United States Patent [19]

Sittmann

[11] **3,892,420**

[45] **July 1, 1975**

[54] **SUPPORT DEVICE FOR SKI SAFETY BINDINGS**

[75] Inventor: **Brigitte Sittmann**, Stuttgart, Germany

[73] Assignee: **Vereinigte Baubeschlagfabriken Gretsch and Co. GmbH.**, Germany

[22] Filed: **Aug. 15, 1973**

[21] Appl. No.: **388,463**

[30] **Foreign Application Priority Data**

Aug. 16, 1972 Germany 2240159

[52] **U.S. Cl.** ..... **280/11.35 T**

[51] **Int. Cl.** **A63c 9/00**

[58] **Field of Search** ..... 280/11.35 T

[56] **References Cited**

UNITED STATES PATENTS

3,199,885	8/1965	Smolka et al.	280/11.35 T
3,572,739	3/1971	Erlebach et al.	280/11.35 T
3,751,055	8/1973	Ishida	280/11.35 T

FOREIGN PATENTS OR APPLICATIONS

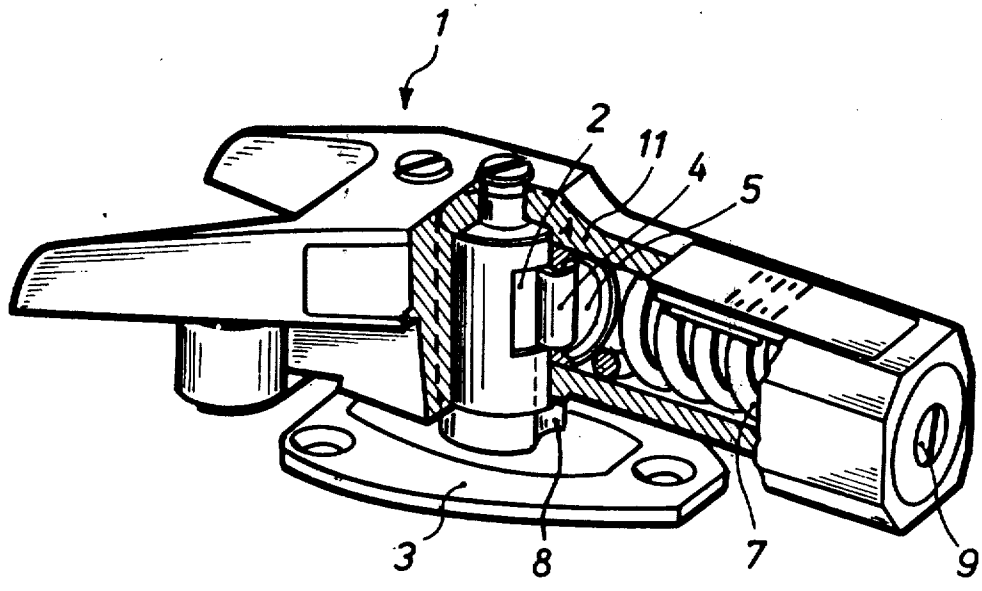
1,466,483	1/1967	France	280/11.35 T
453,989	6/1968	Switzerland	280/11.35 T

Primary Examiner—M. Henson Wood, Jr.
Assistant Examiner—John J. Love
Attorney, Agent, or Firm—Craig & Antonelli

[57] **ABSTRACT**

A support device for safety ski bindings, especially front support mechanism, with a releasable support jaw which is retained by means of a bearing pin at a base plate adapted to be fixed to the ski and which includes a detent groove into which engages a detent member constructed as roller under the pressure of detent spring means; a guide member is thereby arranged between the bearing pin and the spring means which surrounds the roller that slides in the direction of the longitudinal axis of the support mechanism; the guide member may thereby be a component part of the housing wall of the support jaw or may be inserted into the same as separate structural part.

20 Claims, 5 Drawing Figures



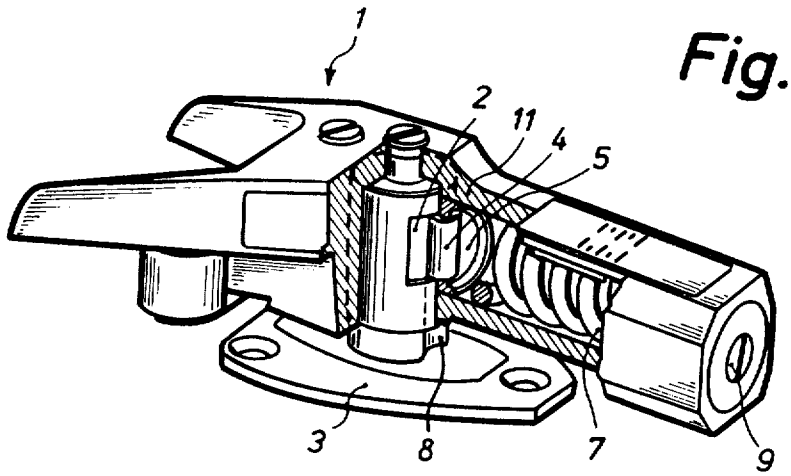


Fig.1

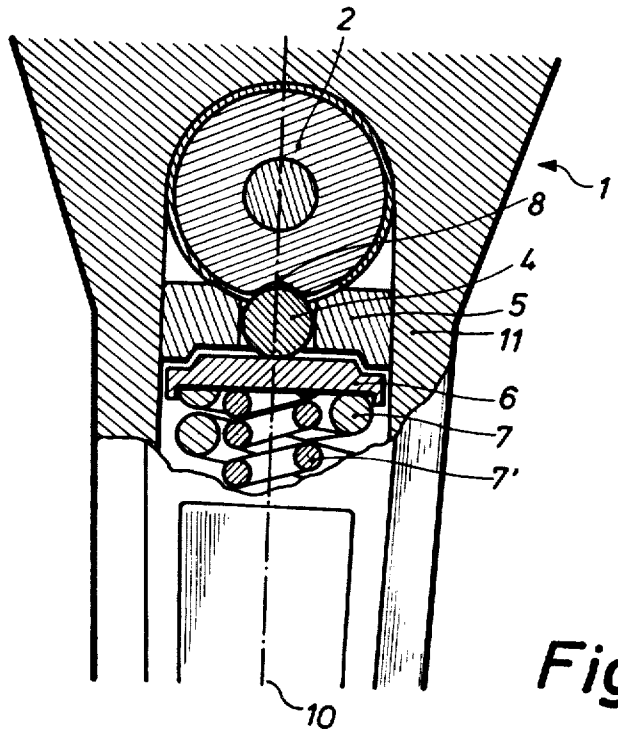
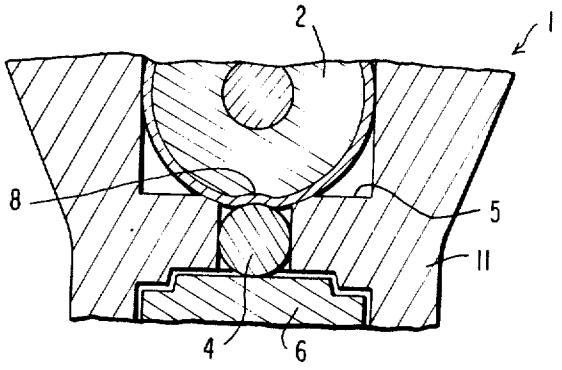


Fig.2

FIG.3



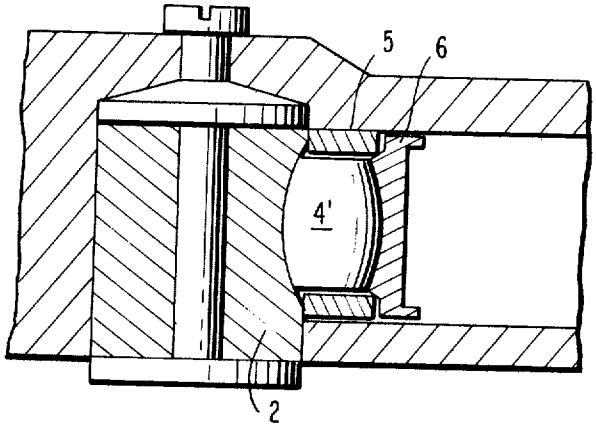


FIG.4

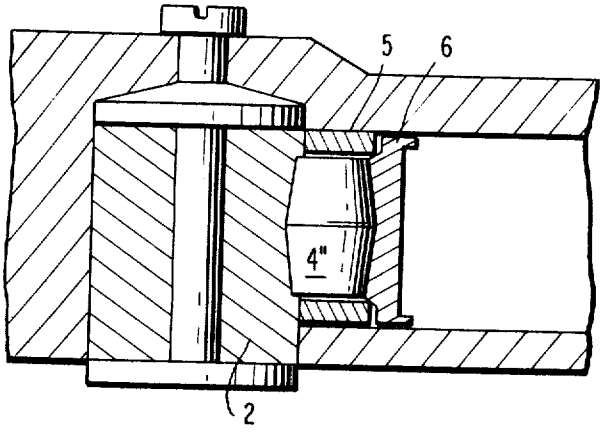


FIG.5

SUPPORT DEVICE FOR SKI SAFETY BINDINGS

The present invention relates to a support device for ski safety bindings, especially front support devices, with a releasable support jaw which is held on a base plate fixed to the ski by means of a bearing pin and includes a detent groove into which engages a detent member constructed as roller under the pressure of detent spring means.

Support devices are known in the art which includes ball detent mechanisms. A ball guided by a piston thereby engages under the pressure of detent spring means into a groove milled into a pivot bolt and therewith locks the support mechanism. During a pivoting of the support device, the ball disengages and rolls off along the surface of the pivot bolt or slides off along the same. These prior art support mechanisms, however, entail the disadvantage that a relatively high surface pressure results due to the point-like abutment of the ball on the pivot bolt, whence grooves may result on the engaging surfaces. The high surface pressure makes high demands as regards the materials used. With the formation of grooves, also the friction increases disadvantageously and consequently an accurate adjustment or maintenance of the release force is no longer possible.

In order to eliminate these disadvantages, the ball has been replaced by a roller which, also guided in a piston, engages due to a spring loading action in a detent groove arranged in a pivot bolt (French Pat. No. **2,078,172**). By reason of the fact that the roller abuts linearly at the pivot bolt, the surface pressure is reduced and the danger of material deformation is decreased. However, this type of construction entails the disadvantage that all of the forces stemming from the roller (longitudinal and lateral forces) are transmitted directly to the piston guided in the housing wall. In particular due to the lateral forces the piston has the tendency to edge or cant in the guidance which may lead to the blocking of the entire detent mechanism. Furthermore, it is of disadvantage that the lubricant required between the piston and the housing wall is continuously displaced by the piston whereby after a short period of time no lubricant is present at these friction surfaces. Rotary oscillations at the support mechanism lead to pump movements at the piston which, with an eventual housing leakiness, pump snow water, i.e., melted snow into the detent mechanism which brings about disadvantageous contact corrosions.

The aim of the present invention essentially consists in eliminating the described disadvantages and to create a favorable force distribution.

The underlying problems are solved according to the present invention in that a guide part is arranged between a bearing pin and spring means, which surrounds the roller sliding in the longitudinal axis of the support mechanism.

It is appropriate that the guide part is a component of the housing wall. However, the guide part may also be inserted as separate structural part into the housing wall of the support jaw.

The advantages achieved with the present invention consist especially in that as a result of the support of the roller in a guide part fixed at the housing, the piston entailing definite disadvantages can be dispensed with altogether. It is thereby immaterial whether the guide part is a component part of the housing wall of the support jaw or is installed into the housing wall as separate structural part by pressing, shrinking or bonding action. The guide part surrounds advantageously the roller and thus supports the same at the generated surfaces thereof and at the end surfaces thereof.

The principal advantage achieved with the present invention resides in that the forces emanating from the roller are divided up. Preferably, one or more detent springs which press against the roller by means of a spring plate absorb the longitudinal forces emanating from the roller whereas the lateral forces directed perpendicularly to a longitudinal axis of the support mechanism are transmitted from the roller by way of the guide element to the housing wall of the support jaw. An immovable structural part assumes according to the present invention the force absorption or force transmission of the lateral forces whereby a friction problem which is difficult to solve is eliminated.

The lubrication is limited in this embodiment only to the roller and the detent springs whereby the problem of lubricant displacement, as occurs with a piston, is solved. Also the engaging surfaces of the roller at pivot bolts, guide elements and spring plates are, when the roller rotates, supplied continuously with lubricant since by reason of the rectilinear abutment surfaces, the lubricant remains on the surface of the roller during rotation and is distributed.

Accordingly, it is an object of the present invention to provide a support mechanism for safety ski bindings which avoids by simple means the aforementioned shortcomings and drawbacks encountered in the prior art.

Another object of the present invention resides in a support mechanism for safety ski bindings in which premature wear is eliminated, yet the requirements as regards the materials used for the various parts thereof are greatly lessened.

A further object of the present invention resides in a support mechanism for safety ski bindings which permits an accurate adjustment and preservation of such adjustment during long periods of operation and use of the device.

A still further object of the present invention resides in a support mechanism for safety ski bindings in which the specific surface pressure is reduced and in which all forces including longitudinal and lateral forces are appropriately absorbed without the use of a piston.

Still another object of the present invention resides in a support mechanism for safety ski bindings which eliminates the danger of jamming due to canting of the piston used heretofore while at the same time greatly improving the permanent lubrication of the various parts.

Another object of the present invention resides in a support mechanism for safety ski bindings of the type described above in which displacement of lubricant during use of the device is far-reachingly minimized.

These and other objects, features and advantages of the present invention will become more apparent from the following description when taken in connection with the accompanying drawing which shows, for purposes of illustration only, several embodiments in accordance with the present invention, and wherein:

FIG. **1** is a perspective view, partly cut away, of a front support mechanism with a detent device for safety ski bindings in accordance with a first embodiment of the present invention;

FIG. 2 is a partial view, partly in cross section, of the front support mechanism of FIG. 1, illustrated on an enlarged scale; and

FIGS. 3–5 are partial cross-sectional views of further embodiments of a detent device for saftey ski bindings in accordance with the present invention.

Referring now to the drawing wherein like reference numerals are used throughout the various views to designate like parts, the front support device illustrated in FIGS. 1 and 2 which includes a support jaw generally designated by reference numeral 1, is pivotally supported on a bearing pin 2. The bearing pin is rigidly connected with a base plate 3 which can be secured at the ski by means of connecting elements, for example screws, not shown herein. In the axial direction, the bearing pin 2 is provided with a preferably V-shaped detent groove 8 into which engages a detent member constructed as roller 4. The roller 4 is supported in the longitudinal direction by a spring plate 6 abutting at detent springs 7 and 7' whereas the lateral support is taken over according to the present invention by a guide member 5. A detent resistance is produced by the detent springs 7 and 7' which, corresponding to the desired release force, is adjustable by means of an adjusting device 9.

As shown in FIG. 3 the guide member 5 can be constructed as integrated structural part of the housing wall 11, or, as shown in FIG. 2, as an individual part manufactured by conventional sintering process, pressed in, shrunk-in or adhesively bonded to the housing wall 11.

The roller 4 is pressed into the detent groove 8 of the bearing pin 2 by the spring force of the detent springs 7 and 7' whereby the support jaw is locked. If, however, torsional forces occur (for example, as a result of a so-called twisting fall of the skier), then the support jaw 1 has the tendency to deflect laterally. However, the spring force of the detent springs 7 and 7' which acts opposite this pivot movement, pivots the support jaw 1 back into its original position. If the occurring lateral forces of the support jaw 1 are larger than the counteracting spring force of the detent springs 7 and 7', then the support jaw 1 will deflect toward the side since the roller 4 has surpassed one of the two outer flanks of the detent groove 8 and now rolls off along the surface of the pivot pin 2.

Up to the release of the support jaw 1, torsional forces occur which are transmitted by way of the bearing pin 2 onto the roller 4. The longitudinal and lateral forces then emanating from the roller 4 are separately absorbed by the advantageous arrangement of the roller 4 in the guide member 5 according to the present invention and are transmitted to the housing wall 11. As shown in FIG. 2, the longitudinal forces extending parallel to a longitudinal axis 10 are absorbed by way of the spring plate 6 by the detent springs 7 and 7' whereas the lateral forces directed perpendicularly to the longitudinal axis 10 are transmitted from the roller 4 directly to the housing wall 11 by way of the guide member 5 fixedly arranged in the housing.

As a result of this force division into longitudinal and lateral forces a good and precise functioning of the support jaw 1 as assured, since not alone the detent springs 7 and 7' but also the housing wall 11 is utilized for the force absorption by way of the guide member 5.

The detent mechanism according to the present invention is not limited to the illustrated embodiment but is applicable also, for example, to heel support devices. Furthermore, the spring means may also be constituted, for example, merely of a single detent spring.

Furthermore, the bearing pin 2 may subtend any desired angle with the base plate 3 or may even be disposed horizontally.

Furthermore, it is possible to rigidly fix the roller 4 and to guide the bearing pin 2 in the guide member 5; in this case, however, means for centering the bearing pin 2 have to be provided.

As shown in FIGS. 4 and 5, it is also possible in principle to provide in lieu of cylindrically shaped rollers 4, drum-shaped roller element 4' or conically shaped roller elements 4''.

While I have shown and described several embodiments in accordance with the present invention, it is understood that the same is not limited thereto but is susceptible of numerous changes and modifications as known to those skilled in the art, and I therefore do not wish to be limited to the details shown and described herein but intend to cover all such changes and modifications as are encompassed by the scope of the appended claims.

What I claim is:

1. A support mechanism for safety ski bindings with a disengageable support jaw means, a bearing pin means for fixedly holding the support jaw means at a ski, said bearing pin means being provided with a detent groove into which engages a detent member constructed as roller means under the pressure of detent spring means, characterized in that a guide member for absorbing laterally directed forces is disposed in the support jaw means and fixed with respect thereto, the guide member is arranged between the bearing pin means and the spring means, said guide member approximately surrounding the roller means which is slidable in the longitudinal direction of the support mechanism, and in that a spring plate means for absorbing the longitudinally directed forces is provided and disposed in the support jaw means between the roller means and the detent spring means, the spring plate means is angularly movably supported against the roller means.

2. A support mechanism according to claim 1, characterized in that the support mechanism is a front support mechanism for a safety ski binding.

3. A support mechanism according to claim 1, characterized in that the roller means is cylindrical.

4. A support mechanism according to claim 1, characterized in that the roller means is drum-shaped.

5. A support mechanism according to claim 1, characterized in that the roller means is conically shaped.

6. A support mechanism according to claim 1, characterized in that the guide member is a component part of the housing wall of the support jaw means.

7. A support mechanism according to claim 1, characterized in that the guide member is inserted into the housing wall of the support jaw means as separate structural part.

8. A support mechanism according to claim 1, characterized in that the bearing pin means is adapted to be fixedly retained on the ski by way of a base plate secured to the ski.

9. A support mechanism according to claim 8, characterized in that the guide member is a component part of the housing wall of the support jaw means.

10. A support mechanism according to claim 8, characterized in that the guide member is inserted into the

housing wall of the support jaw means as separate structural part.

11. A support mechanism according to claim **8**, characterized in that the bearing pin means is arranged vertically with respect to the ski, and in that the axis of the roller means extends parallel to the axis of the bearing pin means.

12. A support mechanism for safety ski bindings with a disengageable support jaw means, bearing means for fixedly holding the support jaw means at a ski, said bearing pin means being provided with a detent groovve into which engages a detent member constructed as roller means under the pressure of detent spring means, characterized by means for effecting a split up of forces steming from the roller means into longitudinal and lateral forces including a guide member for said roller means for absorbing the lateral forces, the guide member being disposed in the support jaw means and fixed with respect thereto, the longitudinal forces are absorbed by the detent spring means, the detent spring means includes a spring means and a spring plate means disposed between the roller means and the spring means, the spring plate means is angularly movably supported against the roller means.

13. A support mechanism according to claim **12**, characterized in that the guide member is a component part of the housing wall of the support jaw means.

14. A support mechanism according to claim **13** characterized in that the guide member is inserted into the housing wall of the support jaw means as separate structural part.

15. A support mechanism according to claim **12**, characterized in that the support mechanism is a front support mechanism for a safety ski binding.

16. A support mechanism according to claim **12**, characterized in that the spring means includes at least a pair of springs disposed in the support jaw means.

17. A support mechanism according to claim **16**, characterized in that the bearing pin means is adapted to be fixedly retained on the ski by way of a base plate secured to the ski.

18. A support mechanism according to claim **17**, characterized in that the roller means is cylinderical.

19. A support mechanism according to claim **18**, characterized in that the bearing pin means is arranged vertically with respect to the ski, and in that the axis of the roller means extends parallel to the axis of the pin.

20. A support mechanism according to claim **19**, characterized in that means are provided for adjusting the pair of springs to obtain a desired release force for the ski binding.

* * * * *