Feb. 18, 1969 H. SCHEIB ET AL 3,428,329

HEEL HOLDERS FOR SAFETY SKI BINDINGS

Filed Aug. 31, 1966 Sheet 1 of 7

FIG. 1

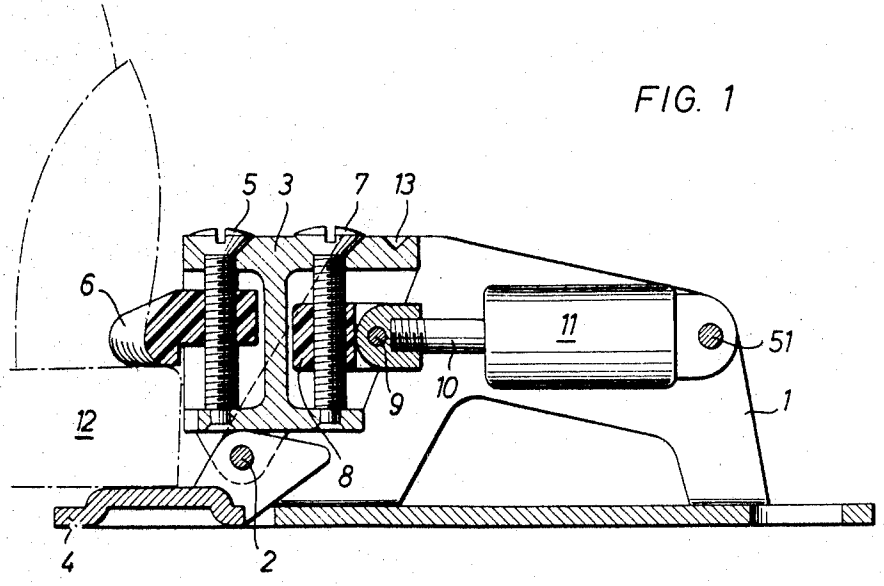
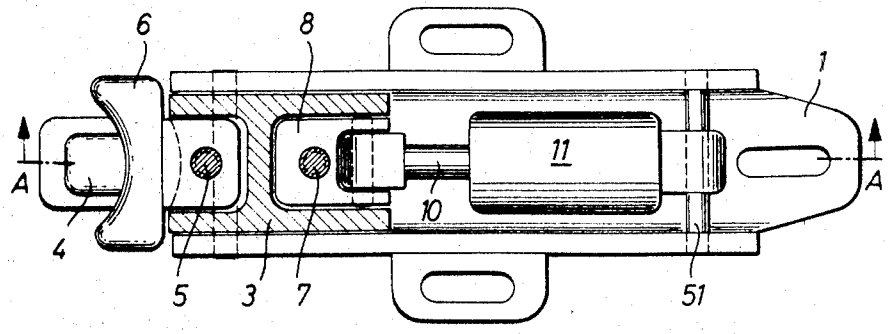


FIG. 2



INVENTORS
HERMANN SCHEIB,
GÜNTER ADAM

BY
Stevens, Davis, Miller & Mosher
ATTORNEYS

HEEL HOLDERS FOR SAFETY SKI BINDINGS

Filed Aug. 31, 1966 Sheet 2 of 7

FIG. 3

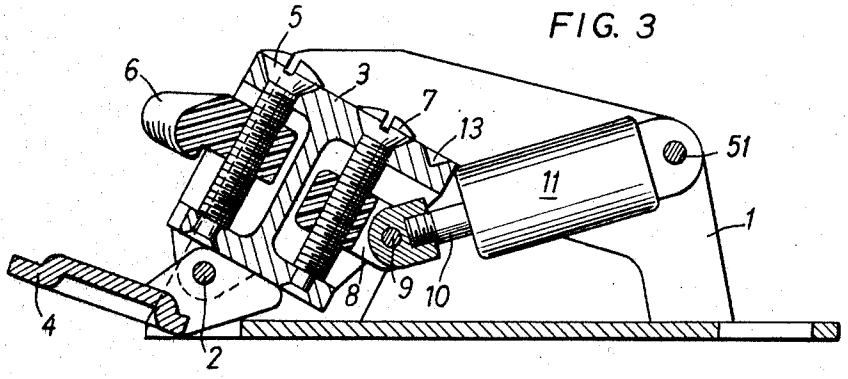


FIG. 9

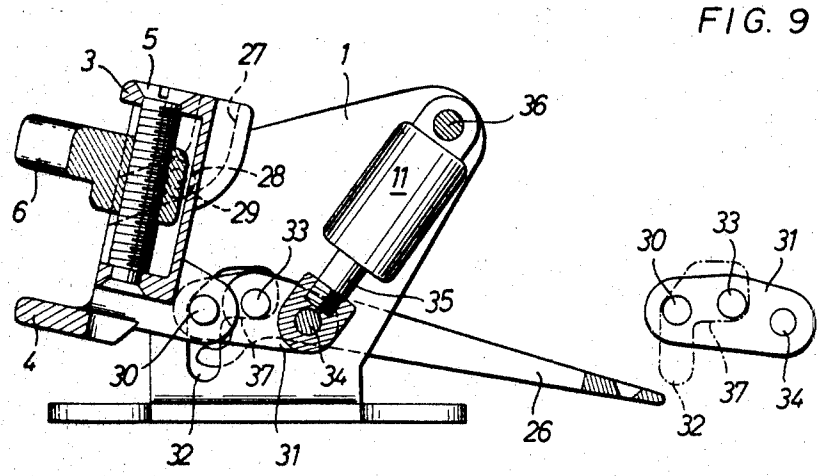


FIG. 6

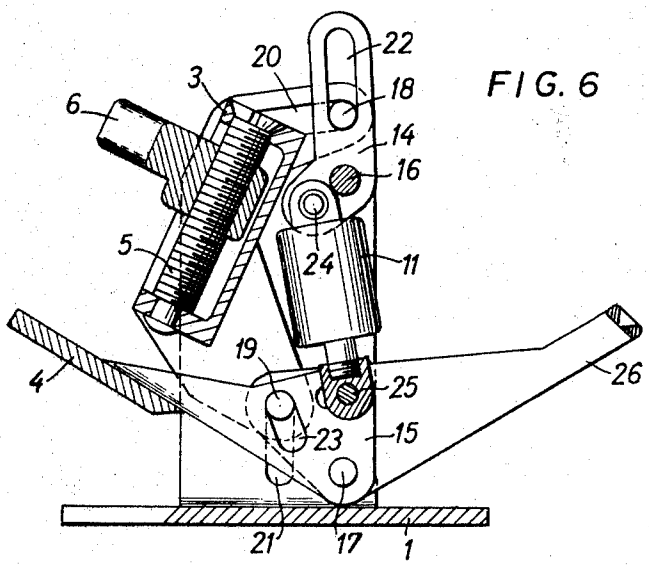


FIG. 4

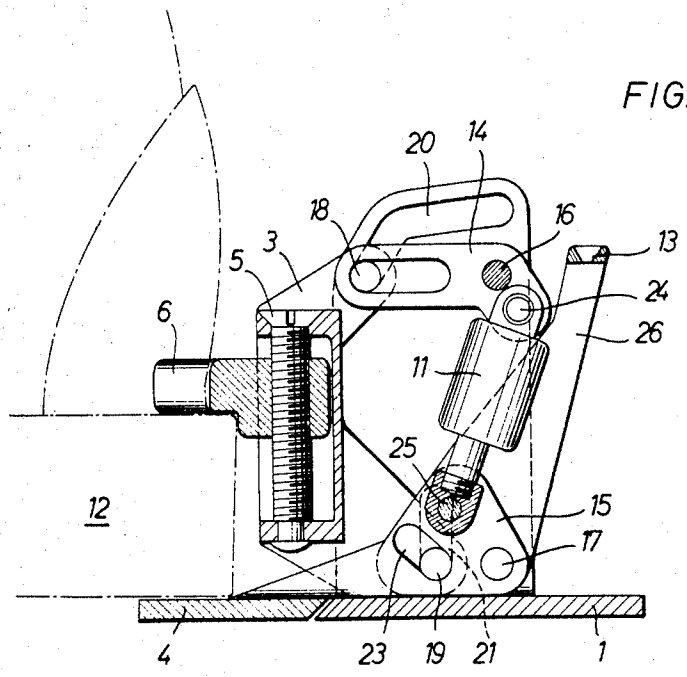
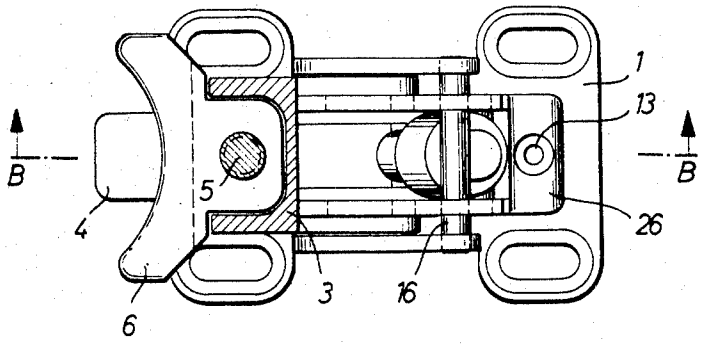


FIG. 5



HEEL HOLDERS FOR SAFETY SKI BINDINGS

Filed Aug. 31, 1966

FIG. 7

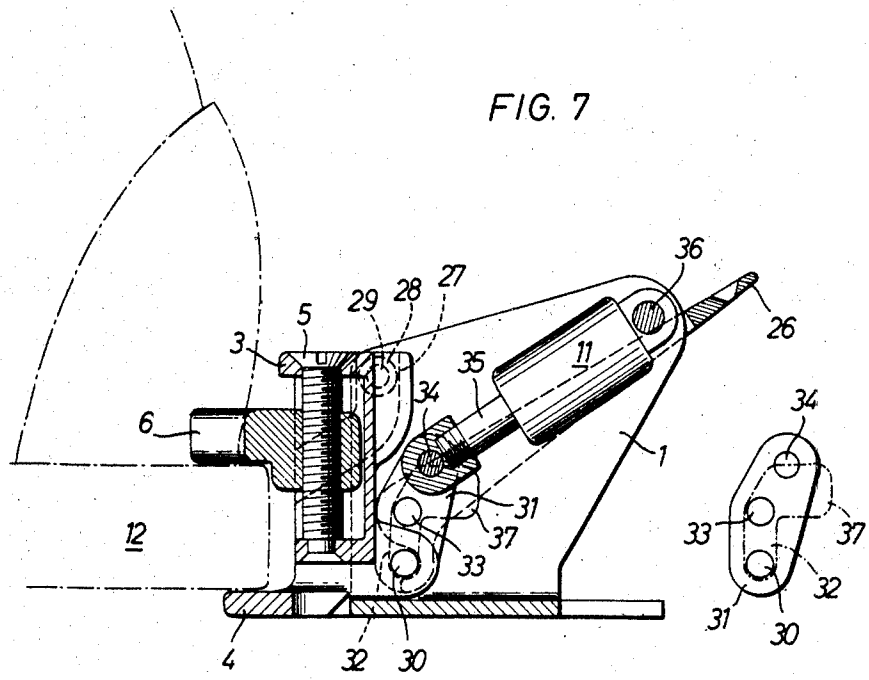


FIG. 8

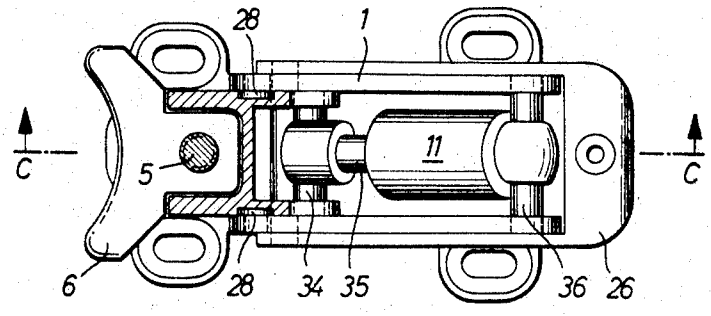


FIG. 10

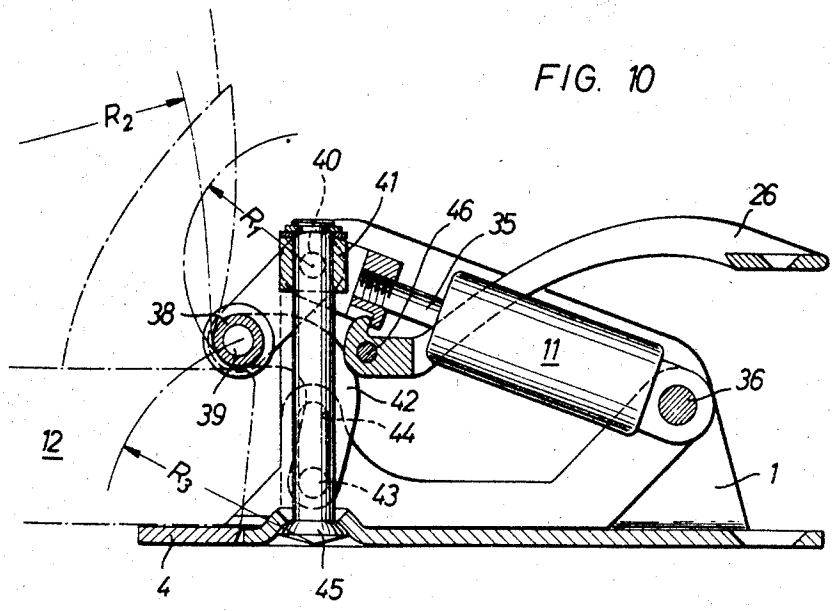

R2
40
41
46
35
26
R1
38
11
36
39
42
44
12
R3
43
1
4
45

FIG. 11

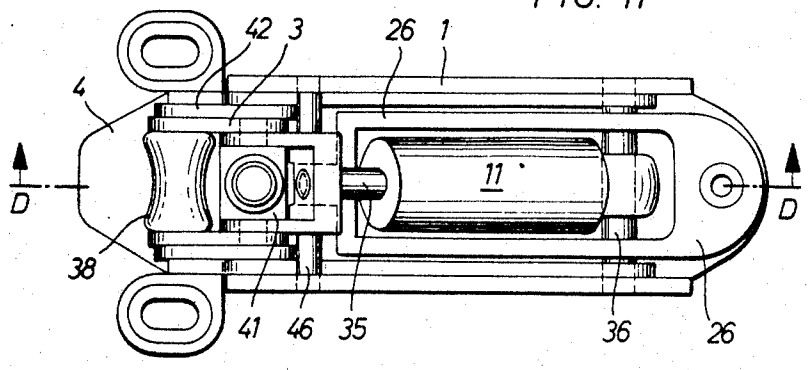

42
3
26
1
4
11
D
D
38
41
46
35
36
26

FIG. 13

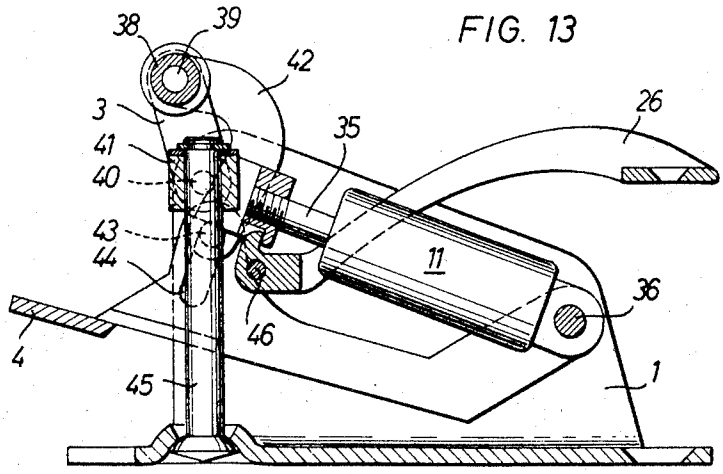


FIG. 12

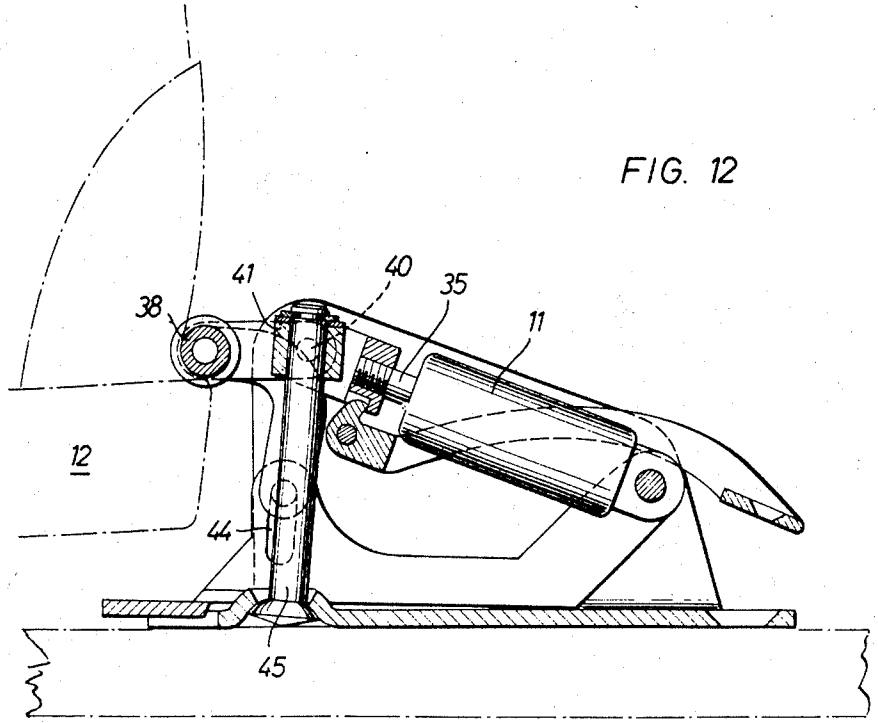


FIG. 14

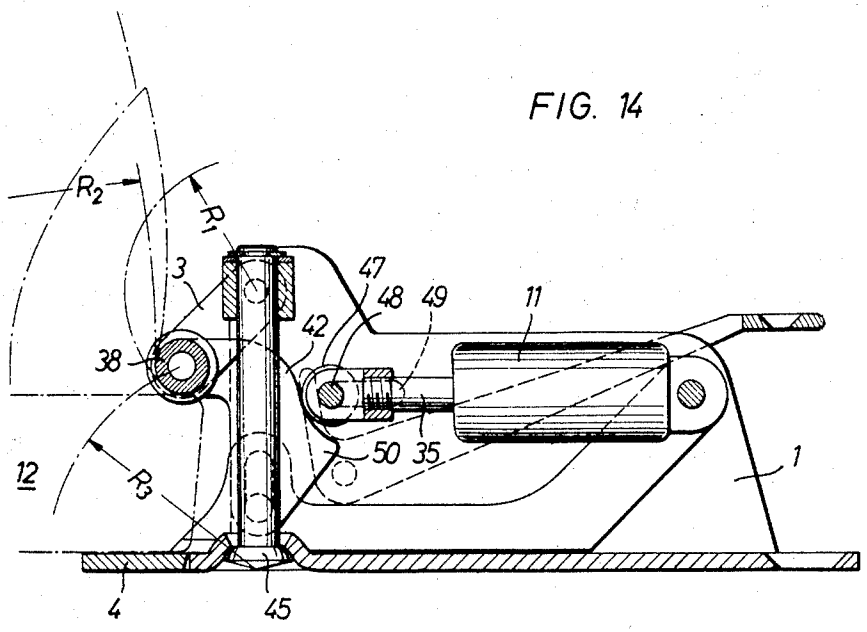
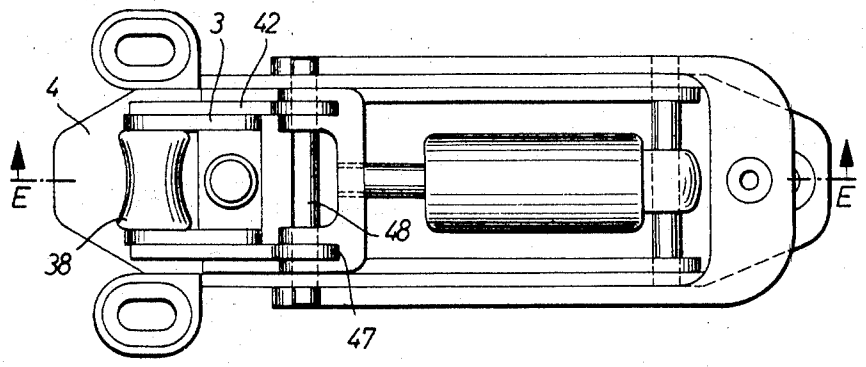


FIG. 15



United States Patent Office 3,428,329
Patented Feb. 18, 1969

3,428,329

HEEL HOLDERS FOR SAFETY SKI BINDINGS

Hermann Scheib and Günter Adam, Garmisch-Partenkirchen, Germany, assignors to Hannes Marker, Garmisch-Partenkirchen, Germany

Filed Aug. 31, 1966, Ser. No. 576,419
Claims priority, application Germany, Sept. 25, 1965, M 66,772
U.S. Cl. 280—11.35 12 Claims
Int. Cl. A63c 9/00

ABSTRACT OF THE DISCLOSURE

A heel holder for safety ski bindings consisting of a pressure member to engage the heel groove of a ski boot. The pressure member is pivotally mounted to the ski on an axis located behind the ski boot. A spring resiliently urges the pressure member against the ski boot, with the pressure member being pivoted to a release position when experiencing an excessive force. The spring element is in the form of a gas spring which has the advantages of functioning as a spring when subjected to minor shocks, and, when subjected to an excessive shock, such as would require release, the gas spring serves to produce equalization of pressure about its piston and functions as a plunger damped by gas pressure so that it moves to a release position without a restoring force.

Many types of heel holders for safety ski bindings are known, in which a pressure member for engaging the heel groove is pivoted to the ski on an axis which is disposed behind the heel and said pivoted member is resiliently urged against the heel of the boot by a spring element, and pivotally movable to a release position against the action of the spring element by an excessive force, which is upwardly directed at right angles to the surface of the ski. Where such heel holders are employed, the foot is generally placed into the binding in a simple manner by engaging the top of the boot with the pivoted toe iron and kicking with the heel on a closing pedal or the like, which is provided on the heel holder and is upwardly inclined in release position. In this manner the pivoted member is caused to engage the heel groove under the action of the spring force. In such heel holders it has proved fairly difficult to find such an adjustment of the spring that the foot will be released by a forward fall but will remain firmly connected to the ski under the action of other strong tension forces of relatively short duration, such as frequently occur during skiing. When the user of one of the known heel holders has experienced a single unnecessary release of his foot by the binding and possibly a heavy fall as a consequence of such release, he will tend to adjust the spring to such a strong force that the release is not ensured even in case of a real danger.

According to the invention, the disadvantages of the known heel holders are avoided in a heel holder of the kind described initially hereinbefore in that the spring element consists of a gas spring, which comprises a cylinder filled with a gaseous fluid under superatmospheric pressure, and a piston which is slidable in said cylinder and provided at one end with a piston rod, which extends outwardly through one end wall of the cylinder in sealed relation therewith, said piston having one or more passage bores for the gaseous fluid, which bores have a total cross-sectional area that is very small relative to the piston area. The piston area is preferably at least one hundred times the total cross-sectional area of the passage bore or bores. In the gas springs known per se, the passage bores prevent an additional unilateral compression during a displacement of the piston in the cylinder because the passage bores enable an equalization of pressure between the chambers which are disposed on both sides of the piston. Thus, the piston and its piston rod in a gas spring serve actually only as a plunger. As the pressure in the cylinder remains almost constant—there is only a small change in pressure due to the movement of the piston rod into the cylinder—this spring has an almost constant spring rate so that a displacement of the piston is opposed by an almost constant force in any position of the piston.

When the ratio between the total cross-sectional area of the passage bores and the area of the piston disc is very small, preferably 1:100 or less, strong tensile forces of short duration will cause the spring to give a response which is different from that to prolonged tensile forces of the same strength. This is due to the fact that the small passage bores have a damping effect so that in the case of stresses of very short duration the gaseous fluid cannot be transferred fast enough from one cylinder chamber to the other so that only a resilient cushioning is obtained and the foot is hardly lifted from the ski. During a stress of somewhat longer duration, although still of an order of a fraction of a second, such as is typical of a forward fall, an equalization of pressure between the two chambers of the gas spring can take place and the piston can be forced into the gas spring to such an extent that the pressure member can be pivotally moved to its release position.

In a first advantageous embodiment of the heel holder according to the invention, the gas spring is pivoted at one end to the pivoted member and at the other end to a member which is rigidly secured to the ski, the gas spring forms a toggle joint with the pivoted member, and the pivot which connects the pivoted member and the gas spring is adjustable relative to the pivoted member for varying the angle which is included by the lines which connect the pivots. In this case the use of a gas spring has the special advantage that the force tending to extend the piston is almost constant in any position of the piston so that an increase of the spring displacement to be effected until the release takes place corresponds to a substantially proportional increase of the work which is required for the release. In this embodiment, the pivoted member may have a pivot pin, which mounts a bearing bracket for the gas spring, which bearing bracket is provided with a female screw thread and adjustable by a rotation of the pivot pin whereas the axis of the gas spring in operative position is approximately at right angles to the axis of the screw-threaded pin.

In another advantageous embodiment of the invention which has been described hereinbefore, or independently of the use of a gas spring, a heel holder of the kind described first hereinbefore comprises two double-armed levers or pairs of such levers, which are pivoted to a housing which is connected to the ski, one lever arm of each lever or pair is pivoted to the pivoted member and the other lever arm is pivoted to one end of the spring element, in such a manner that a movement of the pivoted member from its operative position toward the release position causes the pivots of the spring elements to approach each other until they have assumed a dead center position, and to move apart from each other after having passed through said dead center position. The pivoted member may comprise two pins, which extend in the longitudinal direction of the ski and extend through slots formed in the housing for guiding the pivoted member along the path which is desired for the release movement. The pivoted member may suitably be guided by means of its guide pins in cam slots formed in the double-armed levers. One of the double-armed levers may be provided at one lever arm with a closing pedal and at the other lever arm with an opening means. The just described

embodiment can be used to special advantage together with a gas spring and is distinguished in that the gas spring or other spring element is subjected to two stresses during the release movement as the two pivots respectively connected to one of the two parts of the gas spring or to one of the two ends of other spring elements approach each other during the release movement, whereas in the known heel holders one of these pivots remained always stationary relative to the ski. The twofold utilization of the spring element permits the same effective resistance to the release to be produced with a smaller, less expensive spring element.

A further embodiment of the invention may also be used in a heel holder of the kind described first hereinbefore independently of the use of a gas spring but is preferably used together with a gas spring as a spring element. In this embodiment the pivoted member is firmly connected to a closing pedal and this pivoted member and one end of the spring element are pivoted to one arm of a double-armed lever, the fulcrum pin of which slides during the opening and closing movements along the edges of aligned apertures in the housing, the guide edges effective during the opening movement are upwardly and rearwardly inclined, the guide edges effective during the closing movement are approximately parallel, and the fulcrum pin is freely moveable in the aperture. This embodiment has the special advantage that, owing to the different means for guiding the fulcrum pin of the lever during the opening and closing movements, respectively, the force required for opening the heel holder is larger than that required for closing the same. Owing to this arrangement, the pivoted member cannot suddenly impinge with a large force into the heel groove when the heel holder is being closed. Such an impact is not only inconvenient for the user but may also cause premature wear of the boot and of the heel holder.

A last advantageous embodiment of the invention may also be used with other spring elements, if desired. In this embodiment, the pivoted member is mounted on a stud, which is pivoted to the ski for movement to the rear, said stud is approximately vertical in operative position, and the free end of the pivoted member, which free end engages the heel groove, is pivoted to a bail member, which is guided in a slot formed in the lever which is pivoted to the housing and carries the closing pedal, said slot being approximately vertical in operative position and the spring element bearing at one end on the housing and opposing the pivotal movement of the stud. This embodiment employs a tangential deflection and has the special advantage that it is not necessary to provide a sole holder which can be adjusted to heels of different height, as the end of the pivoted member may suitably be provided with a freely rotatable roller and is engageable with any heel groove. An opening lever is suitably pivoted to the housing and serves for retracting the spring element to enable a convenient stepping out of the binding. In a modification of this embodiment, that end of the spring element which does not bear on the housing is guided in the housing and cooperates by means of a roller with a cam formed on the bail member. The cam may be shaped to provide for any desired behavior of the spring during the opening movement.

The invention will be explained more in detail in the following specification with reference to the drawings, which shows different embodiments by way of example. In the drawings,

FIG. 1 is a sectional view taken on line A—A of FIG. 2 and showing a first embodiment of a step-in heel holder according to the invention,

FIG. 2 is a top plan view, partly in section, showing the heel holder according to FIG. 1,

FIG. 3 is a sectional view taken on line A—A of FIG. 2 and showing the heel holder of FIGS. 1 and 2 after the release,

FIG. 4 is a sectional view taken on line B—B of FIG. 5 and showing a second embodiment,

FIG. 5 is a top plan view, partly in section, showing the embodiment of FIG. 4,

FIG. 6 shows the embodiment of FIGS. 4 and 5 after the release and

FIG. 7 is a sectional view taken on line C—C of FIG. 8 and showing a third embodiment. The rocker lever used in this embodiment is separately shown,

FIG. 8 is a top plan view, partly in section, showing the embodiment of FIG. 7,

FIG. 9 shows the embodiment of FIGS. 7 and 8 after a release. The rocker lever is again separately shown,

FIG. 10 is a sectional view taken on line D—D of FIG. 11 and showing a fourth embodiment,

FIG. 11 is a top plan view showing the embodiment of FIG. 10,

FIG. 12 is the embodiment of FIGS. 10 and 11 during the release,

FIG. 13 is the embodiment of FIGS. 10 to 12 after the release of the foot,

FIG. 14 is a modification of the embodiment of FIGS. 10 to 13 and

FIG. 15 is a top plan view showing the modification of FIG. 14.

In the step-in heel holder shown in FIGS. 1 to 3, the pivoted member **3** and the closing lever **4** are pivoted to the housing **1** by the pin **2**. The gas spring **11** is pivoted on the pin **51**. The adjusting screw **5** is rotatably riveted in the pivoted member **3** and enables an adjustment of the sole holder **6** to any height of the heel. The screw **7** for adjusting the hardness of the spring and consequently the resistance to a release is also rotatably riveted in the pivoted member **3** and carries a bearing bracket **8**, to which the piston rod **10** of the gas spring is pivoted by the pin **9**. The force of the gas spring produces a torque about the pivot pin **2**. The magnitude of said torque depends on the position of the bearing bracket **8** and on the force of the gas spring **11**. An upward movement of the bearing bracket **8** by a rotation of the screw **7** will increase the torque because the force of the gas spring acts then on a larger level arm. The force required for a release of the binding can be adjusted in this simple manner.

The torque causes a downwardly inclined force to be applied to the sole holder **6**, which engages the heel groove over the end portion **12** of the heel of the skiing boot. This force can be resolved into vertical and horizontal components. The horizontal component urges the boot forwardly and ensures a firm engagement of the skiing boot with the toe iron. The vertical component urges the heel downwardly so that it is forced under the required pressure against the ski. During a forward fall which would be dangerous to the leg, the tensile force acting upwardly on the skiing boot in a vertical direction will exceed the downwardly directed component of the pressure applied by the sole holder so that the pivoted member **3** is moved about the pivot pin **2**. During this movement, the pivot pin **9** progressively approaches the dead center line, which extends through the pins **2** and **51**. When the pin **9** has moved beyond this dead center position, the gas spring **11** will cause the pivoted member **3** to continue its pivotal movement and open the binding to such an extent that the sole holder **6** entirely releases the end portion **12** of the sole. The danger for the leg of the skier is thus eliminated.

FIG. 3 is a sectional view taken on line A—A in FIG. 2 and shows the heel holder after the release. The heel holder will also be in this position when the skier desires to step into the binding. By means of the closing lever **4**, the heel of the boot forces the pivoted member **3** in the opposite direction beyond the dead center position so that the gas spring is again caused to produce the torque which resiliently urges the skiing boot against the toe iron and downwardly against the ski. To enable an opening of the binding by hand, the pivoted member **3** has a depression **13**, which is engageable by the point of

the ski stick to urge the pivoted member beyond the dead center position.

Owing to the special design of the gas spring which has been described hereinbefore, tensile forces of short duration, which are directed from the ski at right angles thereto, will not cause a release, even if such forces are relatively large, because the pressure equalization between the two chambers of the gas spring cannot be effected so fast and the tensile force is merely resiliently absorbed.

The special feature of the step-in binding of FIGS. 4 to 6 resides in that the force of the gas spring is utilized in two ways. In the known bindings, one spring end of the spring element was mounted on and supported by the housing of the binding, so that this end was virtually secured to the ski, whereas the other spring end acted on the detent means of the heel holder or was indirectly supported by the heel groove.

In the embodiment shown, the gas spring **11** is pivoted to two rocker levers **14** and **15**, which are rotatably mounted in the housing **1** by the pivot pins **16** and **17**. The pivoted member **3** is connected to the rocker levers **14** and **15** by the pivot pins **18** and **19**.

According to a further feature of the invention, the pivot pins **18** and **19** guide the pivoted member **3** in the slots **20** and **21**. These slots are formed in the housing and have such a configuration that they constrain the pivoted member **3** to perform a movement which causes a release of the sole **12** during the release action. The adjusting screw **5** is rotatably mounted in the pivoted member **3** and enables an adjustment of the sole holder **6** to any height of the heel.

When the sole holder **6** applies an excessive, upwardly directed force to the pivoted member **3**, the pins **18** and **19** are displaced along the guiding slots **20** and **21** and cause a pivotal movement of the rocker levers **14** and **15**. The pins **18** and **19** are suitably provided with rollers which engage the slots **20**. The rocker levers **14** and **15** are also formed with slots **22** and **23** to enable the pins **18** and **19** and the pivoted member **3** to follow the slots **20** and **21**.

A continued rotation of the two rocker levers **14** and **15** causes a progressive approach of the gas spring **11** to the dead center line, which extends through the pins **16** and **17**, so that the gas spring is progressively compressed. The gas spring **11** is pivoted by pins **24** and **25** to the rocker levers.

The movement beyond the dead center position is no longer opposed but assisted by the gas spring so that the binding is suddenly opened to such an extent that the sole **12** is entirely released by the sole holder **6**. The rocker lever **15** terminates at its forward end in a closing lever **4** and at its rear end in an opening lever **26**, which is formed with the depression **13** for engagement with the point of the ski stick when it is desired to open the binding. When the binding is open, a depression of the closing pedal lever **4** by the heel will close the binding. The closed binding can be opened with the aid of the opening lever **26**.

In the embodiment of FIGS. 7 to 9, the pivoted member **3** carries the rotatably riveted adjusting screw **5** and the sole holder **6** and forms a unit with the closing pedal **4**. The pivoted member **3** is also formed with guide slots **27** on both sides. These guide slots guide the upper portion of the pivoted member **3** during the release movement. The lower portion of the pivoted member **3** is connected by the pivot pin **30** to the rocker lever **31**. The pivot pin **30** is movable in a guide slot **32** formed in the housing **1**. The rocker lever **31** is separately shown for the sake of clarity and provided with pins **33** and **34**. The pin **33** engages the trapezoidal extension of the slot **32**. The piston rod **35** of the gas spring **11** is pivoted to the pin **34**.

The gas spring **11** is mounted by the pin **36** in the housing **1**. When a force is applied by the heel through the sole holder to the pivoted member, the pin **30** will be raised and take the rocker lever **31** along. The pin **33** and the housing slot **32** in the housing **1** cooperate to constrain the rocker lever **31** to rotate about the pin **30**. This pivotal and lifting movement is opposed by the force of the gas spring. The pin **34** progressively approaches the dead center line, which extends through pins **30** and **36**.

Beyond this dead center position, the rocker lever **31** can swing down about the pin **30** until the pin **33** engages the horizontal, straight edge **37** of the guide slot **32**. The force of the gas spring then rotates the rocker lever **31** about the pin **33** and causes the pin **30** and the pivoted member **3** to be raised further. The cams **27** of the pivoted member **3** cooperate with the rollers **28** and constrain the pivoted member **3** to perform a movement whereby the sole holder **6** is progressively moved away from the end portion **12** of the heel and finally releases the heel.

To close the binding, pressure is applied by the heel to the closing pedal **4** and is transmitted by the pin **30** to the rocker lever **31**, which rotates about the pin **33** and raises the pin **34** above the dead center line.

This embodiment has the special advantage that the pin **33** is on a lower level during the closing of the binding than during the opening movement, so that a much smaller force is required for closing the binding than for opening the same. As a result, the sudden shock which is experienced when the dead center line is overcome is relatively small because the force is also small at this time. Nevertheless, the full force is available during the subsequent release action.

The binding is opened by hand by moving the opening lever **26** in the direction opposite to its closing movement, also under a low spring stress. The opening lever **26** is mounted on the pin **33** and embraces the pin **30**.

The step-in heel holders shown in FIGS. 10–15 involve tangential deflection. A roller **38** is rotatably mounted by a pin **39** in the pivoted member **3**. The latter is pivoted on the pin **40** in the bearing bracket **41**. The piston rod **35** of the gas spring **11** is pivoted by the pin **40** to the bearing block **41**. The other end of the gas spring **11** is mounted on a pin **36** in the housing **1**. The bail **42** is pivoted to the pin **39** and at its lower end has a pin **43**, which engages the guide slot **44** formed in the closing lever **4**, which is mounted on the pin **36**. The bearing bracket **41** is mounted on a stud **45**, which is pivoted in the housing **1** and extends approximately vertically in operative position.

If the force which acts on the heel of the skier during a forward fall is applied through the sole **12** to the pivoted member **3**, the latter will tend to move upwardly about the pin **40** on a radius R_1. As the stiff skiing boot is raised on a radius R_2, the pivoted member is constrained to move along this path. For this reason, the pin **40** must leave its initial position and performs a rearward pivotal movement against the action of the gas spring **11**. This movement is guided by the stud **45**.

FIG. 12 shows the binding in the position which it assumes at the time of the tangential deflection. The roller **38** was raised by the heel end portion **12** along its curved path. The pin **40** has been moved to the rear with the stud **45** and has forced the piston rod **35** into the gas spring **11** to a larger extent.

During the next phase, the pivoted member **3** is moved to its uppermost position, in which the heel end portion **12** is entirely released. By means of the bail **42** and the pins **43**, the closing lever **4** is pulled upwardly too and moved to its step-in position. To close the binding, pressure is applied by the heel to the closing lever **4** and is transmitted by the pins **43**, the bail **42**, and the pin **39** on to the pivoted member **3** so that the roller **38** engages the heel groove.

The binding is opened by hand with the aid of the opening lever **26**, which is mounted by the pin **46** in the housing **1**. The actuation of the lever **26** forces the piston rod **35** into the gas spring **11** and at the same time pulls the pin **40** rearwardly.

A modification of the step-in binding just described is shown in FIGS. 14 and 15. A roller **47** is mounted on a pin **48**, which is carried by the piston rod **35** of the gas spring **11** and guided in the guide slot **49** formed in the housing **1**. The bail **42** has a cam **50**, which cooperates with the roller **47**. For a release of the binding, the tangential deflection must be overcome and the gas spring is additionally compressed further by the cam **50**.

A further advantage of this design resides in that the need for a sole holder which is adjustable to the height of the heel is eliminated because the roller **38** will fall into any heel groove as it follows the pivotal movement R_3 of the stud **45**.

We claim:

1. A heel holder for safety ski bindings comprising a pressure member for engaging a heel groove of a ski boot, means pivotally mounting said pressure member to the ski on an axis which is disposed behind the heel, a spring element resiliently urging said pressure member against the heel of the boot, said pressure member being pivotally movable to a release position against the action of the spring element by an excessive force, which is upwardly directed at right angles to the surface of the ski, the spring element being in the form of a gas spring which comprises a cylinder filled with a gaseous fluid under superatmospheric pressure, and a piston which is slidable in said cylinder and provided at one end with a piston rod, which extends outwardly through one end wall of the cylinder in sealed relation therewith, said piston having at least one passage bore for the gaseous fluid, which bore has a total cross-sectional area that is very small relative to the piston area.

2. A heel holder according to claim **1**, characterized in that the piston area is at least one hundred times the total cross-sectional area of the passage bore.

3. A heel holder according to claim **1**, further including a member which is rigidly secured to the ski, and the gas spring being pivoted at one end to the pressure member and at the other end to said member, the gas spring forming a toggle joint with the pressure member, and the pivot which connects the pressure member and the gas spring being adjustable relative to the pressure member for varying the angle which is included by the lines which connect the pivots.

4. A heel holder according to claim **3**, characterized in that the pressure member has a pivot pin, and a bearing bracket for the gas spring mounted on said pivot pin, said bearing bracket being provided with a female screw thread and adjustable by a rotation of the pivot pin, whereas the axis of the gas spring in operative position is approximately at right angles to the axis of the screw-threaded pin.

5. A heel holder for safety ski bindings comprising a pressure member for engaging a heel groove of a ski boot, means pivotally mounting said pressure member to the ski on the axis which is disposed behind the heel, a spring element resiliently urging said pressure member against the heel of the boot, said pressure member being pivotally movable to a release position against the action of the spring element by an excessive force, which is upwardly directed at right angles to the surface of the ski, a housing connected to the ski, two double-armed levers pivoted to said housing, one lever arm of each lever being pivoted to the pressure member and the other lever arm being pivoted to one end of the spring element in such a manner that a movement of the pressure member from its operative position toward the release position causes the pivots of the spring elements to approach each other until they have assumed a dead center position, and to move apart from each other after having passed through said dead center position.

6. A heel holder according to claim **5**, characterized in that the pressure member comprises two pins which extend in the transverse direction of the ski and extend through slots formed in the housing for guiding the pressure member along the path which is desired for the release movement.

7. A heel holder according to claim **6**, characterized in that the pressure member is guided by means of its guide pins in cam slots formed in the double-armed levers.

8. A heel holder according to claim **5**, characterized in that one of the double-armed levers is provided at one lever arm with a closing pedal and at the other lever arm with an opening means.

9. A heel holder for safety ski bindings comprising a pressure member for engaging the heel groove, means pivotally mounting said pressure member to the ski on an axis which is disposed behind the heel, a spring element resiliently urging said pressure member against the heel of the boot, said pressure member being pivotally movable to a release position against the action of the spring element by an excessive force, which is upwardly directed at right angles to the surface of the ski, a closing pedal to which the pressure member is firmly connected, means defining aligned slots, a double-armed lever, said pressure member and one end of the spring element being pivoted to one arm of said double-armed lever with the pivot pin sliding during the opening and closing movements along the edges of said aligned slots, the guide edges effective during the opening movement being upwardly and rearwardly inclined, the guide edges effective during the closing movement being approximately parallel.

10. A heel holder for safety ski bindings comprising a pressure member for engaging the heel groove, means pivotally mounting said pressure member to the ski on an axis which is disposed behind the heel, a spring element resilently urging said pressure member against the heel of the boot, said pressure member being pivotally moveable to a release position against the action of the spring element by an excessive force, which is upwardly directed at right angles to the surface of the ski, a stud upon which said pressure member is mounted, said stud being pivoted to the ski for movement to the rear and being approximately vertical in operative position, a bail member pivotally connected to the free end of the pressure member, which free and engages the heel groove, a housing, a lever including a slot pivoted to said housing and carrying the closing pedal, said bail member guided in said slot formed in the lever, said slot being approximately vertical in operative position and the spring element bearing at one end on the housing and opposing the pivotal movement of the stud.

11. A heel holder according to claim **10**, further including an opening lever, which is mounted on the housing and serves for retracting the spring element.

12. A heel holder according to claim **10**, wherein the end of the spring element which does not bear on the housing is guided in the housing and cooperates by means of a roller with a cam formed on the bail member.

References Cited

UNITED STATES PATENTS

2,981,547	4/1961	Taggart.
3,190,635	6/1965	Wustenhagen et al. --- 267—65
3,330,572	7/1967	Miller.

BENJAMIN HERSH, *Primary Examiner.*

J. A. PEKAR, *Assistant Examiner.*