United States Patent

[11] **3,577,602**

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[21] Appl. No. **761,741**
[22] Filed **Sept. 23, 1968**
[45] Patented **May 4, 1971**

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[32] Priority **Sept. 27, 1967**
[33] **Germany**
[31] **P 16 85 786.6**

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[54] **BUCKLE, ESPECIALLY FOR SKI BOOTS**
1 Claim, 7 Drawing Figs.

[52] **U.S. Cl.** **24/70**
[51] **Int. Cl.** **A43c 11/14**
[50] **Field of Search** 24/270-
—272, 279; 24/68 (SK), 69 (SK), 70 (SK)

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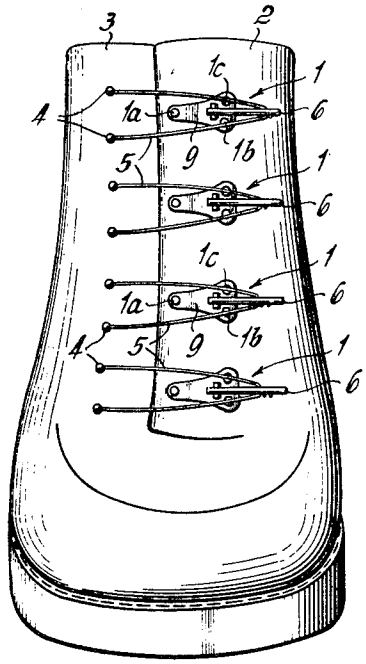
Primary Examiner—Donald A. Griffin
Attorney—Walter Becker

ABSTRACT: A shoe buckle, especially for ski boots, which includes: an approximately triangular plate, and bearing means connected to said plate and having a substantially U-shaped contour, said bearing means comprising two-spaced supporting members at least approximately perpendicular to the respective adjacent major surfaces of said plate and provided with axially aligned bores for receiving a pivot pin, said bearing means also comprising a flat arm integral with said supporting members and forming the transverse arm of said U-shaped contour, said flat arm being spot-welded to said plate at an area thereof which is wider than the length of said flat arm.



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SHEET 1 OF 2

FIG. 1

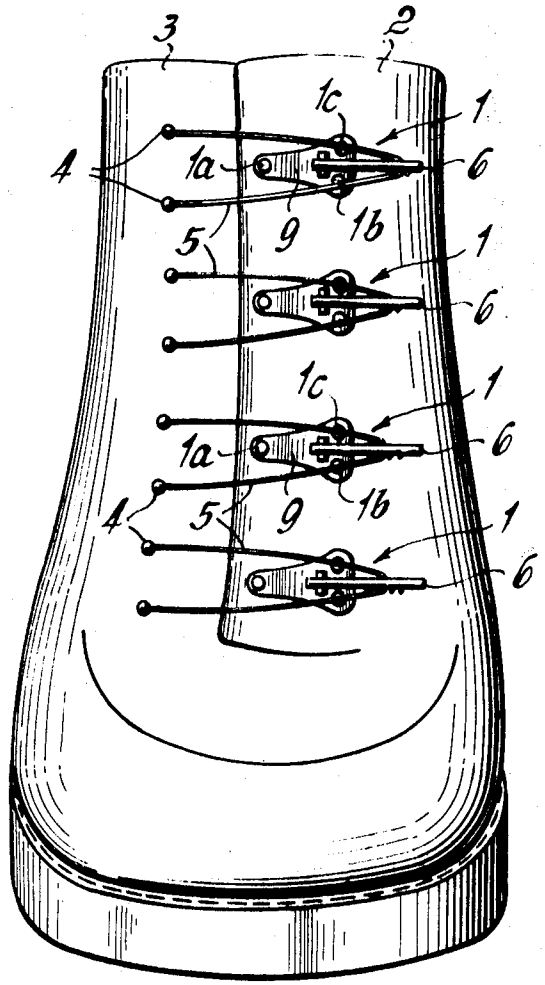

FIG. 2

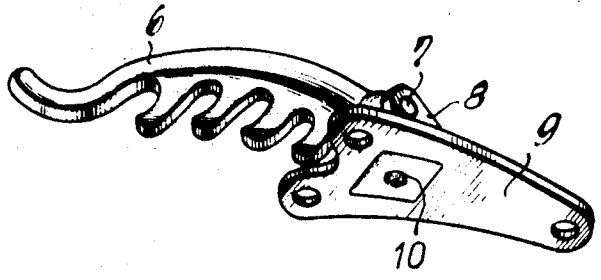

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FIG. 4

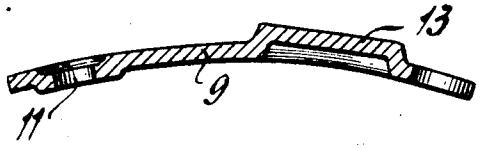


FIG. 3

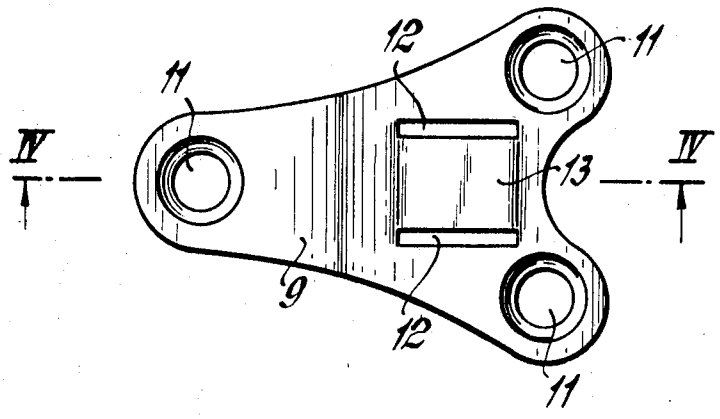


FIG. 6

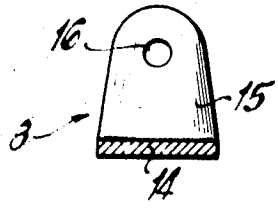


FIG. 5

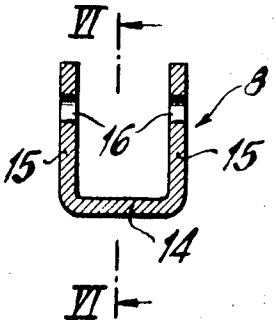
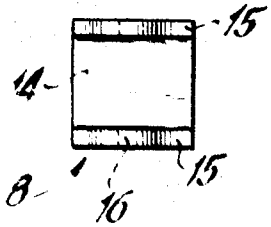


FIG. 7



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BUCKLE, ESPECIALLY FOR SKI BOOTS

The present invention concerns a shoe buckle, especially for ski boots, with an approximately triangular-curved plate of sheet metal and a bearing for the tensioning lever for rotatably journaling said tensioning lever so as to permit the latter to turn about a pivot pin located in two parallel flanges of said bearing, said flanges protruding approximately perpendicularly from said plate, which latter forms a fixed unit with said bearing.

Shoe buckles of the above-mentioned type are frequently employed particularly on ski boots so that such boots can in a simple and reliable manner be opened and closed even under unfavorable conditions when it is cold and the parts are iced. Moreover, such buckles permit variation of closure tension with a few operations. To this end, the shoe buckles are arranged on an upper closing flap of the shoe, whereas a lower closing flap has for each shoe buckle a pair of eyelets with a pulling element, for instance, a shoestring of leather or synthetic material. For purposes of closing the shoe, the pulling element is placed into one of a plurality of cutouts provided along the tension lever while the latter is in upward position, whereupon said lever is in a direction away from said eyes pressed downwardly upon the upper closing flap. Depending on whether the pulling element is located in a cutout closer or farther away from the axis of rotation of said lever, the closing tension will be more or less strong. Inasmuch as the closing tensions, for reasons of safety frequently have to be considerably high, there exists the danger that in view of the tilting moment on the bearing for the tensioning lever, a considerable pressure is exerted upon the shoe and the foot of the wearer. This closing pressure is undesired because it interferes with a sliding of the closing flaps upon each other during the closing action whereby a safe closure will be made more difficult and in addition, the wearer is impeded physically.

In order to distribute the tilting moment during the fastening of the shoe buckle over as large an area of the plate as possible and thereby to reduce the closing pressure, it is known so to design the shoe buckle that the length of said plate in the direction toward the marginal area of the closing flap amounts to at least three times the distance between said plate and the turning axis of the tensioning lever.

There may also be mentioned as prior art shoe buckles those which have a plate which is cast as a single piece with the bearing means for the tensioning lever. The cast piece consists of light metal. However, such cast pieces of the shoe buckle are relatively expensive to produce.

Furthermore, shoe buckles have become known according to which the plate and the flanges of the bearing for the tensioning lever are stamped out as a single piece from a piece of metal. These flanges are bent over by 90° either solely within the area of the turning axis of said tensioning lever or along a larger section of the plate. The manufacturing costs of these shoe buckles are considerably lower than those for cast shoe buckles. The shoe buckles cast together with the bearing means as one single piece have the drawback that the plate within the area of the flanges or bending edge can be only as wide as the distance between the flanges. The said flange distance is determined on the other hand by the relatively narrow tensioning lever. As a result, the effective contacting surface for the plate is relatively small so that increased surface pressure is unavoidable. The effective contacting surface is furthermore reduced in particular with longer bending edges by relatively large curvatures transverse to the contracting plate. If, however, only the relatively narrow flanges are sharply bent within the area of the bearing means for the tensioning lever, the corners of the flanges will at the contacting plate have the tendency to tear.

Finally, it is also known to embed a bearing for the tensioning lever with parallel flanges into a wide elastic contacting plate of synthetic material. Such a shoe buckle, however, cannot, in contrast to other heretofore known shoe buckles be connected to the top side of the upper closing flap by means of three rivets near the corners of an approximately triangular

contacting plate. Furthermore, a precise alignment of the bearing means for the fastening lever in the contacting plate of synthetic material is relatively difficult to obtain.

It is, therefore, an object of the present invention to provide a satisfactory shoe buckle which can be produced in an inexpensive manner and which during the closing operation will exert a relatively low closing pressure.

It is another object of this invention to provide a shoe buckle as set forth in the preceding paragraph which in spite of a relatively short distance between the connecting areas at the edges of the nearly triangular contacting plate will permit a relatively large contacting surface.

These and other objects and advantages of the invention will appear more clearly from the following specification in connection with the accompanying drawings, in which:

FIG. 1 illustrates a front view of a ski boot with shoe buckles according to the invention;

FIG. 2 is a perspective view on a larger scale than that of FIG. 1 of the shoe buckle structure according to the invention;

FIG. 3 shows a top view of the contacting plate of the shoe buckle structure according to FIG. 3, the scale of FIG. 3 being larger than that of FIGURE 2;

FIG. 4 is a longitudinal section through the contacting plate of FIG. 3, said section being taken along the line IV–IV thereof;

FIG. 5 is a transverse section through the tensioning lever bearing without the pivot pin, the scale of FIG. 5 substantially corresponding to that of FIGS. 3 and 4;

FIG. 6 is a section along the line VI–VI of FIG. 5; and

FIG. 7 is a top view of FIG. 6.

The above-mentioned objects have been realized by the shoe buckle according to the present invention which comprises a curved contacting plate preferably of steel sheet metal and bearing means forming a fixed unit with said plate for pivotably supporting the tensioning lever, which is characterized in that the bearing means for the tensioning lever consists of a separate U-shaped portion which is perpendicular to the longitudinal direction of the pivot axis of said tensioning lever and has a flat web or arm between the two flanges, said arm being connected with the contacting plate 9 by electric spot welding while the contacting plate at its connecting area with the bearing means for the tensioning lever is wider than the base thereof.

According to an advantageous design of the shoe buckle, there are provided two slots in the contacting plate through which slots the flanges of the bearing means extend.

By stamping out the said slots, the alignment of the bearing means for the tensioning lever on the contacting plate is secured so that the flanges will point exactly in the longitudinal direction of the contacting plate. In this way, the tilting moment is best converted into a uniform low closing pressure. By welding the tensioning lever bearing to the contacting plate, any sliding of the parts will be impossible so that this manufacturing process does not require special attention.

A particularly advantageous design of the shoe buckle according to the present invention is characterized in that between the slots a plane elevation is pressed out to such an extent that when the tensioning lever bearing is introduced, the bottom side of the web or arm is practically without a step arranged at the marginal area of the contacting plate.

The above structure yields the advantage that the bottom side of the entire shoe buckle uniformly contacts the shoe. This, in turn, favors a uniform pressure distribution. Above all, in view of the plane elevation which is particularly well engaged by the flat web or arm of the introduced tensioning lever bearing, a fast and secure contact establishment will be considerably facilitated when welding the parts together by spot welding.

In order to realize a very good absorption of the tilting moment when the shoe buckle is fastened, and also in order to obtain a uniform pressure distribution, the prefabricated parts are best welded to each other in such a way that the distance between the connecting area and the outer end of the contact-

ing plate in a direction opposite to the direction of the tensioning lever in its closing position will at least be three times as great as the distance between the connecting area and the pivot axis of the tensioning lever.

Referring now to the drawings in detail, FIG. 1 shows the customary arrangement of shoe buckles on a ski boot. As will be seen from the drawing, the shoe buckles 1 are connected to the upper closing flap 2 by three rivets 1*a*, 1*b* and 1*c*. Opposite each shoe buckle, and on the lower closing flap 3 there is provided a pair of eyelets 4 for holding a pulling element 5. A loop of the pulling element is by means of a tensioning lever 6 tensioned when the shoe buckle is closed so that the closing flaps are moved toward each other. Since this arrangement of the shoe buckle according to the invention pertains to the prior art, further description thereof seems to be superfluous. There will now be described the structure of the shoe buckle itself which forms the essence of the present invention.

FIG. 2 more specifically illustrates the structure of the shoe buckle. As will be seen therefrom, the shoe buckle has a tensioning lever 6 preferably of forged light metal, and is journaled in bearing means 8 for rotation about a pivot pin 7. Said tensioning lever is pivotable about pivot pin 7 which in turn is riveted to a tensioning lever bearing 8 forming a bearing block. The bearing 8 is fixedly connected to a contacting plate 9. The reference numeral 10 of FIG. 2 indicates a welding spot on the tensioning lever bearing by means of which a connection with the contacting plate is obtained. The two parts welded to each other, viz the bearing 8 and the contacting plate 9 will now be described in their prefinished condition.

FIGS. 3 and 4 respectively illustrate in longitudinal section and bottom view the prefinished contacting plate 9. As will be seen from the drawing, said plate 9 has the shape of an acute-angled triangle the portions of which are provided with connecting bores 11. The said plate 9 is curved along the longitudinal central plane thereof. In the vicinity of one and or the narrower base of the triangle, two slots 12 are stamped out of the plate. These slots 12 are symmetrically parallel to the longitudinal central plane of said plate 9. Between the slots 12, an elevation or portion 13 is pressed out of the contacting plate and, more specifically, to such an extent as the material of the tensioning lever bearing is thick. The elevation is, in contrast to the remaining portion of the contacting plate, not curved but plane. The contacting plate is stamped out from a steel sheet metal strip by means of a follow-on tool.

FIGS. 5—7 show the structure of the bearing 8 for the tensioning lever. As will be evident from these FIGS., said bearing comprises an approximately U-shaped portion of sheet metal with a flat web or arm 14 and two lateral flanges or upright arms 15. The distance between said flanges corresponds precisely to the distance of the slots 12 in the contacting plate 9. These slots 12 are only slightly wider than the thickness of the sheet metal used for the tensioning lever bearing and are slightly longer than the flanges 15 of the bearing, which flanges as will be described further below, are passed through said slots 12. The flanges 15 have oppositely located bores 16 for receiving the pivot shaft 7 shown in FIG. 2.

The prefinished tensioning lever bearing is then for purposes of mounting the buckle passed with its flanges or upright arms 15 through the slots 12 of the contacting plate 9 in such a way that the web 14 will be located in the depression of the plate 9 as formed by the elevation 13 and the outer marginal area of the slots. In this way the bottom side of the shoe buckle is practically plane. Subsequently, the two prefinished parts 8,9 are fixedly connected at 10 by spot welding. The tensioning lever and the pivot pin may be mounted in customary manner on the parts welded together.

The slots 12 in the contacting plate 9 or the connecting area 10 of the bearing with the contacting plate 9 are so arranged that the distance between the connecting area and the outer end of the contacting plate 9 opposite to the direction of the tensioning lever in its closing position will at least be three times as great as the distance between the connecting area and the pivot axis of the lever or the bores 16.

By the employment of two parts for the engaging plate and the bearing means, respectively, the supporting plate may also within the area of its connection with said bearing means be wide so that its closing pressure will be distributed over a large surface of the shoe and will not be transmitted to the foot. By bending the flanges of the bearing means, no reduction in the effective engaging surface occurs. A tearing at the bending edge of the flanges will not occur for all practical purposes.

In addition to the above advantages, the show buckle according to the present invention can be produced at low cost. Moreover, the separately prefabricated contacting plate and the bearing means for the tensioning lever may be combined in different embodiments so that changes in the shoe buckle can easily be realized. It is important above all that in view of the low closing pressure, a proper closing of the shoe provided with the buckle according to the invention will be assured.

It is, of course, to be understood that the present invention is by no means limited to the particular design shown in the drawings, but also permits modifications within the scope of the appended claims.

I claim:

1. A shoe buckle especially for ski boots, which includes, in combination: an approximately triangular plate provided with rivet openings at its three corners and parallel slots adjacent one end of said plate, bearing means having a substantially U-shaped contour connected to said plate, said bearing means comprising a plane web and two spaced parallel arms at opposite sides of said web approximately perpendicular to the plane of said web, the portion of said plate between said slots being pressed upwardly a distance approximately equal in depth and area to the web of said U-shaped member, said U-shaped member being fixed to said plate with its arms passed upwardly through said slots and its web in said recess so that the under surface of said web conforms approximately to the under surface of said plate, said web and said portion of said plate being secured together, said bearing member having aligned openings in its arms spaced from said plate, a pivot pin extending through said openings, and a tensioning lever journaled on said pivot pin.