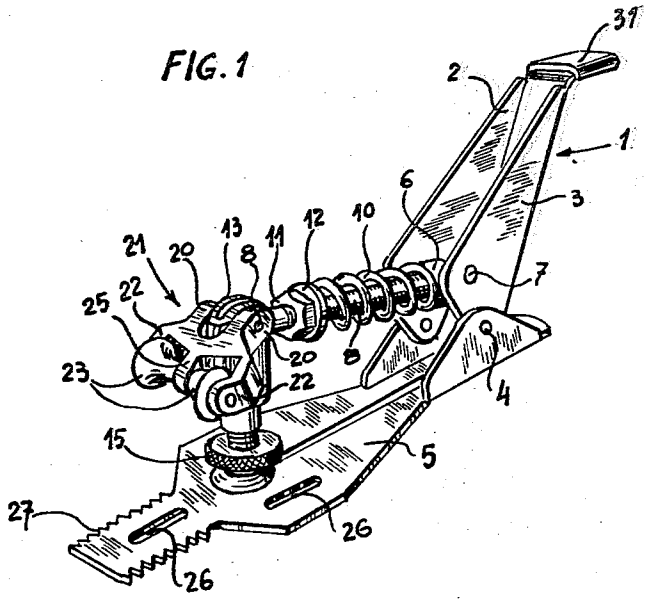
June 25, 1963 L. COVINI 3,095,209

HEEL SAFETY DEVICE FOR SKI BINDING

Filed June 9, 1961

FIG. 1



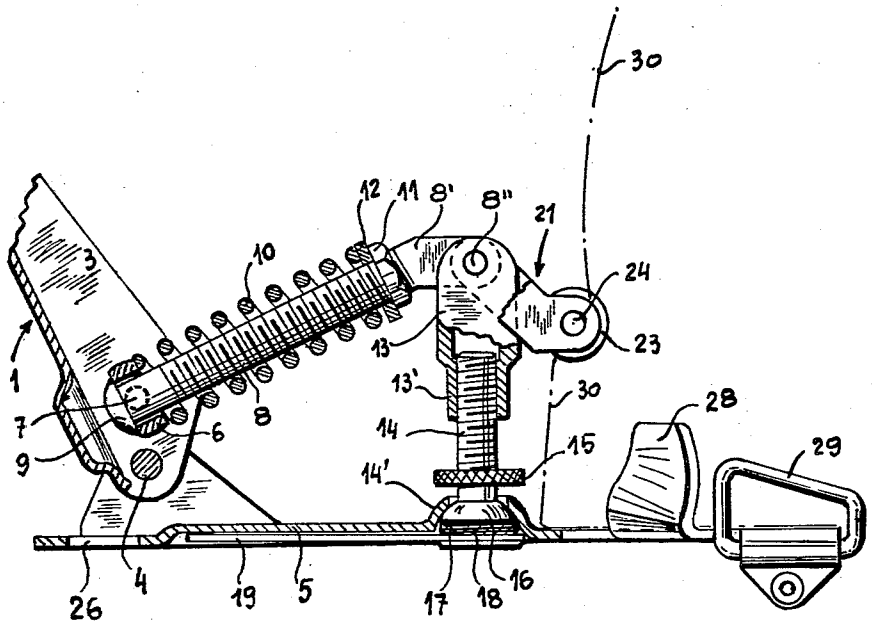


FIG. 2

LORENZO COVINI
INVENTOR.

BY

Karl F. Ross
AGENT

United States Patent Office 3,095,209 Patented June 25, 1963

3,095,209

HEEL SAFETY DEVICE FOR SKI BINDING

Lorenzo Covini, Milan, Italy, assignor to Cober, Milan, Italy, a corporation of Italy

Filed June 9, 1961, Ser. No. 116,052
Claims priority, application Italy June 24, 1960
6 Claims. (Cl. 280—11.35)

This invention relates to a safety device for anchoring the heel portion of a ski boot in a ski binding wherein the toe clip or clamp portion may be of known type. It is an object of this invention to provide for the skier a high safety of a degree heretofore unobtainable.

Another object of the present invention is to provide a device for anchoring the heel portion of a ski boot which is highly efficient in use, simple to install and to operate, and economical from the viewpoint of manufacture. A number of ski bindings are known in which safety means for releasing the ski from the boot under torque strain are provided on the toe; usually ski bindings of conventional type are not provided with a safety device which enables forward and upward displacement of the heel of the boot, while those bindings which allow for suitable displacements are rather complex in their construction and operability, e.g. for the purpose of transmitting remote strain by resilient means adapted to secure the heel of the boot. Consequently release devices heretofore proposed are rather complicated and the strapping of a ski is not so quick as would be desirable.

It is therefore a further object of the present invention to provide a device for securing the heel of the boot to the ski (no special toe release being needed) which:

(1) overcomes all the drawbacks mentioned above;
(2) affords a high degree of safety to forward flexures of the skier's foot;
(3) is simple to install and to operate, both in securing and in releasing the boot;
(4) is of simple design.

In accordance with this invention I provide a device which is biased in a heel-gripping sense by an operating lever controlled by a toggle spring, which, if overcome by a certain amount of force exerted upon the heel gripper, releases the boot; consequently the device operates as a safety device for forward flexures of the skier's foot.

According to a feature of this invention the heel gripper includes a double bracket on one side of which there are pivotally mounted two hollow frustoconical rollers adapted to engage the heel of the skier's boot. The hollow rollers are pivotally mounted on the bracket with their facing narrower ends separated by the central leg of the bracket; the opposite legs of the double bracket are pivotally connected with one end of a rod, preferably a threaded bolt, whose other end is slidably supported by a ring affixed to the operating lever and are also connected with a substantially upright two-part stem which is fastened to a base plate while being movable through a small angle from a released to a secured position.

Again, according to another feature of the invention, the connection between the stem and the operating lever advantageously is a toggle linkage including a compression spring which surrounds the aforementioned bolt and is compressed between said ring and a nut which is mounted on the threaded end of the bolt. The nut bears against the adjacent end of the spring for properly loading the same.

Additionally the releasing force may be adjusted by vertical adjustment of the upper portion of said standard which is hollow and internally threaded at its lower end, to receive the threaded upper end of the bottom portion of the stem whose head is held pivotally affixed to the ski by the base of the device. The adjustment is effected by means of a knurled ring integral with the bottom part of the stem which may be rotated to alter the positioning thereof relative to the upper stem part.

By way of non-limitative example an illustrative embodiment of this invention is shown in the accompanying drawing in which:

FIG. 1 is a perspective view showing the binding device according to the invention, and

FIG. 2 is a side elevation partly in section of the device shown in FIG. 1.

The binding device includes an operating lever **1**, formed from a metal sheet, which has two side walls **2, 3**. The operating lever **1** is pivotally connected at **4** to a base plate **5** to be secured to the ski runner. Between the side walls **2** and **3** of the operating lever **1** there is pivotally mounted at **7** a ring **6** in which there is slidably mounted a threaded bolt **8** having a head **9** engaging the ring **6**.

The bolt **8** is surrounded by a compression spring **10** whose tension may be adjusted by means of a nut **11** which bears upon a washer **12** and, thereby, upon the spring **10**.

The threaded bolt **8** extends at its front end with a flat portion **8'**, which is pivotally mounted on pivot pin **8''** to the upper stem portion **13** whose bottom end is hollow and threaded as shown at **13'**.

The upper stem portion **13** receives the upper end of the bottom portion **14** of the stem which may be inclined by small angles from the vertical position as seen in the drawing. The knurled ring **15** integral with the bottom portion **14** of the stem is operated to adjust the elevation of the upper stem portion **13**. The bottom portion **14** has a head **16** connected to the base **5** which is provided with a suitable swivel housing **14'** surrounding said head **16**. The head **16** rests upon a washer **17** and, through it, upon a rubber pad **18** which is carried by the plate **19**.

By clockwise or anticlockwise rotation of the bottom portion **14** of the two-part stem its upper portion **13** is displaced upwardly or downwardly to adjust the safety degree against forward flexures of the skier's foot, as will be explained later.

On the ends of the pivot **8''** projecting from both sides of the upper stem portion **13** there are journaled the legs **20** of a double bracket **21** which carries rotably mounted between its three legs **22, 25** opposite legs **20**, two substantially frustoconical rollers **23** supported by the pivot **24** and disposed with their narrower ends adjacent each other but separated by the leg **25** of the universally swivelable bracket.

Furthermore the device comprises: slots **26** and racks **27** for periodical adjustment and for securing it to the ski runner, abutments **28** for the heel of the boot and a link **29** for a safety belt (not shown).

The operation of the device is as follows:

With the skier's boot placed as shown in dotted lines at **30**, the handle portion of the lever or tab **31**, rubber covered, is rotated forwardly (i.e. clockwise in FIG. 2). The stem **13, 14** is urged forward to bring the rollers **23** into gripping engagement with the heel of the boot. The spring **10**, already somewhat precompressed is then further loaded more and more as long as the vector of the force exerted by the spring passes above the fulcrum **4** of the lever **1**; the moment of said force opposes the rotation of the lever and tends to push the lever back to the starting position, in the event of its release. On the other hand further rotation of the lever causes the vector of the force exerted by the spring to pass below the fulcrum and the moment to change its direction by toggle action.

The reversed moment urges the lever **1** in its clock-

wise direction while pushing the rollers **23** against the heel of the ski boot so as clampingly to engage it.

If, with the device in this clamping position, the skier should lift the heel, e.g. for a sudden stop of the runner the two rollers **23** gripping the boot **30** are rocked with the heel and cause the bracket **21** to rotate about the axes **8''** to compress the spring **10**, thereby canceling the clamping action of the rollers **23** whose path diverges from the path followed by the heel of the boot; it will be seen that the heel-gripping extremity **23** of bracket **21** is positioned below its horizontal pivotal axis **8''** so that the heel cannot be raised without concurrent rearward displacement of the top of the stem portion **13** to which this bracket is hinged.

It should here be noted that clockwise or anticlockwise rotations of the knurled ring **15** result in alterations of the position of the bracket **21** and therefore adjustment of the degree of safety of the device.

It will be understood that changes could be made in the safety ski binding of this invention without departing from the scope of the invention as defined by the following claims. It is therefore intended that the matter shown in the accompanying drawing and described in the foregoing specification shall be considered as illustrative and not in a limiting sense.

I claim:

1. In a ski binding including a base plate provided with boot-engaging abutments, the combination therewith of a heel-clamping assembly comprising an operating lever pivotally secured to said base plate rearwardly of the boot of a skier, universal swivel means on said base plate between said lever and said boot, an upstanding stem tiltably secured to said base plate by said swivel means, a resilient connection between said lever and the top of said stem, and a heel-gripping member hinged to the top of said stem for swinging motion about a horizontal axis, said member being provided with a heel-engaging extremity forwardly of said stem and below said axis, said lever being displaceable between a released position and an operating position in which said connection resiliently urges the top of said stem forwardly while maintaining said extremity in clamping engagement with the heel of said boot.

2. The combination according to claim 1 wherein said stem includes a lower portion rotatable on said swivel means and an upper portion threadedly engaged by said lower portion for adjusting the elevation of said axis by rotation of said lower portion.

3. The combination according to claim 1 wherein said connection comprises a toggle linkage including a rod pivoted to said stem, a ring traversed by said rod and pivoted to said lever, and a compression spring surrounding said rod while bearing upon both said rod and said ring.

4. The combination according to claim 3 wherein said rod is a bolt provided with a nut, said nut adjustably bearing upon said spring.

5. The combination according to claim 1 wherein said member is a bracket with three projecting legs at said extremity and with a pair of rollers journaled between said legs for rolling contact with said heel.

6. The combination according to claim 5 wherein said rollers are substantially frustoconical and face each other with their narrower ends across the middle one of said legs.

References Cited in the file of this patent

UNITED STATES PATENTS

2,573,955	Cubberley	Nov. 6, 1951
2,610,861	Campbell	Sept. 16, 1952

FOREIGN PATENTS

172,281	Austria	Aug. 25, 1952
173,073	Austria	Nov. 10, 1952
1,110,856	France	Oct. 19, 1955
1,222,897	France	Jan. 25, 1960