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(54) Device for adjusting the position of a quarter with respect to the shell of a sports shoe

(57) Device for adjusting the position of a quarter with respect to the shell of a sports shoe. The device comprises first means (1), associated with the quarter, for preselecting the desired interaction between the quarter and the shell. There are also second engagement means (32) which are associated with the shell. Finally, there are third means for interaction between the first preselection means and the second engagement means which can be activated when the quarter is moved.

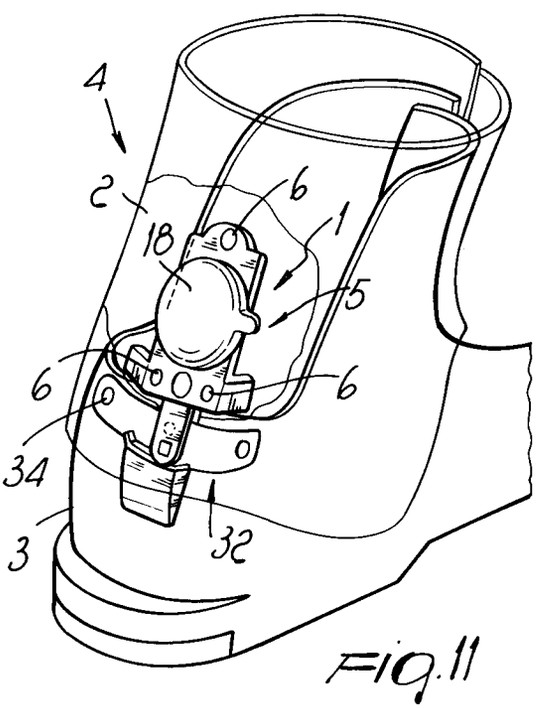

FIG. 11

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The present invention relates to a device for adjusting the position of a quarter with respect to the shell of a sports shoe.

Conventional ski boots have a shell to which at least one quarter is articulated approximately at the malleolar region and can thus oscillate backwards or forwards during sports practice.

One of problems observed in using ski boots consists in controlling the oscillation of the quarter according to the sport being practiced and to the user's need to be able to walk once the boots have been disengaged from the skis and from the respective bindings.

German patent no. 1,932,776 discloses a ski boot which has a quarter behind which an elongated elliptical strip protrudes towards the shell; a seat is formed axially on said strip and has three separate regions at which it is possible to selectively position the appropriately shaped stem of a screw rotatably associated at a plate that is rigidly coupled to the rear of the shell.

In this solution it is therefore possible to force a given inclination of the quarter with respect to the shell; however, the selected position is fixed and can be achieved only by using specific tools and when the boot is removed, owing to the particular position of the screw.

Because of this, the stem of the screw cannot be easily positioned so as to allow the quarter to freely oscillate, also due to the fact that since the stem can freely rotate it may undergo unwanted jammings that may also lead to the deformation of the strip, consequently making it impossible to use the boot.

In any case, direct activation of the screw entails the intervention of the skier, who must turn the stem until it disengages and then reengage it in the desired seat.

US patent 3,543,421 discloses a ski boot that has a shell to the side whereof a quarter is articulated; said quarter has a bar in a rear region, and said bar is oscillatably pivoted transversely to said quarter.

The stem of a locator is rotatably associated at one end of said bar and abuts at a plate that is longitudinally associated proximate to the underlying shell.

This solution allows to vary the inclination that can be imparted to the quarter, but the mutual disengagement of the locator and of the plate to vary the inclination is difficult to perform if intense friction occurs between them owing to the fact that the leg rests on the quarter.

French patent no. 2,020,726 discloses a ski boot that is composed of a shell to which a quarter is articulated, a flexible flap being associated with said quarter in a rear region and having a tooth that is directed towards the facing shell and can be selectively arranged in a seat or in one of a plurality of separate seats formed longitudinally with respect to a plate that is rigidly coupled to the rear of the shell.

However, even this solution has drawbacks: first of all it is not easy to activate for the user, like the previous ones, since it is not always easy to correctly position the tooth in the desired seat while wearing the boot; moreover, the possible presence of snow or ice at the seats can make very difficult to extract and insert the pivot from and in the seats; furthermore, the activation of the flap is even more difficult while wearing the boot, since the skier tends to rotate the quarter backwards because he must bend down to grip said flap, consequently producing intense pressure on the tooth and therefore making it more difficult to extract it.

German patent no. 28 07 371 discloses a device for adjusting the quarter with respect to the shell of a ski boot, which is constituted by an eccentric element that is rotatably associated at the quarter and interacts on an adapted support that protrudes to the rear of the shell in the region that lies below the lower edge of the quarter.

Even this solution has some of the above-mentioned drawbacks, since the activation of the eccentric element by means of a knob is not easy for the user because this operation is usually performed while the quarter rests on the shell, and this, owing to the friction that occurs, makes very difficult, if not impossible, to turn the eccentric element and therefore change function.

In any case, this solution can allow either a different backward rotation of the quarter or a different forward inclination thereof by varying the position of the eccentric element with respect to the support.

US patent no. 4,499,676 discloses a ski boot that comprises a device for locking the quarter with respect to the shell, constituted by a lever that is transversely associated at the quarter and is adapted, at one end, to engage an adapted abutment element that protrudes to the rear of the shell.

Even this solution has some of the above-mentioned drawbacks, since activation of the lever may be difficult since it is performed, for example to allow walking, when said lever interacts with the abutment element and is forced thereon by the position that the skier assumes to activate said lever.

US patent no. 4,934,075 discloses a ski boot with a device for controlling the angular position of the quarter with respect to the shell, said device being substantially constituted by a knob that is rotatably associated to the rear of the quarter and has, at the end of a stem that is directed towards the shell, an eccentric plate that can be selectively

positioned, by means of a lever provided with an eccentric element, in an adapted seat formed on the shell.

Even this solution has some of the above-mentioned drawbacks, since the knob must be activated while a load is being applied by the quarter to the plate, and therefore with difficulty in activation; said knob furthermore entails, for its correct activation, low tolerances as regards the seat formed on the shell; said seat is instead subjected to considerable stress during sports practice and is therefore subjected to deformations or breakages that hinder the adjustment action.

European patent EP 0 521 282 A1 discloses a ski boot that is provided with a knob-like device that is rotatably associated to the rear of the quarter and has, inside said quarter, a stem that has an end which is shaped so as to form inclined planes and interacts with a pawl that is transversely pivoted to the quarter and oscillates in contrast with a spring that is adapted to push said pawl at an abutment element formed on the shell.

Even this solution has some of the above-mentioned drawbacks, since the knob is activated while the skier is resting the quarter on the shell at the rear, and this in practice blocks the end of the pawl at the abutment formed on the shell; the inclined-plane shape of the stem of the knob is not sufficient to change this situation.

The aim of the present invention is to solve the described technical problems by eliminating the drawbacks of the prior art, by providing a device which, when applied to a shoe, allows the user to rapidly and easily achieve the desired adjustment of the angular position of the quarter with respect to the shell.

Within the scope of this aim, an important object is to provide a device in which the desired angular interaction between the quarter and the shell can be achieved without forcing the user to keep a specific position.

Another important object is to provide a device in which the user can preset the desired degree of interaction between the quarter and the shell with a simple and easy operation, regardless of the previously assumed or current mutual arrangement of the quarter and of the shell.

Another object is to provide a device that is structurally simple and can also be applied to conventional shoe.

Another object is to provide a device that is constructively simple.

Another object is to provide a device that is reliable and safe in use and does not require particular maintenance or particular skill on the part of the user to activate it.

This aim, these objects, and others which will become apparent hereinafter are achieved by a device as claimed in the accompanying claims.

Further characteristics and advantages of the invention will become apparent from the detailed description of a particular but not exclusive embodiment, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is an exploded view of the components of the device;

figure 2 is a sectional view of the device, taken along a longitudinal median plane;

figure 3 is a sectional view, taken along the plane III-III of figure 2, in the condition in which the rotation of the quarter with respect to the shell is blocked;

figure 4 is a view, similar to the preceding one, of the condition in which the device is activated by the user to achieve a condition for easy walking;

figure 5 is a view, similar to the preceding one, of the achievement of the easy-walking condition after tilting the quarter;

figures 6 and 7 are views, similar to figure 5, of the walking condition;

figure 8 is a view, similar to figure 3, of the user's setting of a condition of controlled tilt of the quarter with respect to the shell;

figure 9 is a view, similar to the preceding one, of the achievement of this condition after tilting the quarter;

figure 10 is a view, similar to the preceding one, of the forward flexing condition that can be achieved by the quarter with respect to the shell;

figure 11 is a partially sectional rear perspective view of the application of the device to a shoe;

figure 12 is a sectional view, taken along the plane XII-XII of figure 3;

figure 13 is a sectional view of a component of the device;

figure 14 is a partially sectional side view of the device;

figure 15 is a sectional view of the device, taken along the plane XV-XV of figure 14;

figure 16 is a view, similar to figure 14, in which the eccentric element has loaded the spring;

figure 17 is a view, similar to the preceding one, of the condition in which the quarter is arranged vertically;

figure 18 is a view, similar to figure 14, of a second embodiment;

figure 19 is a plan view of the swivelling element;

figure 20 is a sectional view, taken along the plane XX-XX of figure 18;

figure 21 is a sectional view, taken along the plane XXI-XXI of figure 18;

figure 22 is an exploded perspective rear view of the device of figure 18;

figure 23 is a longitudinal section view according to the line XXIII-XXIII of figure 22;

figure 24 is an exploded perspective view of a device according to a further aspect of the invention;

figure 25 is a side section view of the device of figure 24;

figure 26 is a rear view of the device of figure 24;

figure 27 is a section view according to line XXVII-XXVII of figure 25;

figure 28 is a section view according to line XXVIII-XXVIII of figure 25;

figure 29 is a side view of the device of figure 24.

With reference to the above figures, the reference numeral 1 designates the device for adjusting the position of a quarter 2 with respect to a shell 3 of a sports shoe 4 such as for example a ski boot, a skate, or an ice or trekking boot.

The device comprises first means which are constituted by a first body 5 that is associated to the rear of the quarter 2 of sports shoe 4 by means of adapted fixing elements, such as for example first rivets 6, which can be placed at adapted first seats 7 formed on said first body 5.

Said body 5 is in turn constituted by a support 8 on which a second seat 9 is formed; said second seat 9 is circular in plan, comprises a first axial hole 10, and has a first flat base 11 that affects approximately half of the extension of the support 8 and surrounds in a ring-like fashion the first hole 10.

The first flat base 11 is then connected to a second flat base 12 which is located on a plane that is parallel to the plane of the first flat base 11 and lies below it.

A cylindrical sleeve 13 can be placed at the second seat 9 coaxially to the first hole 10 and affects part of the first flat base 11; a toothed ring 14 is radially associated with said sleeve and can be rotatably arranged on the second flat base 12 of the second seat 9.

Said toothed ring 14 has, in plan view, the shape of a sector that covers less than 180° so that it can oscillate with respect to the axis of the first hole 10 in the seat formed by the second flat base 12.

The toothed ring 14 furthermore has, at the curved edge 15 of the upper flat surface 16 that lies above said toothed ring 14, a first tab 17 which is also curved and protrudes in the opposite direction with respect to the toothed ring 14.

The first body 5 is furthermore constituted by a knob 18 which has a substantially circular shape in plan view and has a second axial hole 19 that allows, by using a first pivot 20, rotary coupling to the sleeve 13 and, through the first hole 10, to the first base 11.

A lever 21 protrudes radially from the knob 18, is allowed to perform an angular movement of less than 180°, as described hereafter, and is slideable on an underlying second tab 22 that protrudes radially with respect to the first base 11.

The knob 18 is internally hollow so as to form a third annular seat 23 for a flexible element such as a first cylindrical helical compression spring 24.

Said first spring 24 is thus accommodated, once the knob 18 has been associated with the support 8, at the second seat 9 and at the third seat 23, as shown in figures 12 and 2.

The third annular seat 23 has an angular extension of less than 360° and is interrupted by a radial wall 17a inside which the first tab 17 can be slideably placed; in this way, when the knob is rotated the first spring 24 is compressed in the same direction without rotating the toothed ring 14.

Once the knob 18 has been associated with the support 8, the first tab 17 that protrudes above the toothed ring 14 is arranged at the third seat 23; the height of said first tab 17 is such as to constitute, at its ends, an abutment and locator element for the ends of the spring 24, as shown in figure 3.

A third tab 25 furthermore protrudes radially from the knob 18 approximately on the opposite side with respect to the lever 21; multiple fourth seats 26 are formed below said third tab and have a semicircular or trapezium-like cross-section.

A fifth cylindrical seat 27 is formed on the support 8 in a region that lies adjacent to the second seat 9 to accommodate a means for temporarily locking the rotation of the knob 18 with respect to the support 8; said means is constituted by a second spring 28 and by a ball 29 which is compressed by said second spring 28 towards the knob 18: if the ball affects one of the fourth seats 26, a stable arrangement is achieved and is overcome when the knob 18 is rotated further by means of the lever 21.

The first body 5 is constituted not only by the support 8 but also by a dome 30 which is associated with the support 8 at an end that lies adjacent to the second flat base 12; said dome is internally provided with a sixth seat 31 that has, in plan view, the shape of two V's arranged tip to tip; said sixth seat is connected to the second flat base 12 of the second seat 9 of the support 8.

The device 1 is furthermore constituted by second temporary or stable engagement means which are associated with the shell 3; said second means are constituted by a curved plate 32 at the ends of which third holes 33 are formed for connection, by means of adapted second rivets 34, to the rear of the shell 2 in a region that lies below the first body 5.

A fourth tab 36 furthermore protrudes from the plate 32 at right angles to the edge 35 that does not face the first body 5; said fourth tab has a first Portion 37 that lies at right angles to the longitudinal median plane of the first body 5 and is followed, in the opposite direction with respect to the lever 21 that protrudes from the knob 18, by a second portion 38 that is inclined towards the dome 30 and then by a third portion 39 that lies at right angles to the first portion 37 and is also directed towards the dome 30.

A first tooth 40 is associated at the plate 32 and protrudes from said plate in the opposite direction with respect to the shell 3; said first tooth 40 has, in plan view, a preferably square shape with chamfered corners and protrudes at the longitudinal median axis of the first body 5 at a preset distance with respect to the first portion 37 of the fourth tab 36.

The device is furthermore constituted by third means for interaction between the first preselection means, associated with the quarter, and the second engagement means associated with the shell; said third means are constituted by a lever 41 rotatably associated at the dome 30 and having a fourth central hole 42 that acts as seat for an adapted second pivot 43 that passes through a fifth hole 44 formed on the dome 30 and through a sixth hole 45 formed on a base 46 which is adapted to rotatably support the lever 41 and can be associated with the overlying dome 30 by means of the first rivets 6.

The lever 41 is thus rotatably accommodated at the sixth seat 31 formed below the dome 30 and has one end that can be arranged in the region that lies above the second flat base 12 of the second seat 9 of the support 8 and has a complementary set of teeth 47 that meshes with the facing toothed ring 14.

The lever 41 has, on the opposite side, a seventh hole 48 for the engagement of a second tooth 49 that protrudes towards the underlying plate 32. The shape of said second tooth 49 is approximately the same as that of the first tooth 40, and said second tooth can be oscillatably arranged in the interspace between said first tooth 40 and the underlying fourth tab 36 that protrudes from the plate 32.

The rotation of the knob 18 is furthermore limited by a first protrusion 50 and by a second protrusion 51 that extend from the edge of the support 8; the ends of the third tab 25 that protrudes radially with respect to the knob 18 interact with said protrusions.

The use of the invention is as follows: assuming that one begins in the condition shown in figure 3, the quarter 2 is not allowed to oscillate with respect to the shell 3, as the lever 21 is located in an intermediate region of the second tab 22 and the first spring 24 keeps the toothed ring 14 in a mirror-symmetrical condition with respect to the median longitudinal axis of the first body 5; the complementary set of teeth 47 of the lever 41 is coupled to the toothed ring 14 and the lever 47 is, in turn, arranged along the median longitudinal axis of the first body 5 so as to interpose the second tooth 49 between the first tooth 40 and the first portion 37 of the fourth tab 36 that protrudes from the plate 32.

In this way, any attempt to tilt the quarter in one direction or the other is contrasted by the interaction between the first tooth and the second tooth.

If the user wishes to change this situation, he can preselect this change by acting directly and exclusively on the lever 21, as shown in figure 4.

Assume that the user wishes to reach, in this manner, a position in which the quarter freely oscillates with respect to the shell, i.e. reach a condition for optimum walking.

The rotation applied to the lever 21 towards the dome 30 forces, by virtue of the radial wall 17a, the loading of the first spring 24 as said spring abuts, at its other end, against the first tab 17 that protrudes from the toothed ring 14, which instead remains motionless like the lever 41.

The rotation of the knob 18 is limited by virtue of the interaction of the third tab 25 with the first protrusion 50.

Said knob is locked in the selected position by virtue of the engagement of the ball 29, which is pushed by the spring 28, in one of the fourth seats 26.

In this way the user preselects the desired condition which allows him to walk easily.

This condition is achieved automatically when a slight movement is imparted to the quarter by the user since once said user stands up again most of the friction between the first tooth, the second tooth, and the first portion 37 of the fourth tab 36 ceases: accordingly, the first spring 24 has a force that is sufficient to make the toothed ring 14, and accordingly the lever 41, perform an angular movement to as shown in figure 5.

In this manner, the rotation of the lever 41 with respect to the second pivot 43 places the second tooth 49 laterally with respect to the first tooth 40 so as to allow, as shown in figures 6 and 7, the quarter to freely oscillate with respect to the shell without any interaction between the second and third means and thus between the lever 41 and the plate 32.

If the user wishes to select a different condition, for example related to the possibility of flexing the quarter forwards and of providing rear support in case of backward flexing, he merely has

to impart a further rotation to the knob 18 in the opposite direction with respect to the dome 30, as shown in figure 8, passing beyond the intermediate condition in which the quarter and the shell are mutually locked, as shown in figure 3, until the second protrusion 51 abuts against one end of the third tab 25 that protrudes radially from the knob 18.

In this manner, as in the preceding case, the user preselects the desired condition without this maneuver altering in any way the position of the toothed ring 14 and of the lever 41 and thus substantially without having to overcome any friction or force due to interaction between mechanical elements except the force for compressing the first spring 24 by virtue of the radial wall 17a.

The temporary and stable positions of the knob 18 with respect to the support 8 are allowed by virtue of the second spring 28 and of the ball 29; said ball selectively arranges itself at the desired one among the fourth seats 26 formed below the third tab 25.

Going back to the condition shown in figure 8, the user can achieve the desired function automatically simply by moving the quarter with respect to the shell, because it is sufficient to rotate the quarter backwards so as to place the second tooth 49 in the interspace between the first tooth 40 and the first portion 37 of the fourth tab 36 of the plate 32 so that the first spring 24 rotates the toothed ring 14 and therefore the lever 41 rotate until the second tooth 49 is placed adjacent to the third portion 39 of the fourth tab 36.

In this manner, as shown in figures 9 and 10, the quarter is allowed to tilt forward, as the second tooth 49 encounters no obstacles in this direction, whereas a backward rotation of the quarter is followed by a limitation of the stroke when the second tooth 49 interacts with the second portion 38 of the fourth tab 36 of the plate 32 that is rigidly coupled to the shell.

It has thus been observed that the invention has achieved the intended aim and objects, a device having been provided that allows the user to very rapidly and easily preselect one of three possible functions related to the interaction between a quarter and the shell, namely a first function for locking them, a function that allows their mutual free forward and backward oscillation, and a function that allows to tilt the quarter forward but limits its backward rotation.

Activation of the device is very simple, as the user only has to overcome a force constituted by the preloading of the first spring 24 and allow the different placement of the ball 29 in the desired seat of the four seats 26.

The desired and preselected function is achieved automatically when the skier or user stands up again and occurs by imparting a very simple tilt to the quarter that allows the force of the first spring 24 to overcome the residual friction, placing the lever 41 in the appropriate position.

The device is furthermore easy to activate also because it does not require the user to have a direct view of the maneuver that he is about to perform on the knob, as it is sufficient to perceive the click of the spring 29 in the fourth seat 26 to understand that the knob has been positioned appropriately.

The device is of course susceptible to numerous modifications and variations, all of which are within the scope of the same inventive concept.

For example, with reference to figures 14-17, the reference numeral 101 designates the device for adjusting the position of a quarter 102 with respect to a shell 103 of a sports shoe 104, such as for example a ski boot, a skate, or a snow or trekking boot.

A first seat 105 is formed to the rear and longitudinally with respect to the quarter 102, and an adapted containment housing 106 for the device 101 is preferably associated with said first seat.

As an alternative, the device can be associated directly to the rear of the quarter 102; the use of the housing allows better industrialization, since it is possible to preassemble the device inside the housing and then associate the housing with the quarter.

The device 101 comprises first means for preselecting the desired interaction between said quarter 102 and said shell 103; said means are constituted by a knob 107 that is pivoted transversely at a lateral surface 108 of the shell 106; as an alternative, said knob is pivoted directly to the lateral surface of the quarter 102.

The knob 107 is connected to a plate 109 that is arranged inside the lateral surface 108 of the housing or of the quarter and preferably has a circular plan and an eccentric element 110 that protrudes towards the inside of the quarter.

The knob 107 rotates rigidly with the plate 109.

The device also comprises second temporary engagement means, which are associated with said shell 103 and are constituted by an abutment or locator 111 that is formed directly, by means of a reduction in thickness, to the rear of the shell 102 proximate to its edge 112 or is obtained thereat by associating with said shell an adapted plate that has an appropriately shaped surface.

The device also comprises third means for interaction between said first preselection means and said second engagement means, which can be activated by means of a movement imparted to said quarter 102; said third means are constituted by a swivelling element 113 that is preferably shaped like a parallelepiped and is pivoted, so that

it can rotate freely, at a first upper end 114 transversely to the quarter 102 or to the shell 106 by means of an adapted pivot 115.

The swivelling element is therefore accommodated within an adapted second seat 116 formed on the shell or on the quarter.

A flexible element, such as a spring 117, is arranged coaxially to said pivot and is associated, at its ends, with the swivelling element 113 and with the eccentric element 110.

The swivelling element is internally partially hollow so as to allow to accommodate the plate 109 with the eccentric element 110 and the spring 117.

In a first operating position, shown in figure 14, said spring is preloaded so as to force the swivelling element to be adjacent to the facing surface of the shell 102.

The swivelling element also has a third seat 118 that is formed adjacent to its rear surface 120 and is adapted to accommodate said plate, said eccentric element, and said spring if, in a second operating position, the knob 107 is turned so as to load said knob in the opposite direction and thus so as to force the swivelling element to move away from the shell.

The interaction between the first means and the third means occurs by virtue of the engagement of one end of the spring 117 with the eccentric element 110, and the swivelling element 113 has a second lower end 119 that rests, in the skiing condition shown in figure 14, on the abutment or locator 111 formed at the shell 103, so as to produce interaction between the second and third means.

The operation of the device is therefore as follows: in the skiing condition, shown in figure 14, the spring 117 forces the swivelling element 113 to lie adjacent to the shell 103, so that the second lower end 119 of said swivelling element interacts with the abutment or locator 111 provided on said shell 103.

A rotation applied to the knob 107 is matched by an equal rotation applied to the plate 109 and to the eccentric element 110: a rotation through approximately 180° of the eccentric element, shown in figure 15, loads the spring 117 in the opposite direction with respect to the previous one, and therefore the spring tends to move the swivelling element 113 away from the shell 102.

In this situation, the first preselection means are activated to pass from the skiing condition, shown in figure 14, to the walking condition, shown in figure 16. In these conditions the third interaction means are activated again, in that the second lower end 119 of the swivelling element 113 interacts with the abutment or locator 111 provided on the shell 103 by virtue of frictions or loads that prevent the swivelling element from disengaging.

If these friction forces do not occur, or as soon as they are eliminated for example by virtue of a slight forward oscillation of the quarter 102, the swivelling element 113 is forced outward by the spring 117 and is therefore forced to move away from the shell 103: this condition causes, as shown in figure 16, the disengagement of the second lower end 119 with respect to the abutment or locator 111 and therefore allows to arrange the quarter 102 vertically.

It has thus been observed that the invention has achieved the intended aim and objects, a device having been provided that allows the user to very rapidly and easily preselect two separate operating positions for the quarter: an inclined one, allowing free forward oscillation, and a vertical one, allowing free forward and backward oscillation.

Activation of the device is very easy, since the user merely has to overcome a force that is constituted by the preloading of the spring 117.

The desired and preselected function is achieved automatically once the skier or the user has stood up again after appropriately turning the knob 107.

Furthermore, activation of the device is simple also because it does not require the user to directly view the maneuver that he is about to perform on the knob. The device is furthermore very simple and cheap.

Figures 18 to 21 illustrate a second embodiment for a device 201 that is adapted to adjust the position of a quarter 202 with respect to a shell 203 of a sports shoe.

The device 201 is again preferably associated at an adapted housing 206 or, as an alternative, directly with the quarter 202.

The first means for preselecting the desired interaction between the quarter and the shell are again constituted by a knob 207 that is transversely pivoted at a lateral surface 208 of the housing 206 or directly to the lateral surface of the quarter 202.

In this case, too, the knob is rotatably rigidly coupled to a plate 209 that lies inside the housing 206; an eccentric element 210 protrudes inside said housing from said plate.

The device again comprises second means for temporarily engaging the shell 203 which are constituted by an abutment or locator 111 that is formed directly to the rear of the shell 203, proximate to its edge 212, or by means of an adapted and appropriately shaped plate associated with said shell.

The device also comprises third means for interaction between said first preselection means and said second engagement means that can be activated by means of a movement applied to said quarter 202; said third means are constituted by a

swivelling element 213 that is freely rotatably pivoted, at a first upper end 214, transversely to the quarter 202 or to the housing 206 by means of an adapted pivot 215.

A flexible element, such as a spring 217, is arranged coaxially to said pivot, and its tips are associated with the swivelling element 213.

Differently from the solution described above, a tab 221 is interposed between the ends of said spring 217 and is monolithic with the swivelling element 213: the interposition of said tab between the ends of the spring preloads said spring.

Accordingly, by turning the knob, and therefore the eccentric element, one acts on one of the ends of the spring 217, so as to increase its load, achieving the same effect described in the previous embodiment.

Furthermore, by initially preloading the spring 217 it is possible to eliminate plays among the various components.

This solution, too, therefore achieves the intended aim and objects, furthermore allowing to eliminate plays among the various components.

Figures 24-29 show a device 301 according to a further aspect of the invention. Device 301 is similar to device 201, and includes a housing 306 associated with the quarter 302 and having a knob, or grip, 307. Knob 307 is associated with a plate 309 having an eccentric element 310.

Pivot 315 connects a swivelling element 313 to the housing 306. The swivelling element 313 has a second pivot 325 connected to the eccentric element 310 by a helicoidal spring 217.

The spring 217 is shorter than the distance between the eccentric element 310 and pivot 325 so that even when the quarter is in one of the two preset positions, as previously described, for either walking or skiing, the spring is always tensioned.

By rotating the eccentric element 310 through 180°, by means of the knob 307, the spring 317 is positioned opposite to the position shown in figure 25, considering as axis of simmetry the axis between pivot 315 and the center of rotation of plate 309.

The spring 317 will then bias the swivelling element 313 either outwardly or inwardly, depending on the position of the spring with respect of the axis of simmetry, respectively in the walking position or in the skiing position.

In both positions, the eccentric element 310 is locked by the knob 307 which is locked on the quarter. The lower end of spring 317 is fixed to pivot 325 which, moving together with the swivelling element 313, may rotate about pivot 215. This happens when the user moves the quarter allowing the swivelling element 313 to engage the shell 303 in the skiing position, or disengage the shell, in the walking position.

Device 301 requires a minimum effort because the knob 307 has to be moved by 90° while the remaining 90° are covered by the force of the spring. In fact, when the eccentric element 310 is on the axis between pivots 315 and 325, a minor movement either to the right or left will automatically turn the eccentric element 310 because of the tensioned spring 317.

Device 301 is also an effective safety device against unwanted movements of knob 307 because knob 307 is always biased in either positions by the tension of the spring 317.

The materials and the dimensions that constitute the individual components of the device may of course be the most pertinent according to the specific requirements.

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 scope of each element identified by way of example by such reference signs.

Claims

1. Device for adjusting the position of a quarter with respect to the shell of sports shoe, characterized in that it comprises first means (1), associated with said quarter, for preselecting the desired interaction between said quarter and said shell, second engagement means (32) associated with said shell, and third means (41) for interaction between said first preselection means (1) and said second engagement means (32) which can be activated when said quarter is moved.

2. Device according to claim 1, characterized in that said third means (41) for interaction between said first preselection means (1) and said second engagement means (32) can be activated with no contact between said third means (41) and said second engagement means (32).

3. Device according to claim 2, characterized in that said first means (1) are constituted by a first body (5) which is associated to the rear of said quarter of said sports shoe by means of adapted fixing elements such as first rivets (6) which can be placed at adapted first seats (7) formed on said first body (5), said first body (5) being constituted by a support (8) on which a second seat (9) with a circular plan is formed, said seat comprising a first axial hole (10).

4. Device according to claim 3, characterized in that said second seat (9) has a first flat base (11) that affects approximately half of the extension of said support (8) and surrounds said first hole (10) in a ring-like fashion, said first flat base being connected to a second flat base (12) which is located on a plane that is parallel to, and lies below, the plane of said first flat base.

5. Device according to claim 4, characterized in that a cylindrical sleeve (13) can be located at said second seat (9) coaxially to said first hole (10) and so as to affect part of said first flat base (11), a toothed ring (14) being radially associated with said sleeve (13), said ring (14) being rotatably arranged on said second flat base (12) of said second seat (9).

6. Device according to claim 5, characterized in that said toothed ring (14) has, in plan view, the shape of a sector that covers an angle of less than 180° so that it can oscillate around the axis of said first hole (10) in the seat formed by said second flat base (12).

7. Device according to claim 6, characterized in that said toothed ring (14) has, at the curved edge of the upper flat surface that lies above said toothed ring, a first tab (17) that is also curved and protrudes in the opposite direction with respect to said toothed ring.

8. Device according to claim 7, characterized in that said first body (5) is also constituted by a knob (18) which has a substantially circular shape in plan view and has a second axial hole that allows, by means of a first pivot (20), rotatable coupling to said sleeve (13) and, through said first hole (10), to said first base (11).

9. Device according to claim 8, characterized in that a lever (21) protrudes radially from said knob (18), is allowed to perform an angular movement of less than 180°,and is slideable on an underlying second tab (22) that protrudes radially with respect to said support (8).

10. Device according to claim 9, characterized in that said knob (18) is internally hollow so as to form a third annular seat (23) for a flexible element such as a first cylindrical helical compression spring (24).

11. Device according to claim 10, characterized in that once said knob (18) has been associated with said support (8), said first spring (24) is accommodated at said second and third seats (9,23).

12. Device according to claim 11, characterized in that said third annular seat (23) has an angular extension of less than 360° and is interrupted by a radial wall (17a) inside which said first tab (17) can be slidingly arranged so that when said knob (18) is rotated said first spring (24) is compressed in the same direction without rotating said toothed ring (14).

13. Device according to claim 12, characterized in that once said knob (18) has been associated with said support (8), said first tab (17) which protrudes above said toothed ring (14) is arranged at said third seat (23), and in that the height of said first tab (17) is such that it constitutes, at its ends, an abutment and locator element for the ends of said first spring (24).

14. Device according to claim 13, characterized in that a third tab (25) protrudes radially from said knob (18) approximately on the opposite side with respect to said lever (21), a plurality of fourth seats (26) being formed below said third tab (25), said seats being shaped like a semicircle or a trapezium in cross-section.

15. Device according to claim 14, characterized in that a fifth cylindrical seat (27) is formed on said support (8) in a region that is adjacent to said second seat (9), said fifth seat (27) accommodating a means (28,29) for temporarily locking the rotation of said knob (18) with respect to said support (8).

16. Device according to claim 15, characterized in that said means is constituted by a second spring (28) and by a ball (29) which is compressed by said second spring towards said knob (18), said ball temporarily affecting one of said fourth seats (26).

17. Device according to one or more of the preceding claims, characterized in that said first body (5) comprises a dome (30) that is associated with said support (8) at an end that is adjacent to said second flat base (12), said dome (30) being internally provided with a sixth seat (31) that has, in plan view, the shape of two V's arranged tip to tip and is connected to said second flat base (12) of said second seat (9) of said support (8).

18. Device according to one or more of the preceding claims, characterized in that said sec-

ond engagement means associated with said shell are constituted by a curved plate (32) at the ends whereof third holes (33) are formed for connection, by means of adapted second rivets, to the rear of said shell in a region that lies below said first body (5).

19. Device according to claim 18, characterized in that a fourth tab (36) protrudes from said plate (32) at right angles to the edge that does not face said first body (5), said fourth tab (36) having a first portion (37) that lies at right angles to the median longitudinal plane of said first body, said first portion being followed, in the opposite direction with respect to said lever (21) that protrudes from said knob (18), by a second portion (38) which is tilted towards said dome (30) and then by a third portion (39) that lies at right angles to said first portion and is also directed towards said dome.

20. Device according to claim 19, characterized in that a first tooth (40) is associated at said plate (32) and protrudes therefrom in the opposite direction with respect to said shell, said first tooth (40) having, in plan view, a preferably square shape with chamfered corners and protruding at the longitudinal median axis of said first body (5) at a preset distance with respect to said first portion (37) of said fourth tab (36).

21. Device according to one or more of the preceding claims, characterized in that said third means (41) are constituted by a lever that is rotatably associated at said dome (30), said lever (41) having a fourth central hole (42) which acts as seat for an adapted second pivot (43) that passes through a fifth hole (44) formed on said dome and through a sixth hole (45) which is formed on a base (46) that is adapted to rotatably support said lever and is associated with said overlying dome by means of said first rivets.

22. Device according to claim 21, characterized in that said lever (41) is rotatably accommodated at said sixth seat (31) formed below said dome (30), said lever (41) having one end which is arranged in the region that lies above said second flat base (12) of said second seat (9) of said support (8) and having a complementary set of teeth (47) that engages said facing toothed ring (14).

23. Device according to claim 22, characterized in that said lever (41) has, on the opposite side, a seventh hole (48) for the engagement of a second tooth (49) that protrudes towards said underlying plate (32), said second tooth (49) having approximately the same shape as said first tooth (40) and being oscillatably arrangeable in the interspace between said first tooth (40) and said underlying fourth tab (36) that protrudes from said plate (32).

24. Device according to claim 23, characterized in that the rotation of said knob (18) is limited by a first protrusion (50) and a second protrusion (51) that extend from the edge of said support (8), the ends of said third tab (25) that protrudes radially from said knob (18) interacting with said first and second protrusions.

25. Device according to claim 1, characterized in that a first seat (105) is formed to the rear and longitudinally with respect to said quarter (102,202,302), an adapted containment housing (106,206,306) for said device being associated with said first seat.

26. Device according to claim 1, characterized in that said first means for preselecting the desired interaction between said quarter and said shell comprises a knob (107,207,307) connected to a plate having an eccentric element protruding from said plate (109).

27. Device according to claim 26, characterized in that said knob (107) rotates rigidly with said plate (109).

28. Device according to claim 27, characterized in that said second temporary engagement means comprises an abutment (111) formed on said shell.

29. Device according to one or more of the preceding claims, characterized in that said third means comprises a swivelling element (113,213,313) pivoted to either said quarter or said shell.

30. Device according to claim 29, characterized in that said swivelling element is accommodated within an adapted second seat formed either on said housing or on said quarter.

31. Device according to claim 30, characterized in that a flexible element, such as a spring (117,217), is arranged coaxially to said pivot, said spring being associated with said swivelling element and with said eccentric element at its ends.

32. Device according to claim 31, characterized in that said swivelling element (113,213) is inter-

nally partially hollow so as to allow to accommodate said plate with said eccentric element and said spring.

33. Device according to claim 32, characterized in that in a first operating position said spring is loaded so as to force said swivelling element to lie adjacent to the facing surface of said shell.

34. Device according to claim 33, characterized in that said swivelling element (113) has a third seat that is formed adjacent to its rear surface and is adapted to accommodate said plate (109), said eccentric element, and said spring if, in a second operating position, said knob (107) is turned so as to load said spring in the opposite direction and thus so as to force the movement of said swivelling element away from said shell.

35. Device according to claim 34, characterized in that the ends of said spring are arranged between a tab that is monolithic with said swivelling element and is adapted to preload said spring.

36. Device according to claim 1, characterized in that it comprises retention means that are rotatably associated with said quarter and temporarily engage locking means that are associated with said shell in order to limit the backward oscillation of said quarter, said device also comprising an actuator that is associated with said quarter and can be activated by means of an external actuation element, said actuator interacting with a mechanical energy accumulator that is operatively connected to said retention means, the activation of said actuator loading said accumulator (117,217,317) with mechanical energy, said mechanical energy being transferred to said retention means for disengagement from said locking means.

37. Device, according to claim 1, characterized in that said first means comprises a swivelling element (313) pivoted to said quarter (302), said second means comprises an abutment formed on said shell (303), said third means comprises a knob (307) associated with a plate (309) and adapted to operate a spring (317), said spring being adapted to bias said swivelling element (313) in either a position of engagement of said abutment or in a position of disengagement from said abutment.

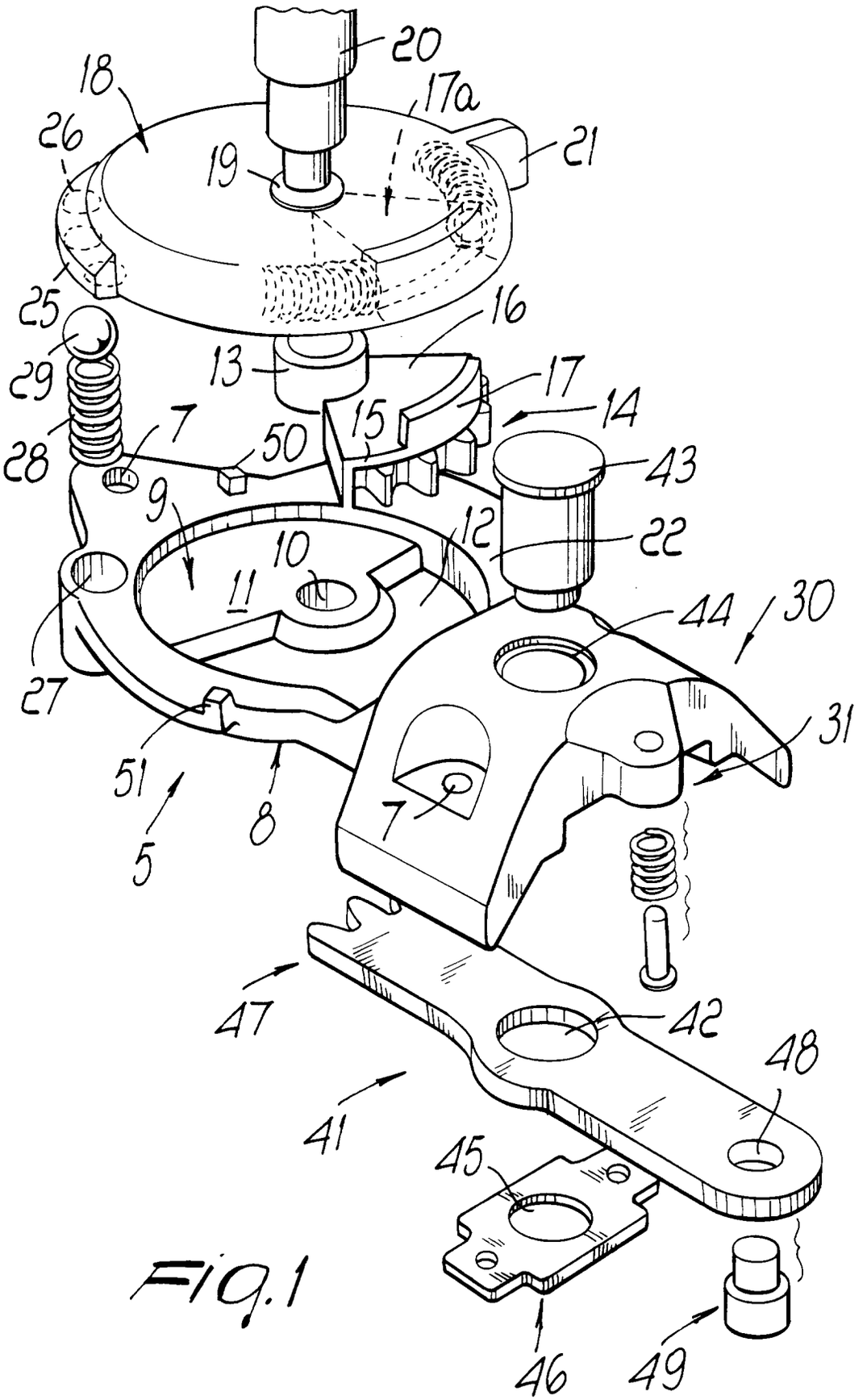
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FIG.1

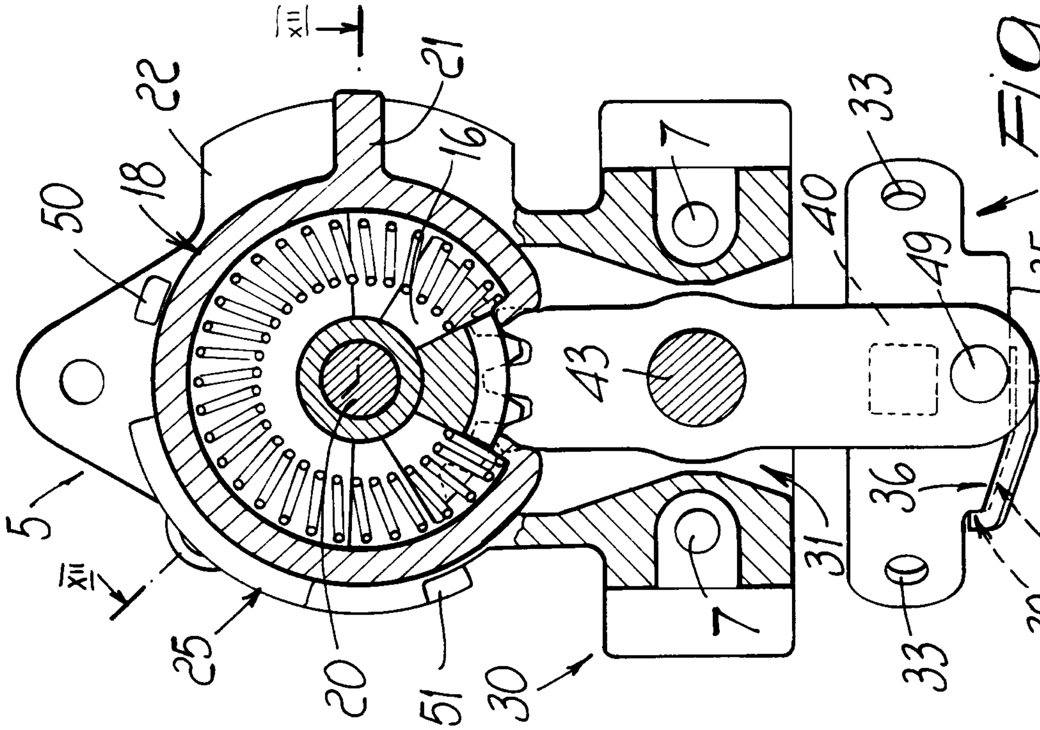

FIG. 3

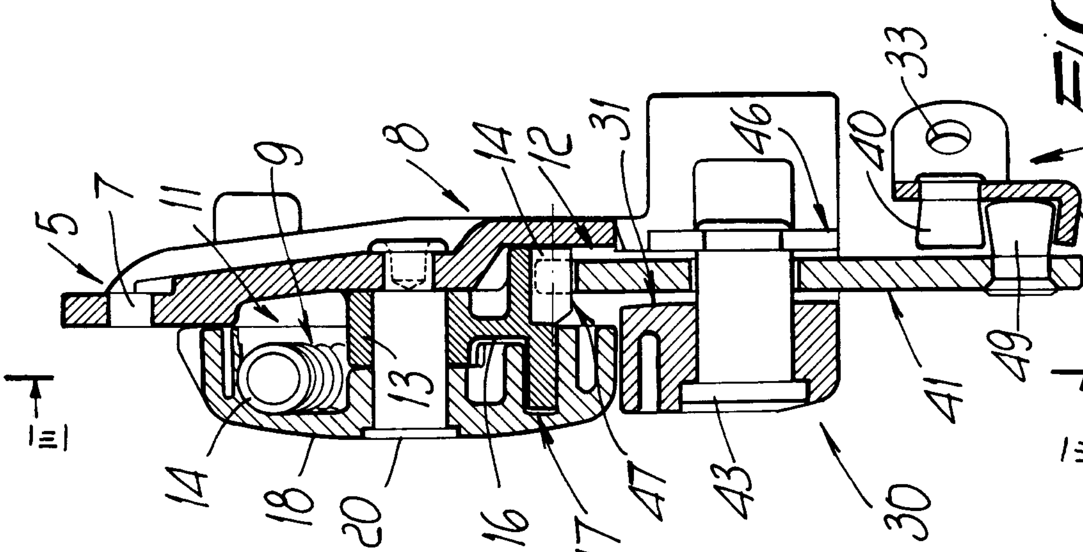

FIG. 2

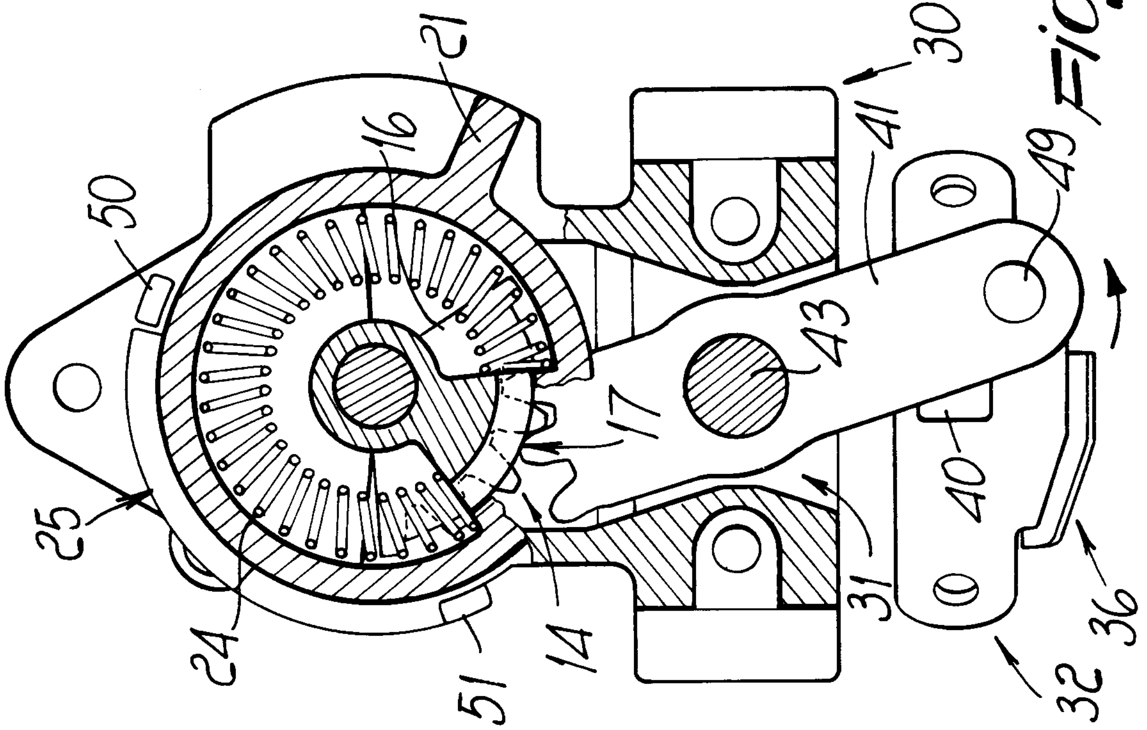

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Fig.5

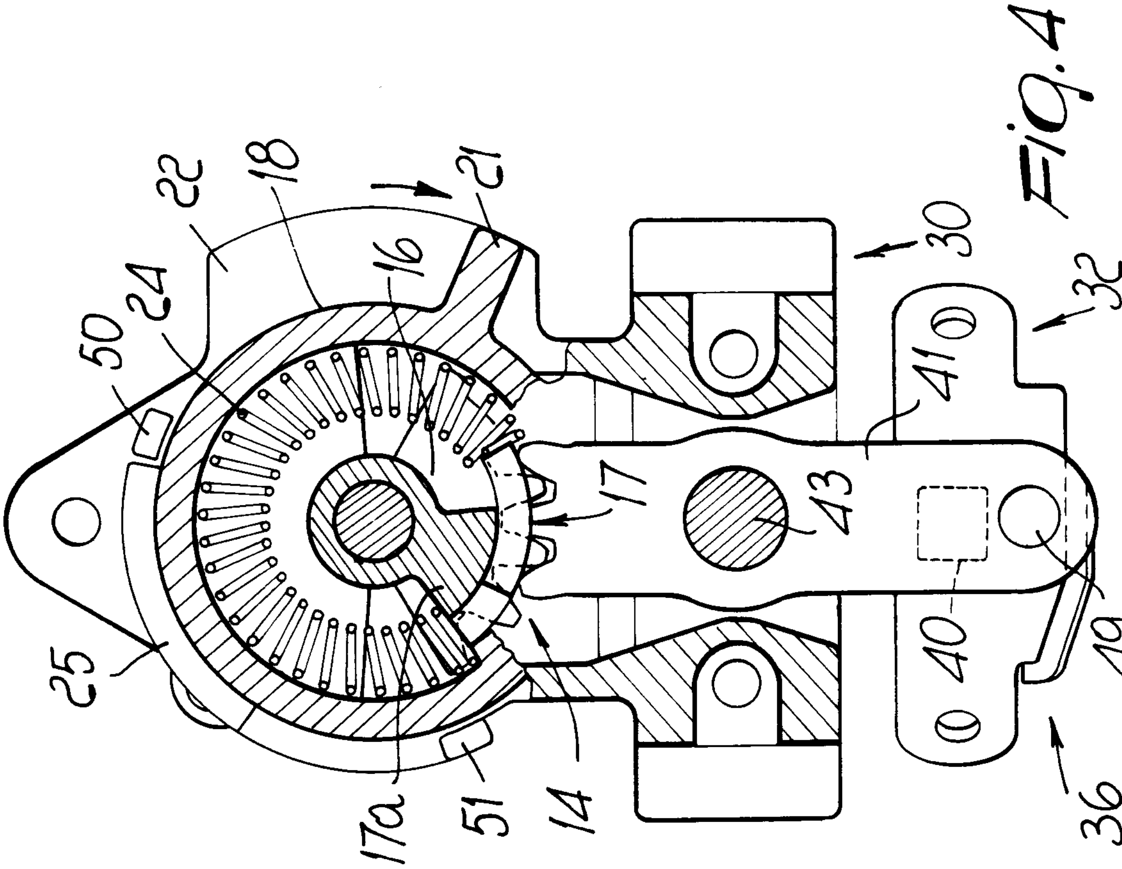

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Fig.4

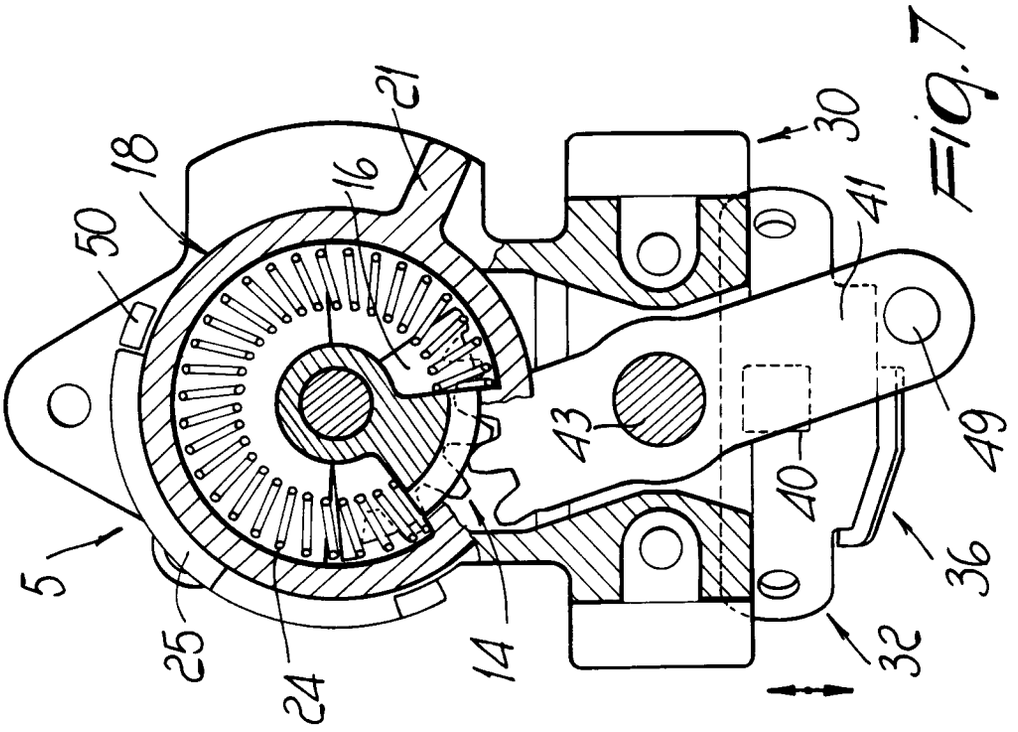
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Fig. 7

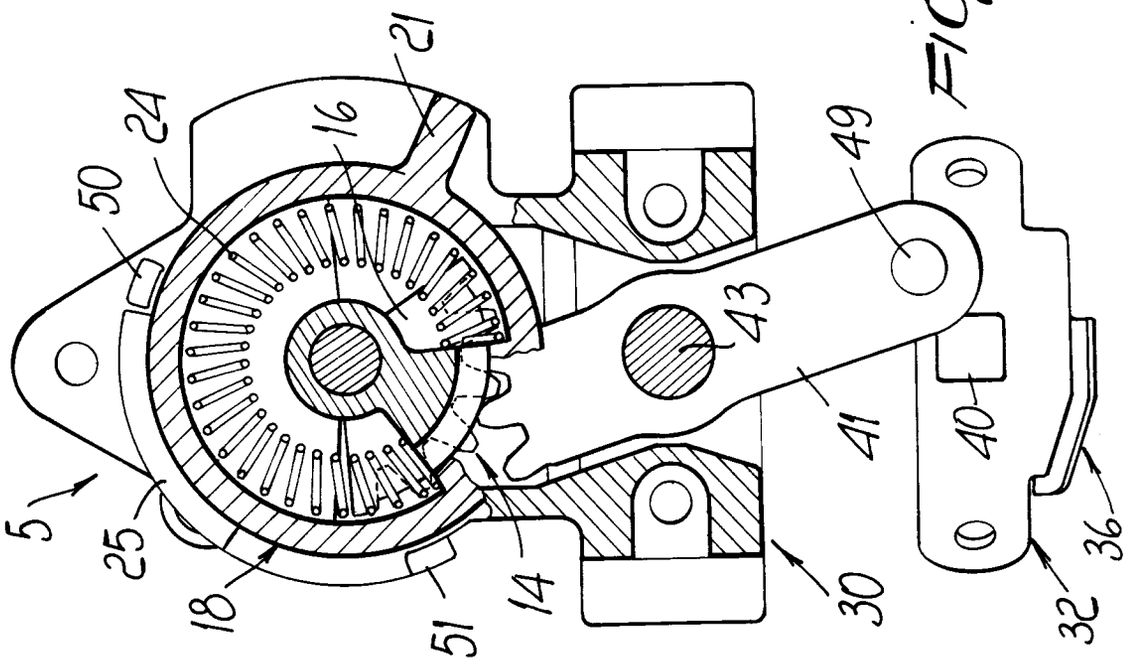
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Fig. 6

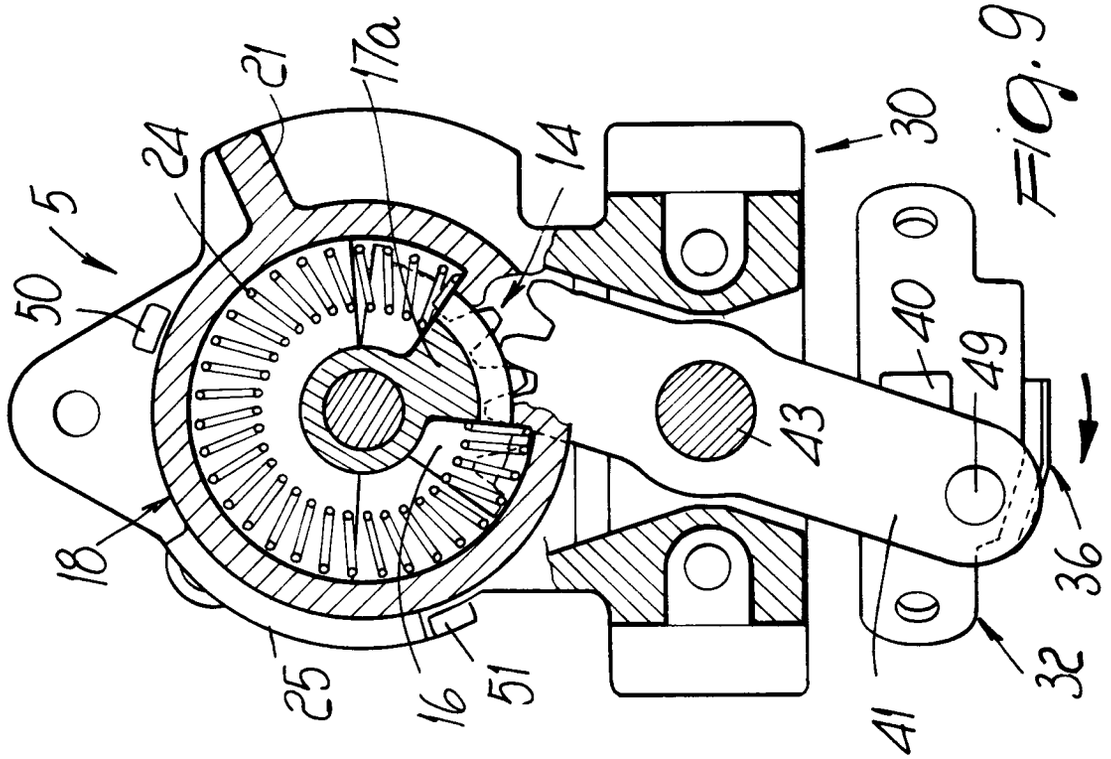
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FIG. 9

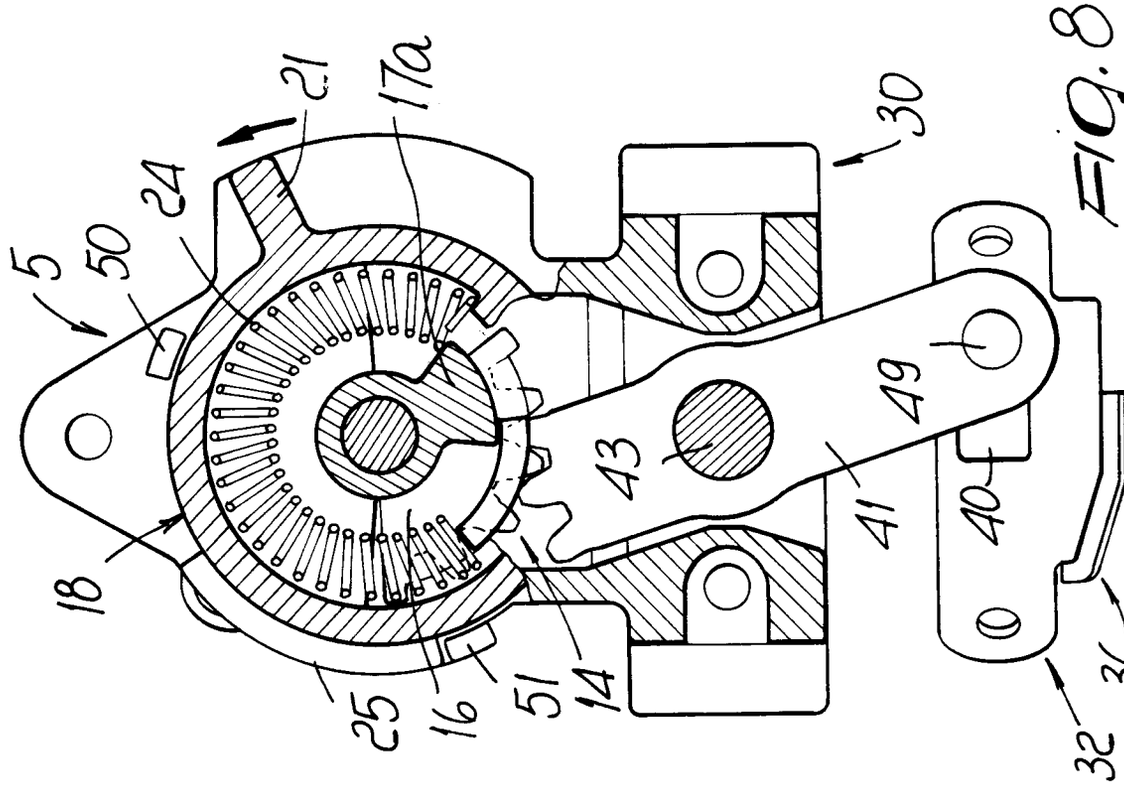
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FIG. 8

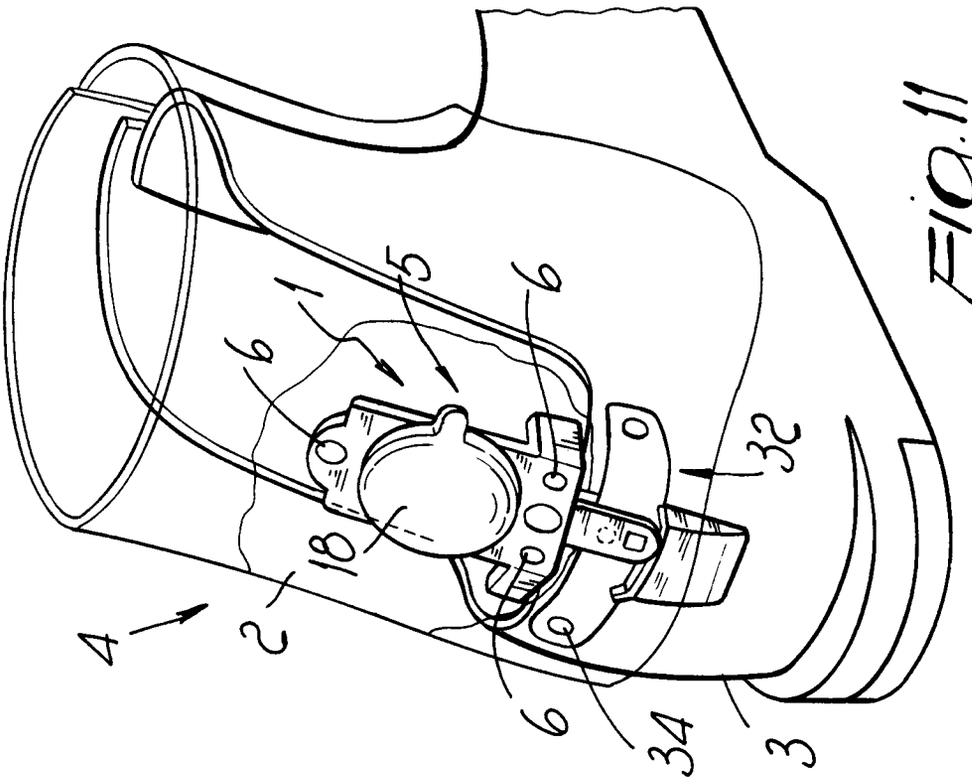
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Fig.11

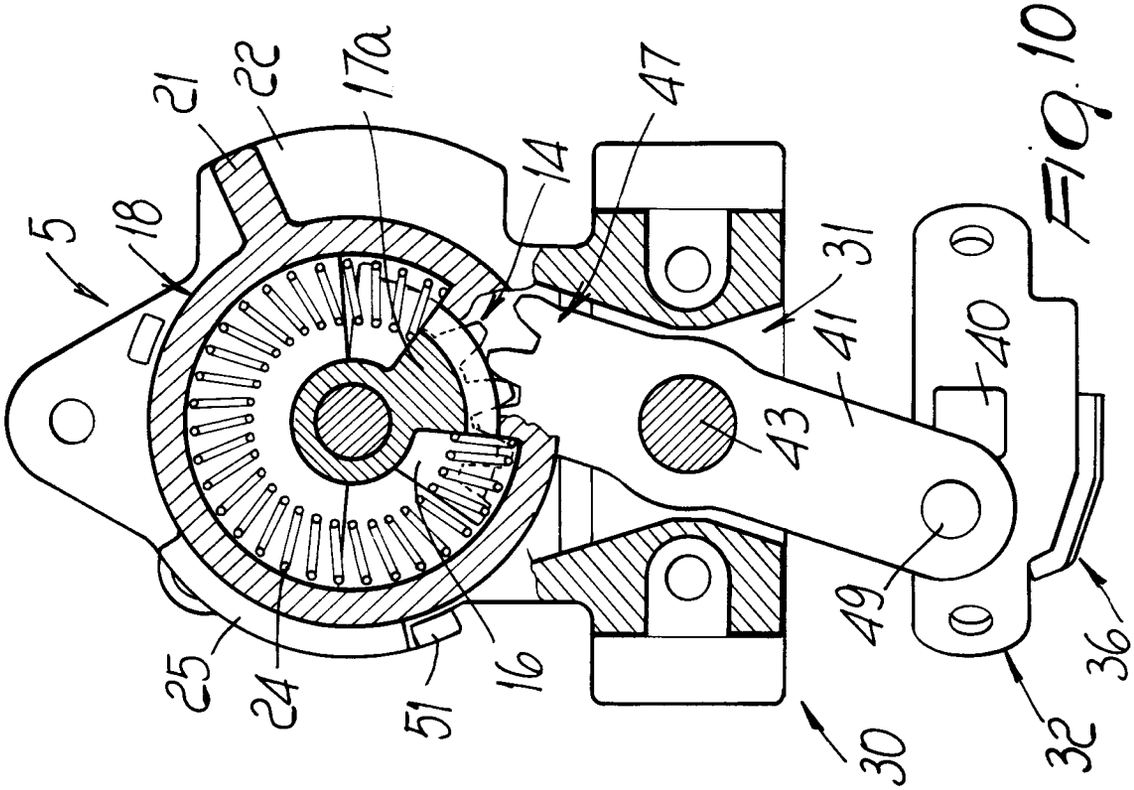
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Fig.10

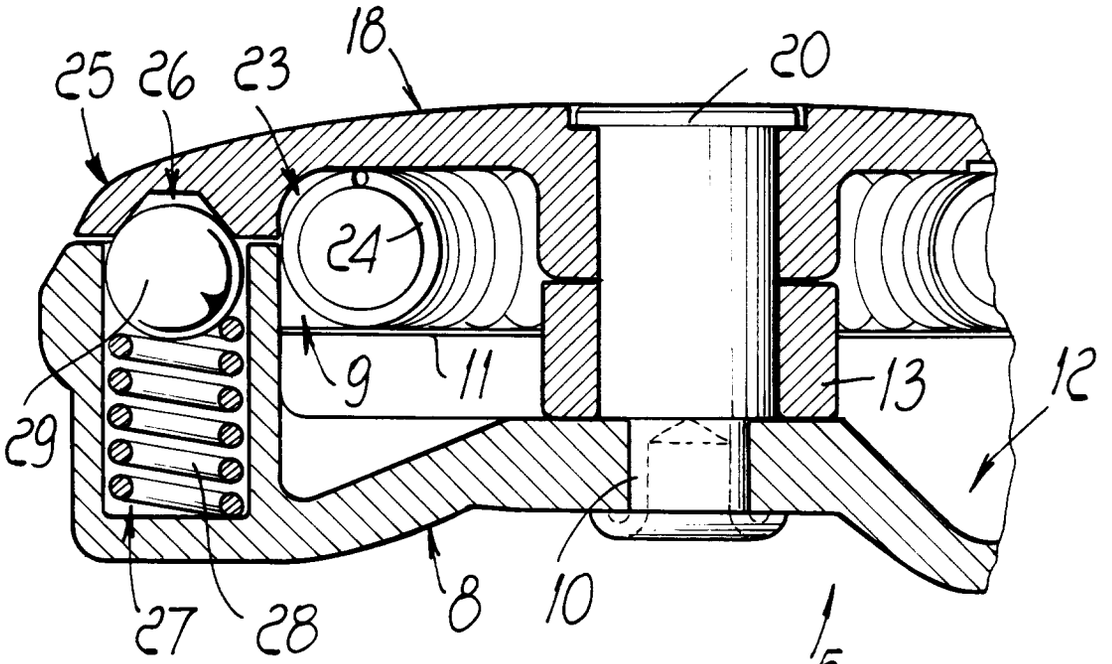

FIG. 12

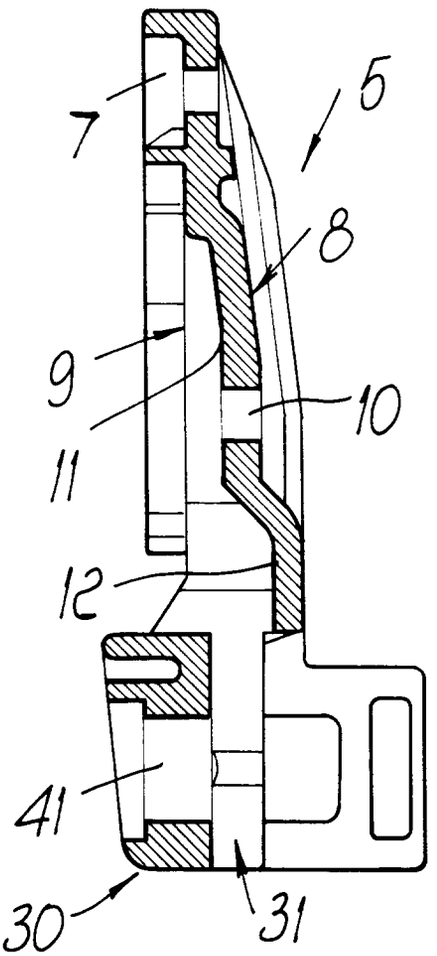

FIG. 13

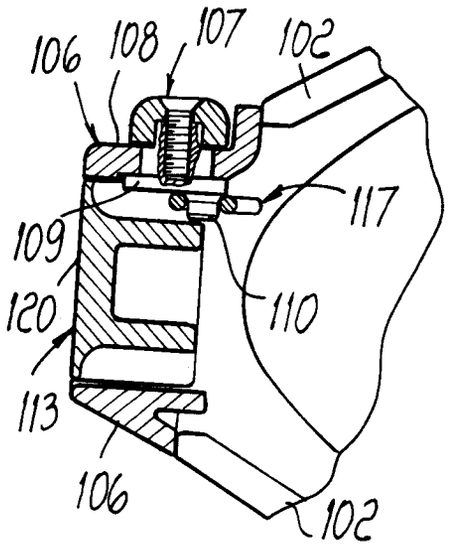
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Fig.15

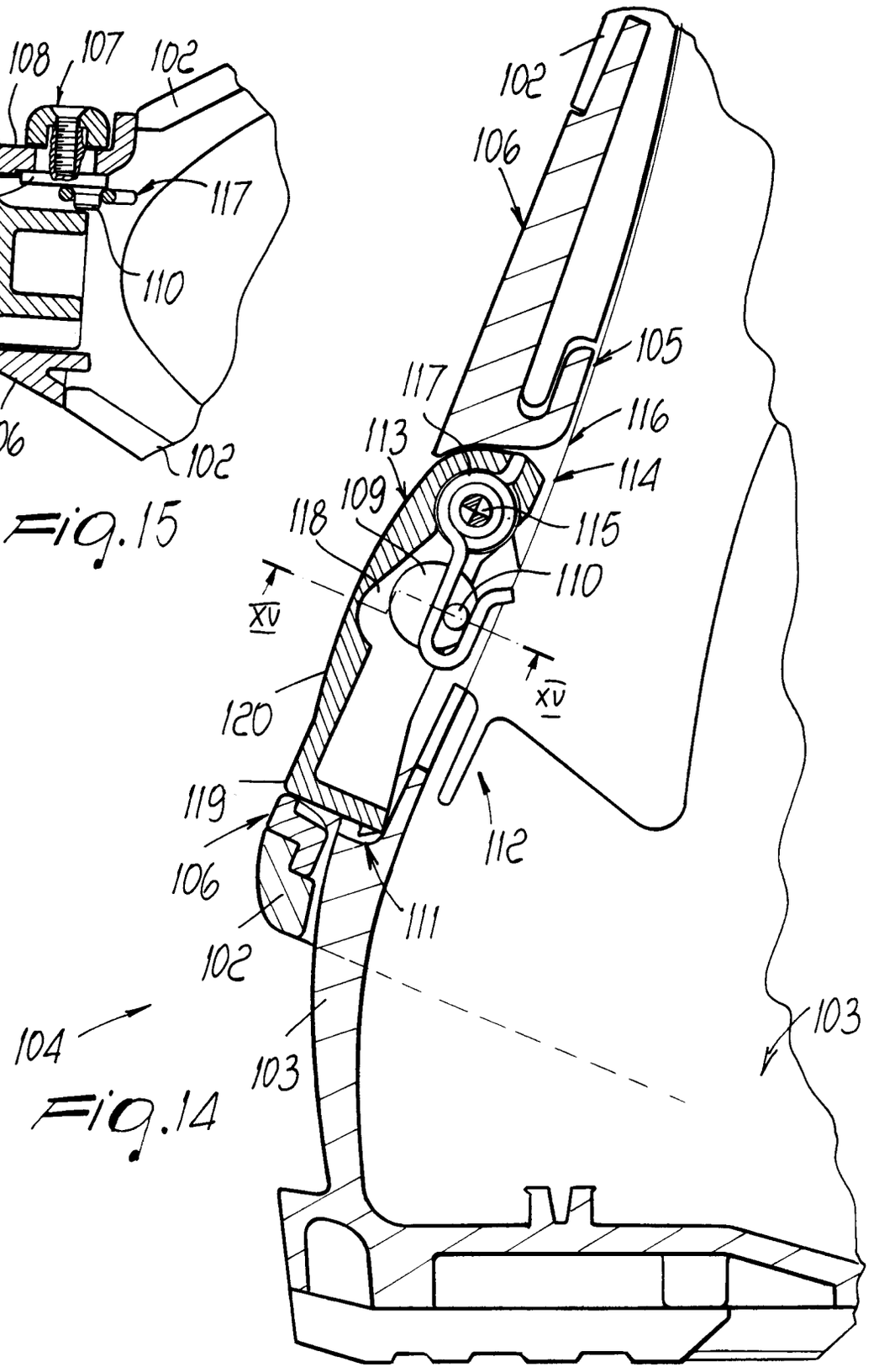
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Fig.14

Fig. 17

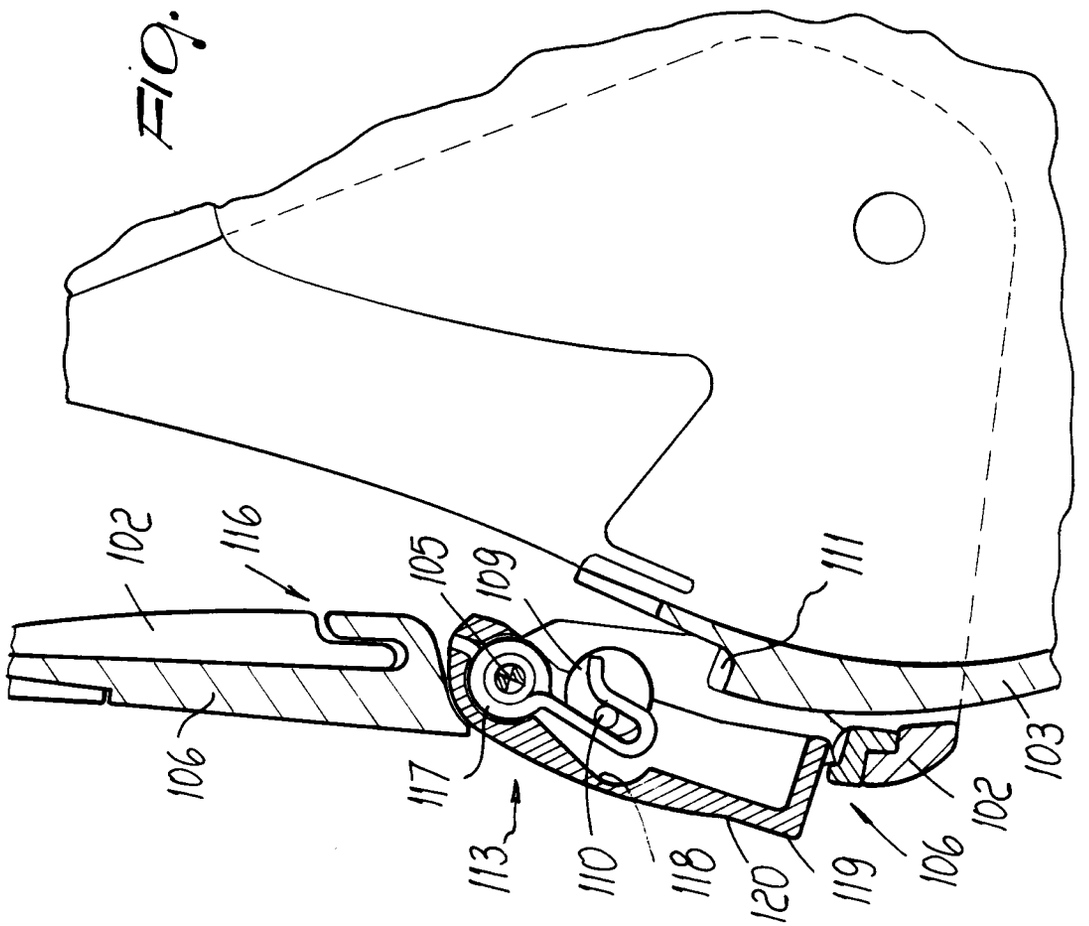
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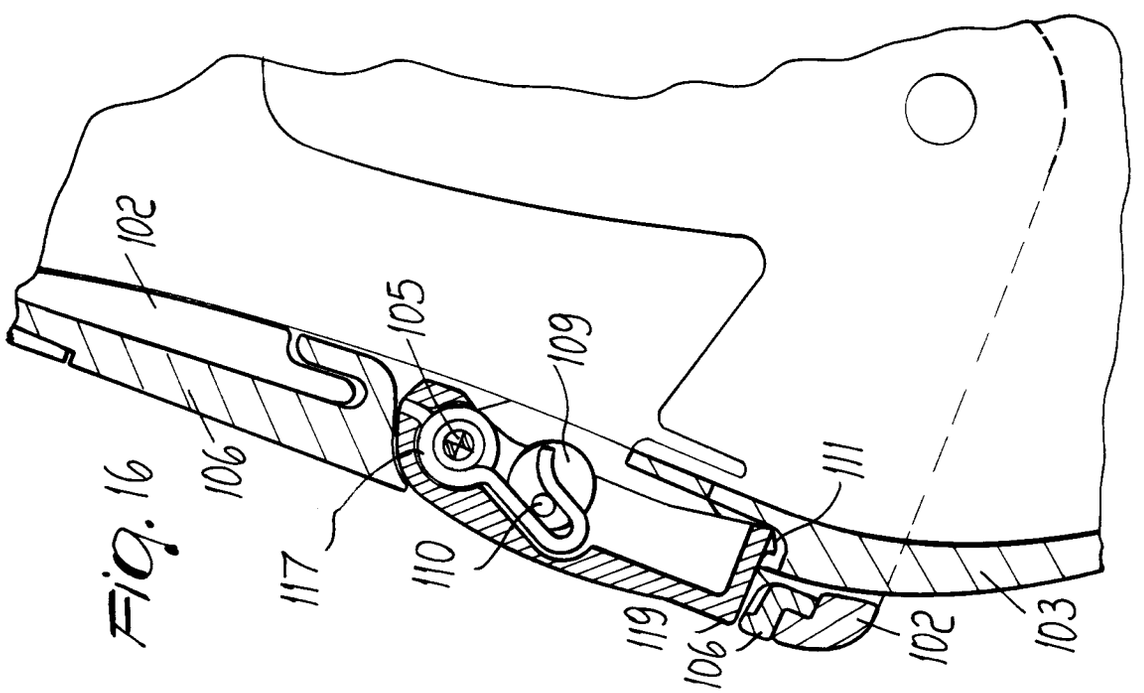
Fig. 16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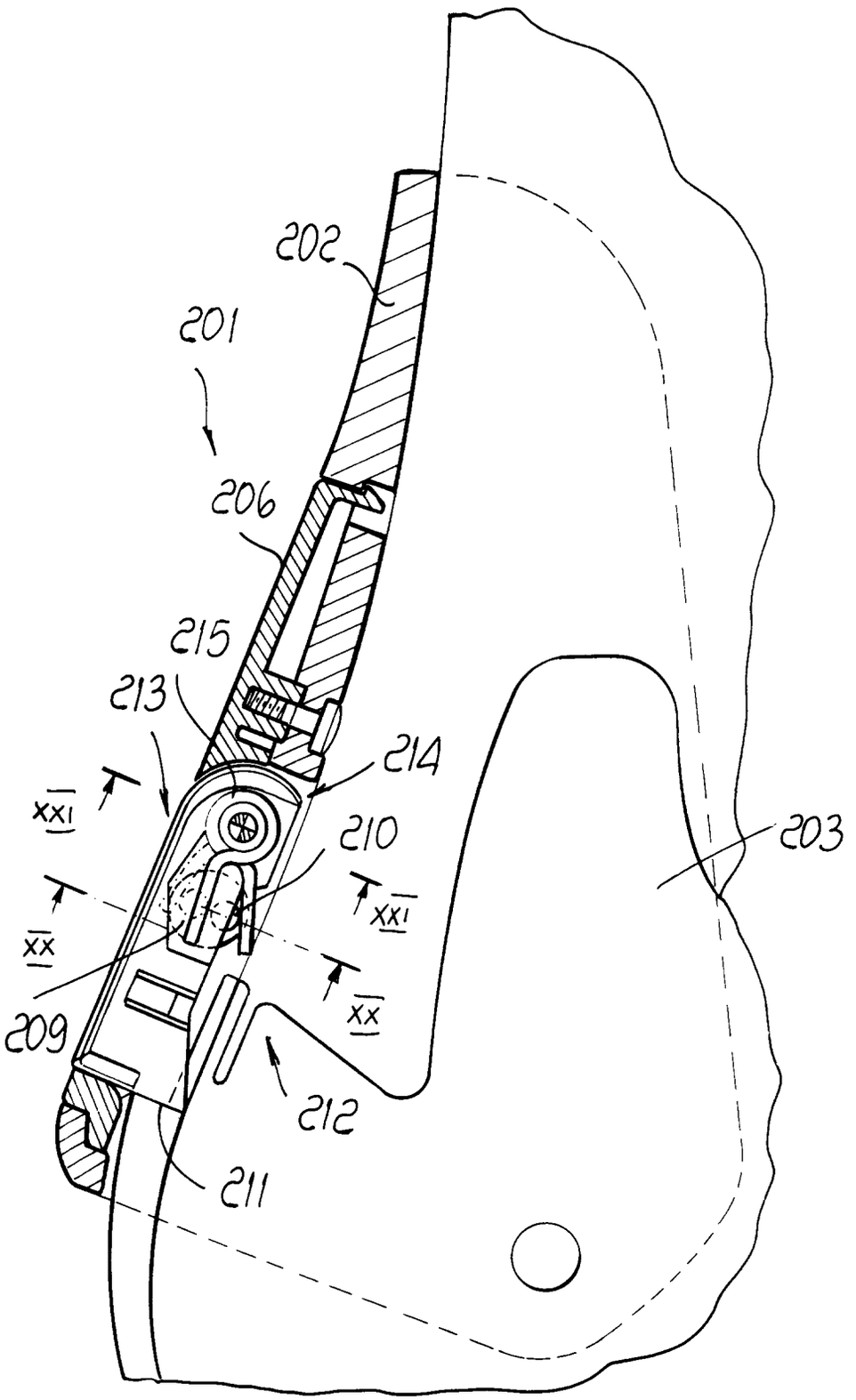

FIG. 18

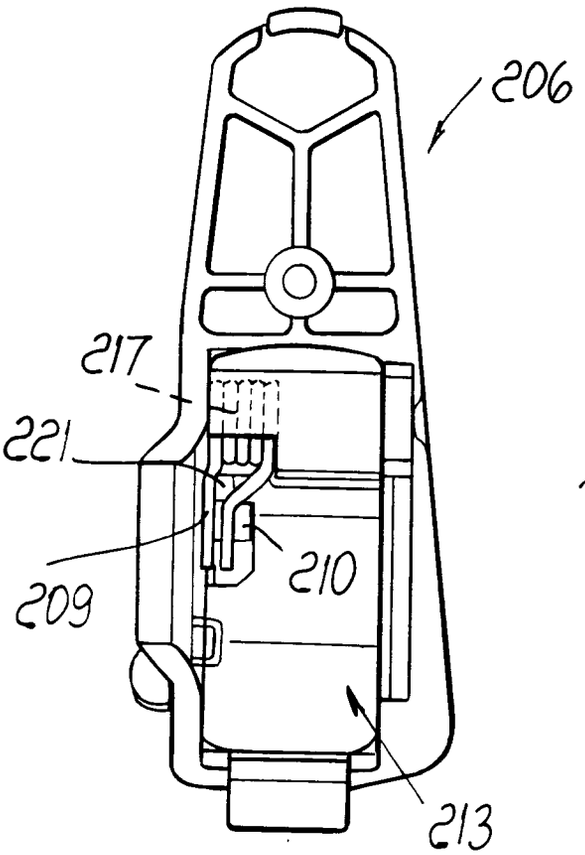

Fig. 19

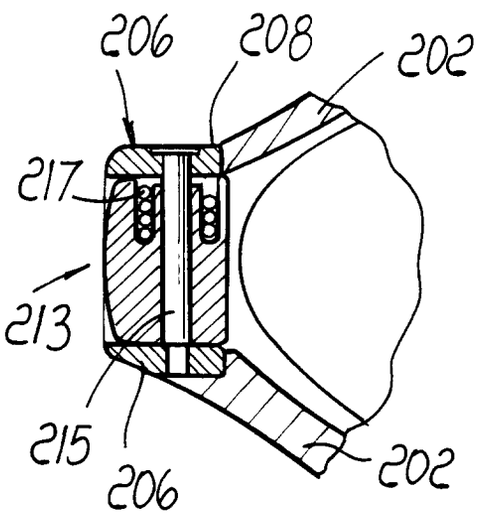

Fig. 21

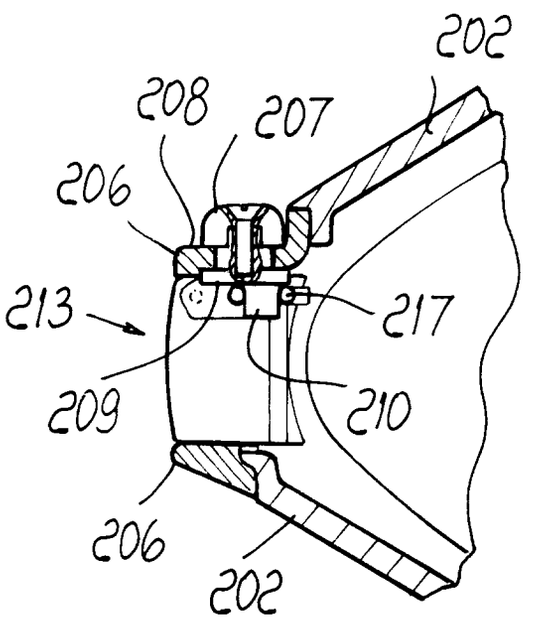

Fig. 20

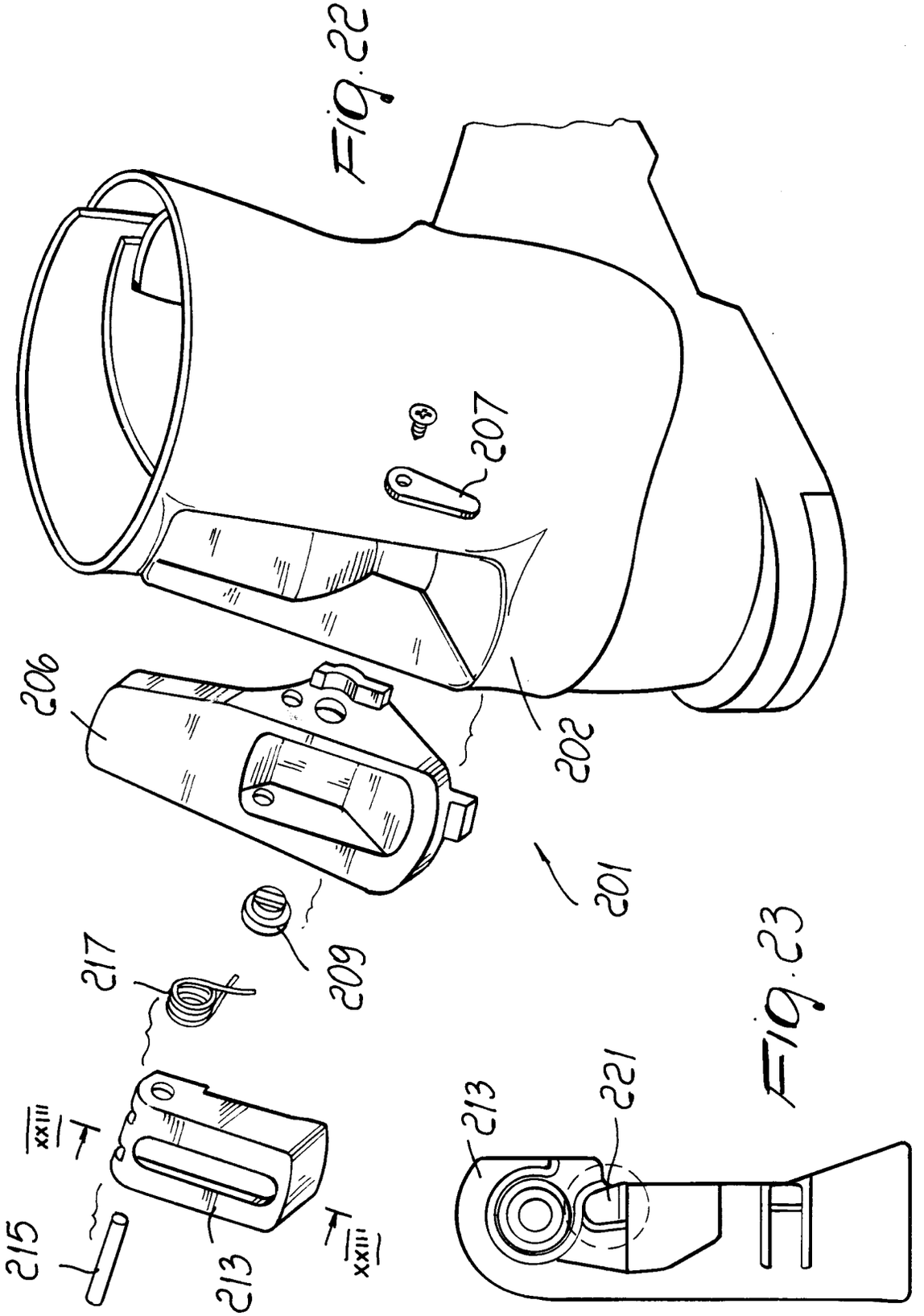
Fig.22
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Fig.23
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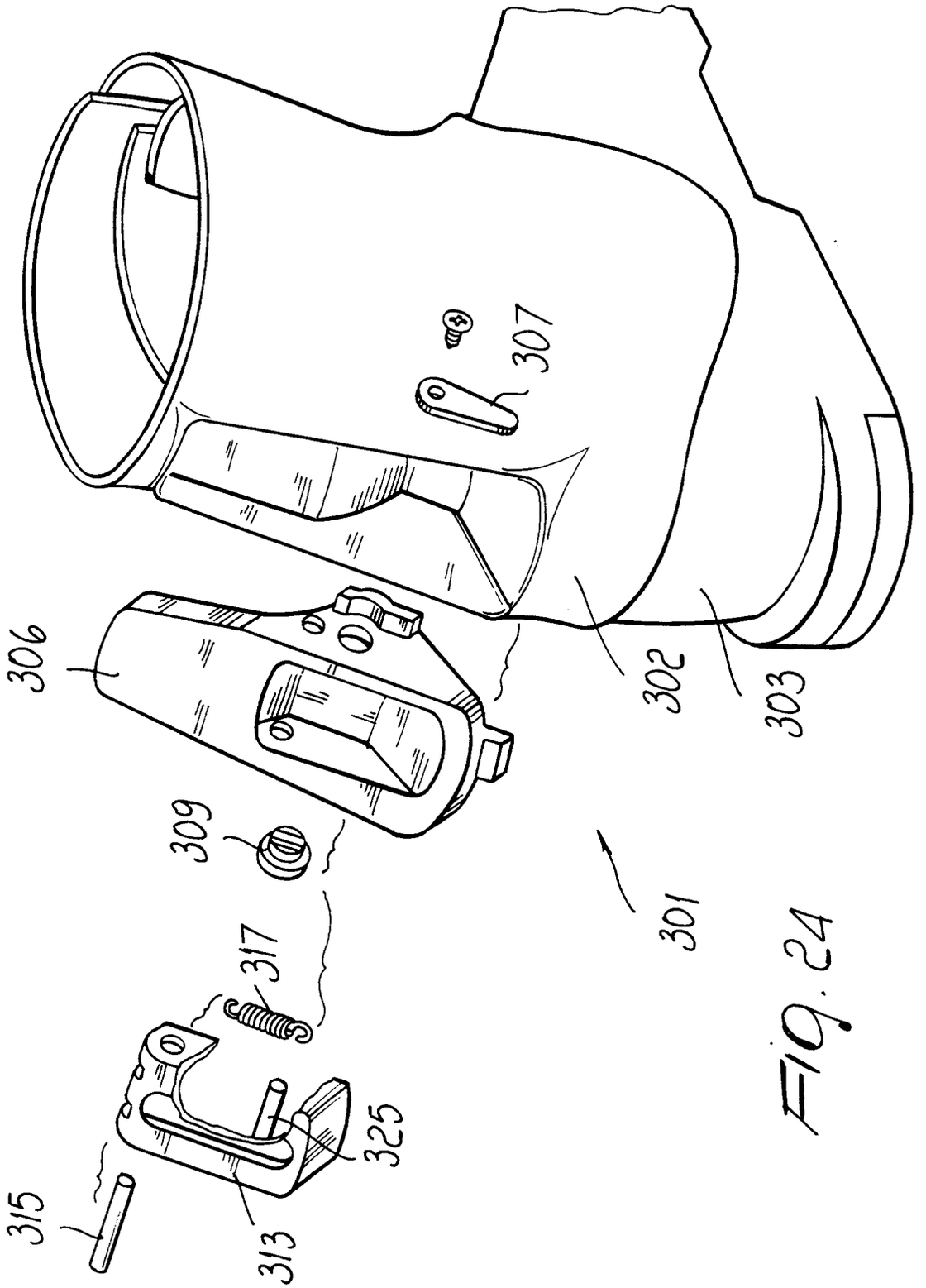

Fig. 24

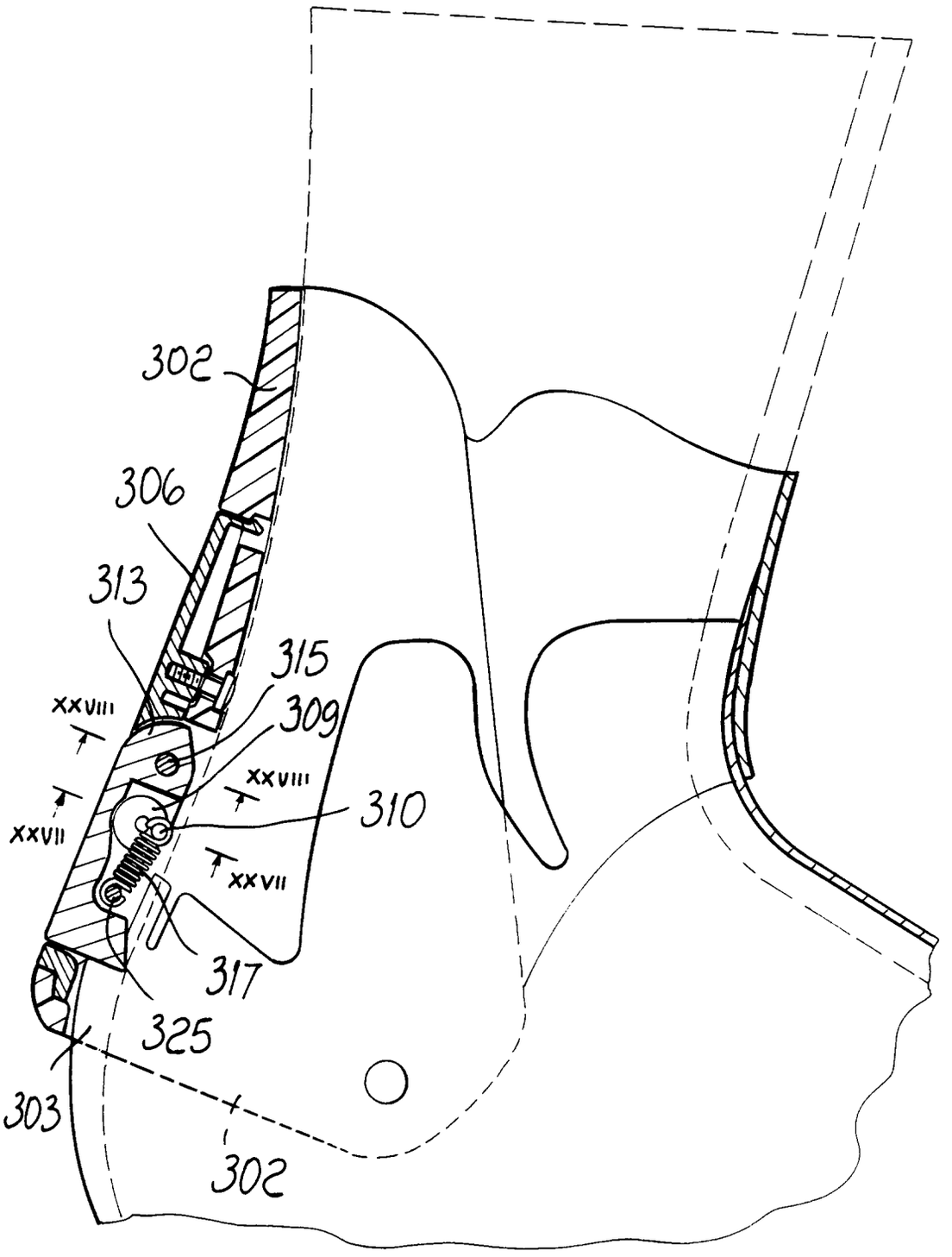
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FIG. 25

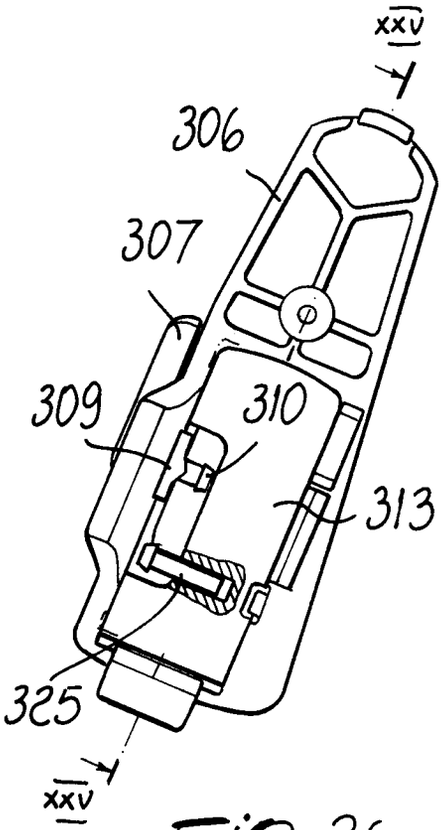

FIG. 26

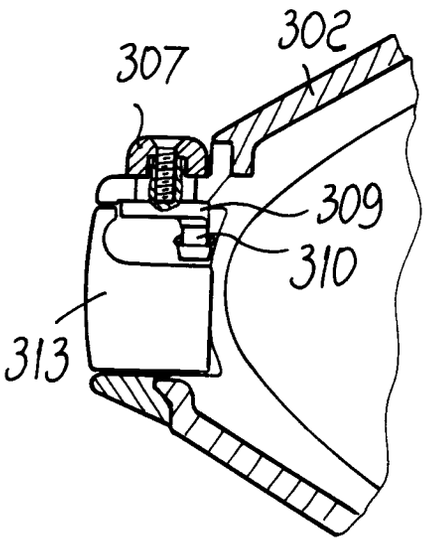

FIG. 27

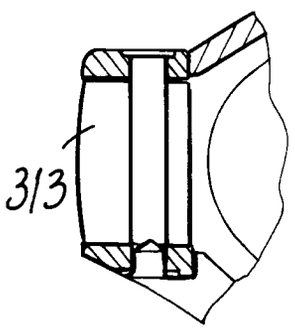

FIG. 28

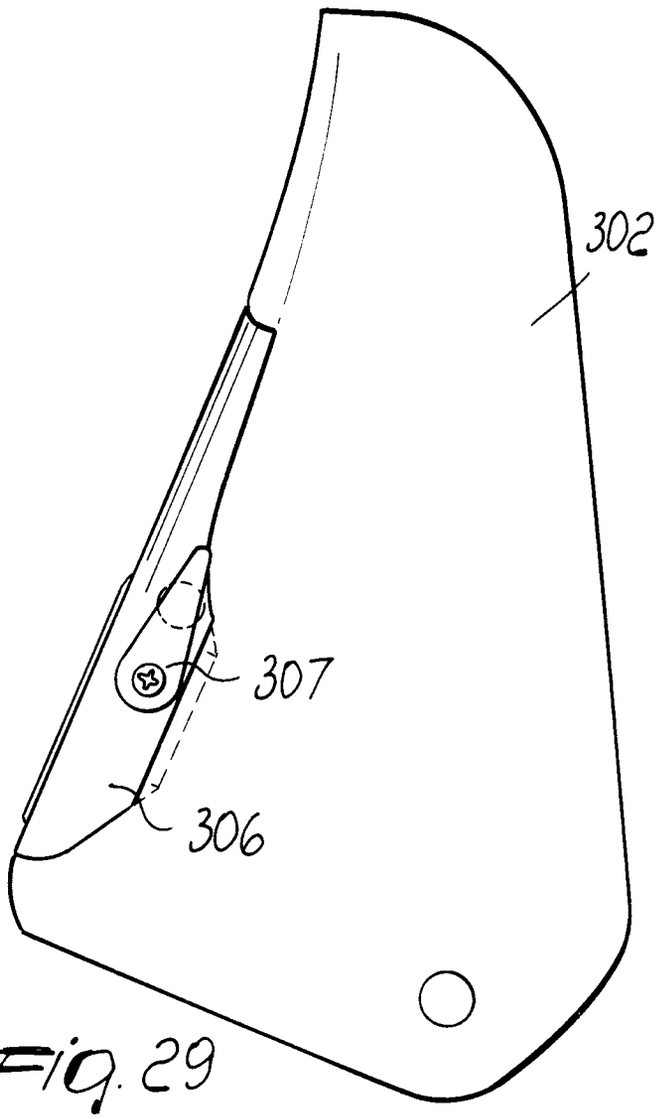

FIG. 29

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 10 8268

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	EP-A-0 582 803 (SALOMON S.A.) * the whole document *	1,25-30, 36,37 31	A43B5/04
X Y	DE-A-42 24 562 (HTM SPORT- UND FREIZEITGERÄTE GES. M.B.H.) * the whole document * * column 6, line 2 - line 15; figure 4 *	1,25,29, 30,36 31	
X	FR-A-2 513 496 (SKISCHUHFABRIK DYNAFIT GESELLSCHAFT MBH) * the whole document *	1,2,25, 36	
X	FR-A-2 647 649 (LANGE INTERNATIONAL SA) * the whole document *	1,2,25, 29,37	
D,X A	US-A-4 934 075 (BENETTI ET AL.) * the whole document *	1 2,3, 25-36	
D,X A	FR-A-2 020 726 (CALZATURIFICIO NORDICA DI A. & F. VACCARI S.N.C.) * the whole document *	1 2-20	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

A43B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 September 1995	Mathey, X

CATEGORY OF CITED DOCUMENTS

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Y : particularly relevant if combined with another document of the same category
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T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

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