in the shape of a button which, by means of a slot 322, projects outside the pad 310 so as to allow the motion of the body 310 from a position in which it is inserted in the cavity 311 to a position of accommodation in a chamber 325 again defined inside the body 310, but so as not to interfere with the characteristics of elastic deformability of the pad 310.

The filler bodies 320 are slideably guided by means of stems 326 which extend axially with respect to the cavities 311 and are positioned along a direction which is substantially perpendicular to the direction of mutual approach of the mutually movable elements wherebetween the pad 310 is interposed.

As illustrated in the drawings, according to the positioning of the filler bodies 320, various degrees of flexibility are achieved. Indeed, by positioning the two filler bodies 320 in the cavities 311, as illustrated in Fig. 15, in practice a stiffening of the characteristics of elastic deformability of the pad 310 is obtained, since in the direction of mutual motion of the parts between which the body 310 is interposed, rigid bodies are provided which fill the cavities 311, impeding their elastic deformation and accordingly reducing the possibility of flexing of the boot.

Fig. 16 illustrates a position with intermediate flexibility, in which one of the filler bodies is extracted from the cavity 311, so that the pad assumes a greater characteristic of elastic deformability, due to the possibility of elastic deformation of the cavity 311 which is not affected by the pads.

The greater flexibility characteristics are obtainable by positioning, as illustrated in Fig. 17, both filler bodies outside the cavities, so that the pad 310 assumes high characteristics of elastic deformability which consequently allows a greater flexibility of the boot.

Naturally, the number of the cavities 311 and accordingly the number of the filler bodies can be modified in any way according to the required range of flexibility values.

From what has been described, it can thus be seen that the invention achieves the intended aims, and in particular the fact is stressed that the adoption of a body in elastically deformable material, interposed between the two mutually movable parts of a boot upon the oscillation of the quarter with respect to the shell, allows quick and easy variation of the characteristics of flexibility without requiring additional elements or elements to be removed.

Furthermore, the device for adjusting the flexibility in the various described aspects of the invention, allows the possibility of being easily used indifferently for front-entry boots and rear-entry boots without giving rise to particular bulk of the outer surface of the boot.

The device thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept; moreover, all the details may be replaced with technically equivalent elements.

In practice, the materials and dimensions employed, may be any according to the requirements and to the state of the art.

Claims

1. Ski boot (1,101,301,305) with a device for varying the flexibility, comprising a shell (2,102,202,302) whereto is connected at least one quarter (3,12,103,205,303,307) characterized in that it comprises an elastically deformable body (4,9,104,109,204,209,310) acting between two mutually movable parts (2,3,102,103,202,203,302,303,307) of said boot (1,101,301,305), there being furthermore provided means (14,111,211,320,321) for varying the elastic deformability at least of the portion of said elastically deformable body (4,9,104,109,204,209,310) interposed between said two mutually movable parts (2,3,12,102,103,202,203,302,303,307).

2. Boot according to claim 1, characterized in that said elastically deformable body (4,9,104,109) is a base (6,106) arranged longitudinally and slideably associated with a preset seat (5,105) extending transversely with respect to said quarter (3,12,103) of said boot (1,101) said base (6,106) having a plurality of dividing walls (7,107) defining seats (8,108) correspondingly shaped elastically deformable means (9,109) interchangeably accommodatable therein, said elastically deformable body (9,109) interacting with an abutment element (10,11,112) rigidly associated with said shell (2,102) of said boot (1,101).

3. Boot according to claim 2, characterized in that said elastically deformable means are composed of small blocks (9,109) provided with different characteristics of elastic deformability.

4. Boot according to claim 2, characterized in that said abutment element (10,11) is composed of a tab (10) projecting from said shell (2) substantially at its mid-longitudinal axis and accommodated in said seat (5) provided on said quarter (3, 12) said tab (10) having a tooth (11), projecting in the direction of said rigid body (4), said tooth (11) defining a dimension approximately equal to that of the facing block (9).

5. Boot according to claim 2, characterized in that said elastically deformable body (4,9,104,109) has a grip element (14,111) projecting outwards through an aperture (13) provided in said quarter (3,12,103) at said seat (5,105), said grip element (14,111) being provided, on its surface facing the outer surface of said quarter (3,12,111), with means (15-19,113) for locking sliding movement of said elastically deformable body (9,109) in a desired position.

6. Boot according to claim 1, characterized in that said elastically deformable body (4,9) is slideably associated with a preset seat (5) provided transversely with respect to a quarter (12) of said front-entry boot (1), said seat (5) being provided proximate to the end of the quarter (12) which is adjacent to the heel (13) of said front-entry boot (1).

7. Boot according to claim 1, characterized in that said elastically deformable body (4,9,104,109,204,209) is slideably associated with a seat (5,105,205), provided in a front quarter (3,103,203) of said boot (1,101), at the foot instep region thereof.

8. Boot according to claim 1, characterized in that said elastically deformable body (104,109) has a circular plane base (106), wherefrom a cylindrical lug (114) projects downwardly and axially, from which lug dividing walls (107), project radially and define seats (108) for blocks (109), having a configuration substantially corresponding to said seats (108), said body (104,109) being rotatably associated with said quarter (103), and accommodated in a substantially cylindrical seat (105) formed in said quarter (103), said body (104,109) furthermore interacting with an abutment element (112), rigidly associated with said shell (103) of said boot (101).

9. Boot according to claim 8, characterized in that said abutment element (112) is constituted by a tab (112), projecting from said shell (102) substantially at its longitudinal mid-axis, said tab (112) having a tooth projecting in the direction of one of said blocks (109) associated with said body (104), said tooth defining a width approximately equal to that of said blocks (109).

10. Boot according to claim 8, characterized in that said elastically deformable body (104,109) has a knob (111) positioned on the outside of said quarter (103) and provided, on its surface which faces the outer surface of said quarter (103), with means (113) for locking its rotation in a desired position.

11. Boot according to claim 1, characterized in that said elastically deformable body (204,209) comprises a plane circular base (206) from which a cylindrical lug (214) projects axially, from which lug (214) dividing walls (207) project radially and define seats (208) for small blocks (209) having a configuration substantially corresponding to said seats (208), said body (204,209) being rotatably associated with said shell (202) of said boot, and interacting with the edge of said quarter (203), said circular plane base (206) being provided, on its surface facing the surface of said shell (202), with means (213) for locking its rotation in a desired position, said body (204,209) being furthermore provided with an externally accessable knob (211).

12. Ski boot according to claim 1, characterized in that said elastically deformable body (310) defines, at its interior, at least one cavity (311) in which a filler body (320) is removably insertable for varying the characteristics of elastic deformability of said elastically deformable body (310) at least in the direction of mutual motion of said two mutually movable parts (302,303,307).

13. Ski boot according to claim 12, characterized in that said elastically deformable body (310) is made of elastically deformable material.

14. Ski boot according to claim 12, characterized in that said cavity (311) is laterally delimited by dividing walls (310) provided enbloc with said elastically deformable body (310).

15. Ski boot according to claim 12, characterized in that said filler bodies (320) define a configuration which substantially corresponds to said at least one cavity (311).

16. Ski boot according to claim 12, characterized in that said filler body (320) has a lug (321) which is accessable from the exterior of said elastically deformable body.

17. Ski boot according to claim 12, characterized in that said filler body (320) is made of substantially rigid material.

18. Ski boot according to claim 12, characterized in that said filler body (320) is slideably guided by a stem (326) extending substantially perpendicular with respect the direction of mutual motion between said two mutually movable parts (302,303,307).

19. Ski boot according to claim 12, characterized in that it comprises a plurality of said cavities (311) arranged side by side.

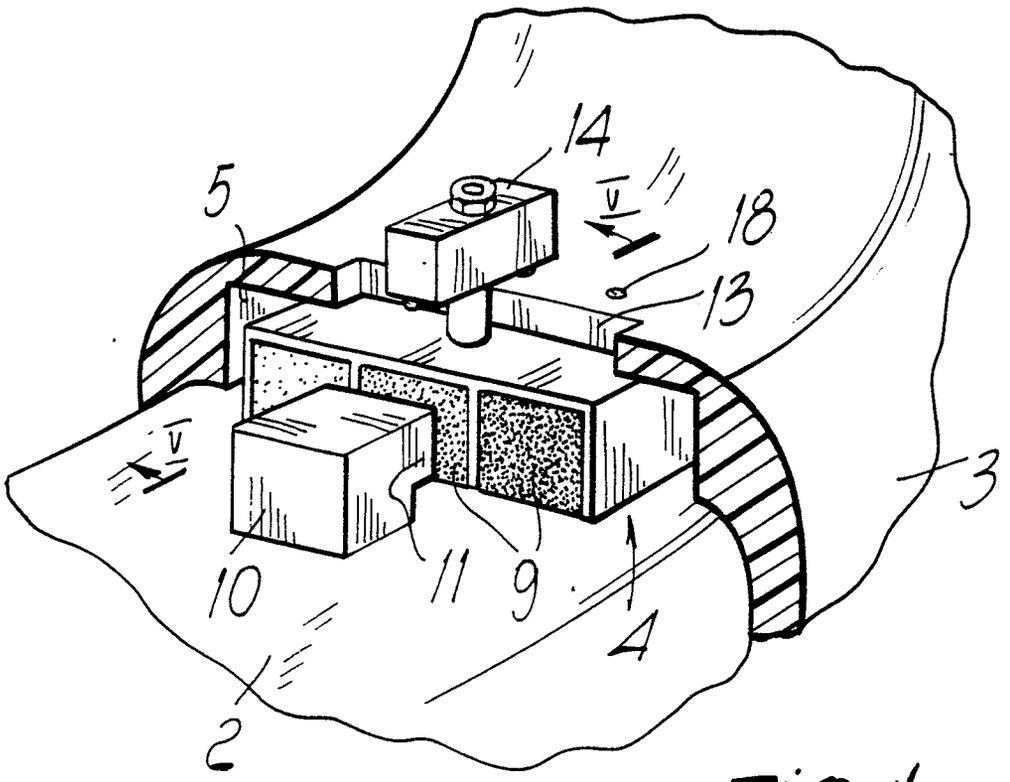


Fig. 1

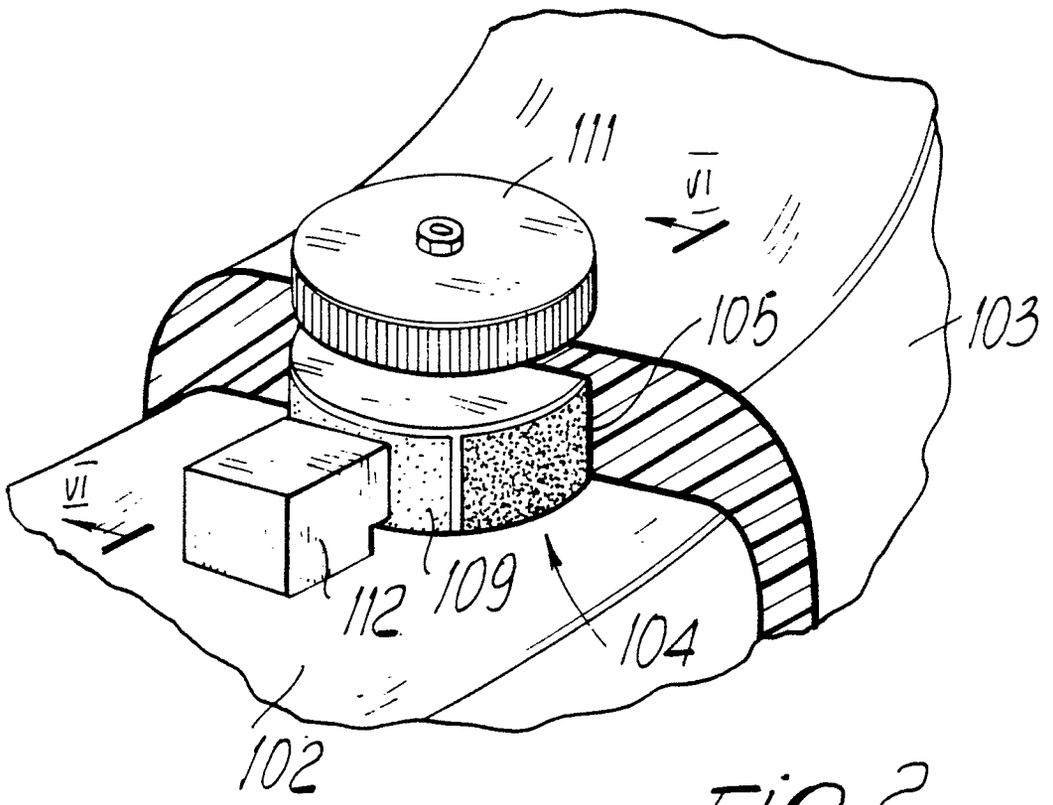


Fig. 2

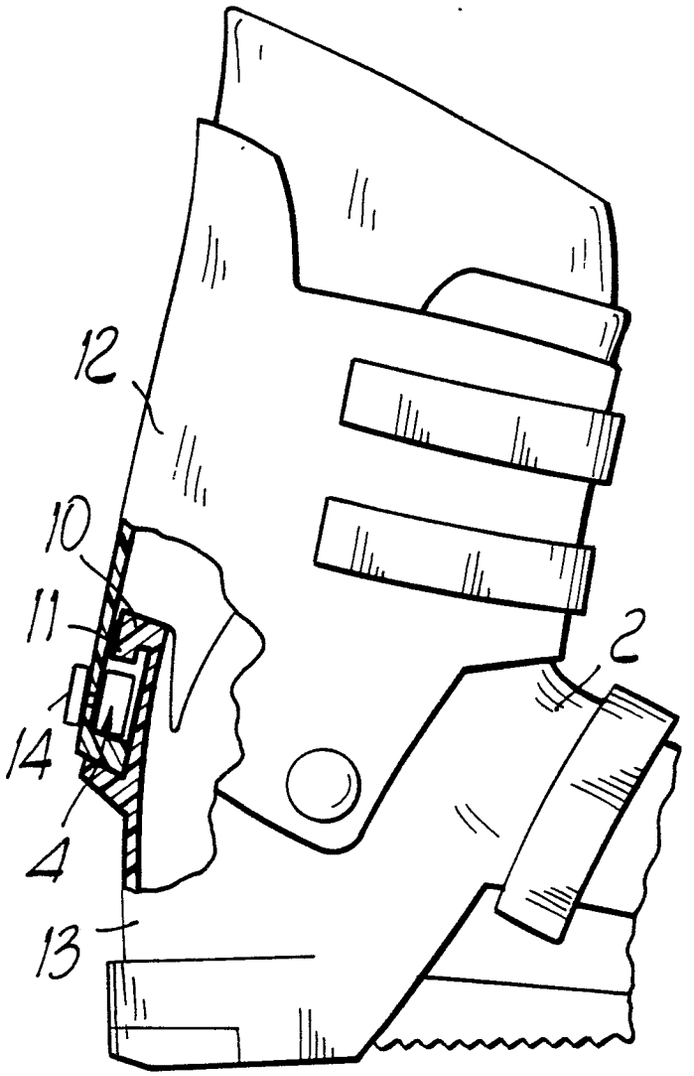


Fig. 3

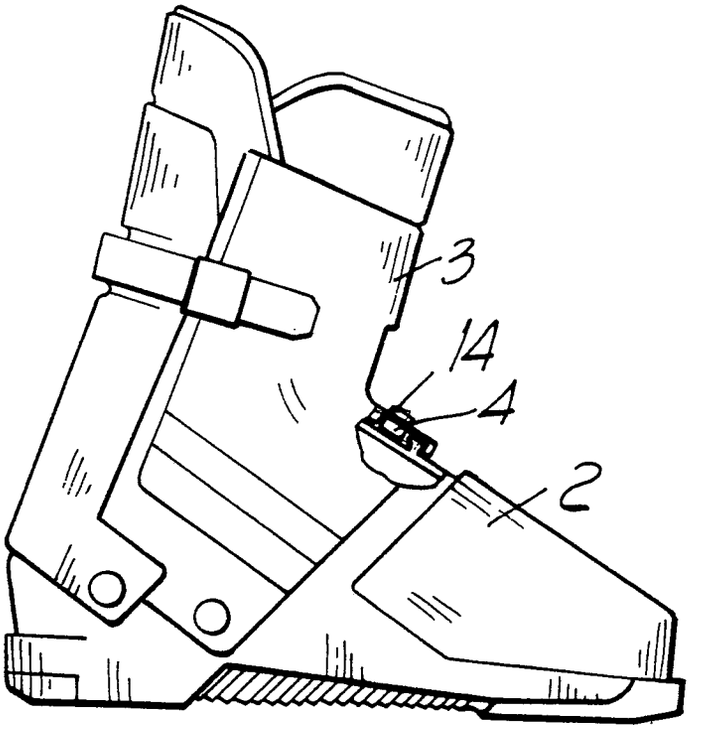


Fig. 4

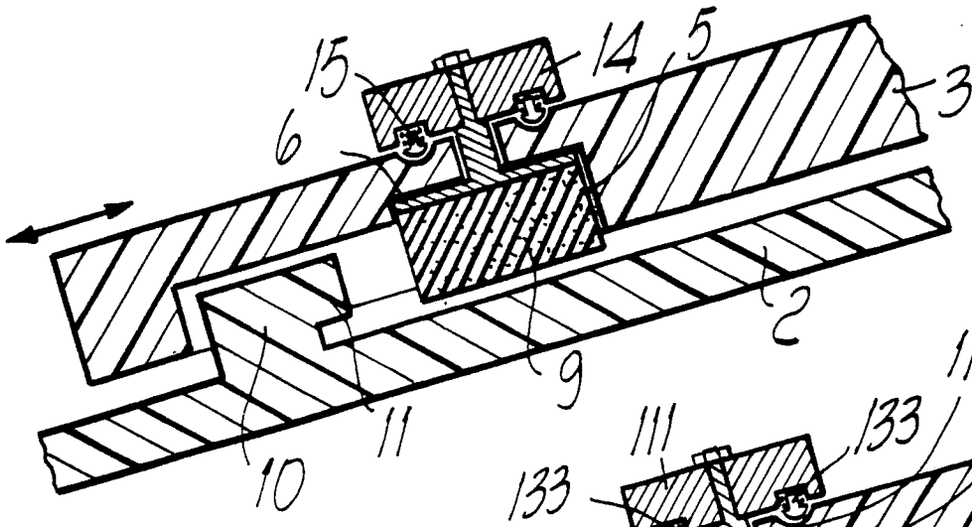


FIG. 5

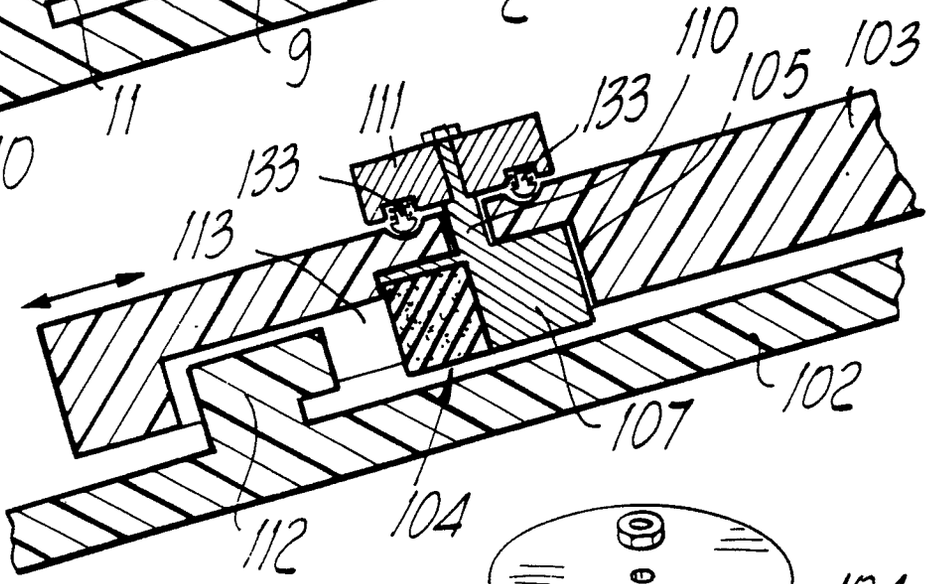


FIG. 6

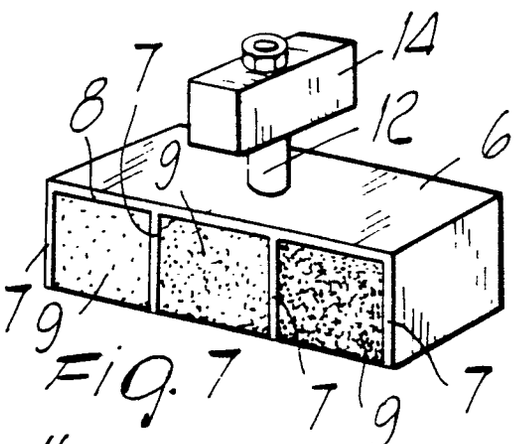


FIG. 7

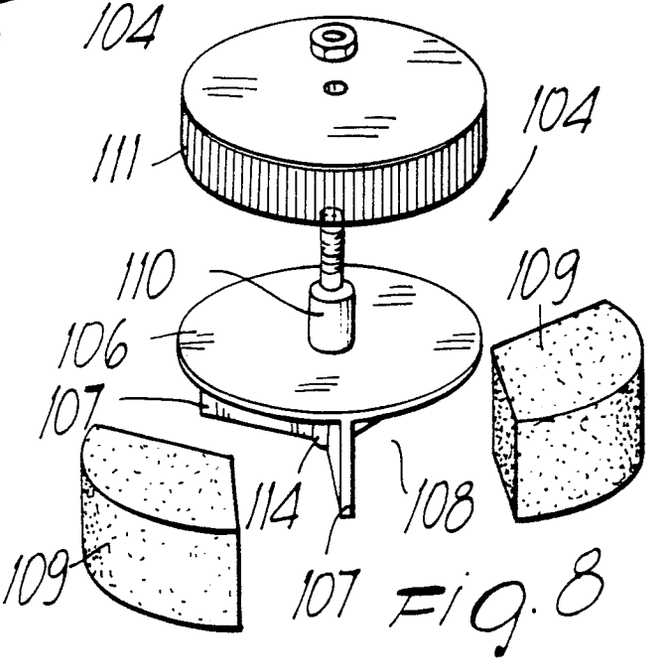


FIG. 8

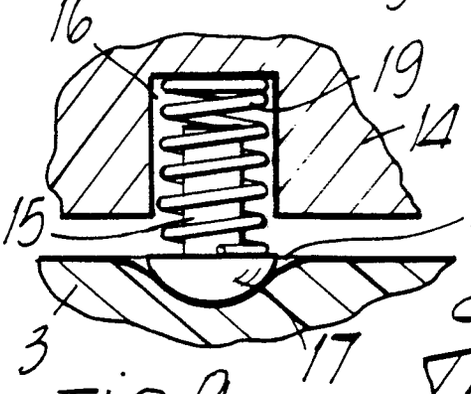


FIG. 9

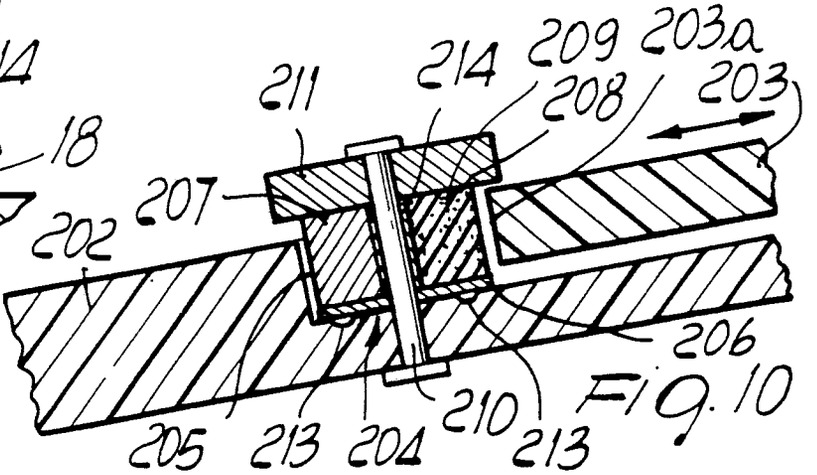
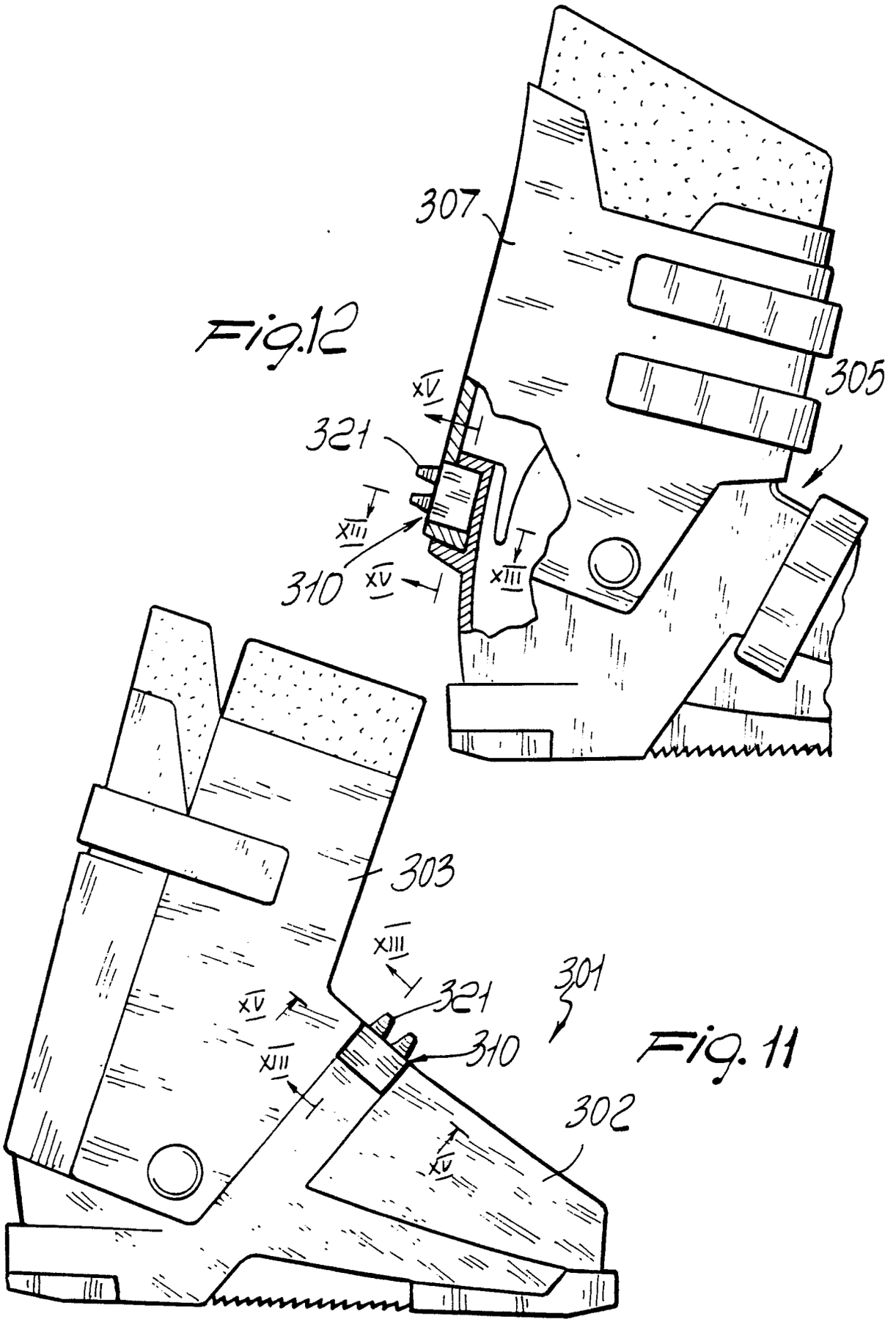


FIG. 10


307
305
321
XV
XIII
310
XV
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303
XIII
321
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XV

Fig.12

Fig. 11

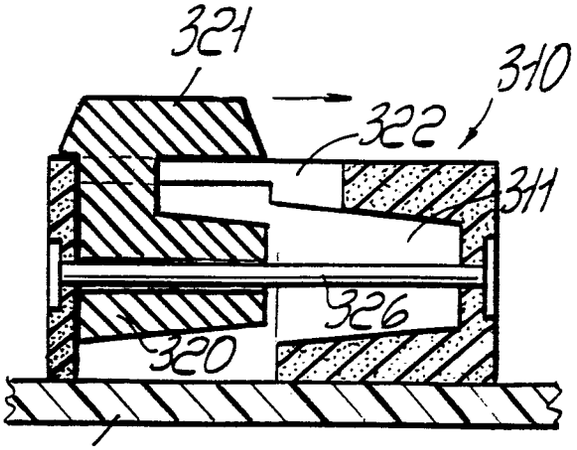

Fig.13

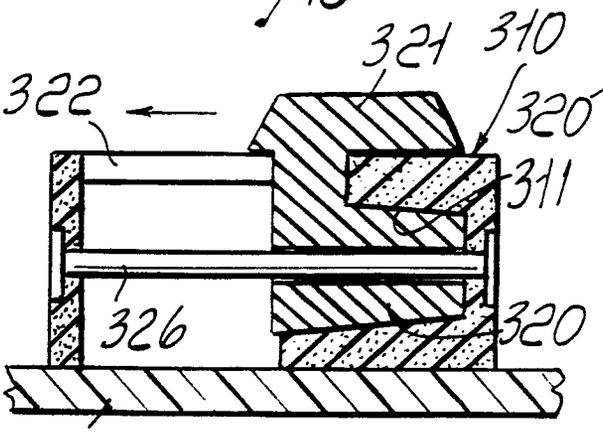

Fig.14

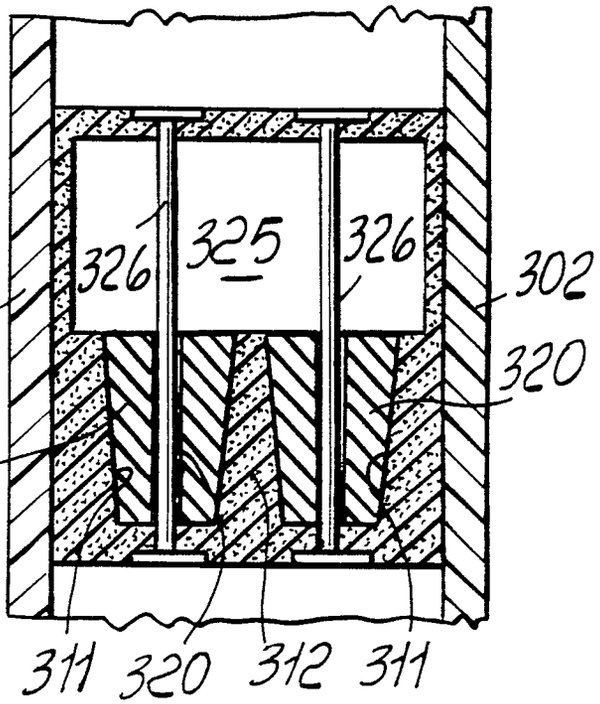

Fig.15

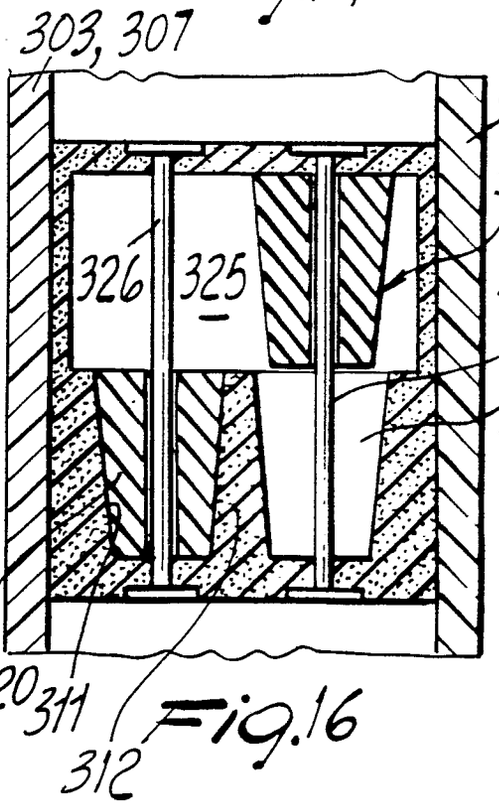

Fig.16

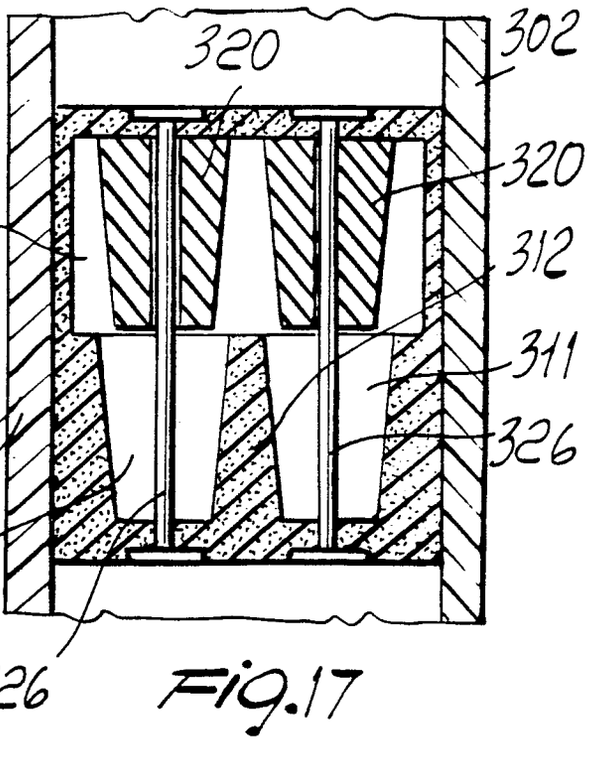

Fig.17