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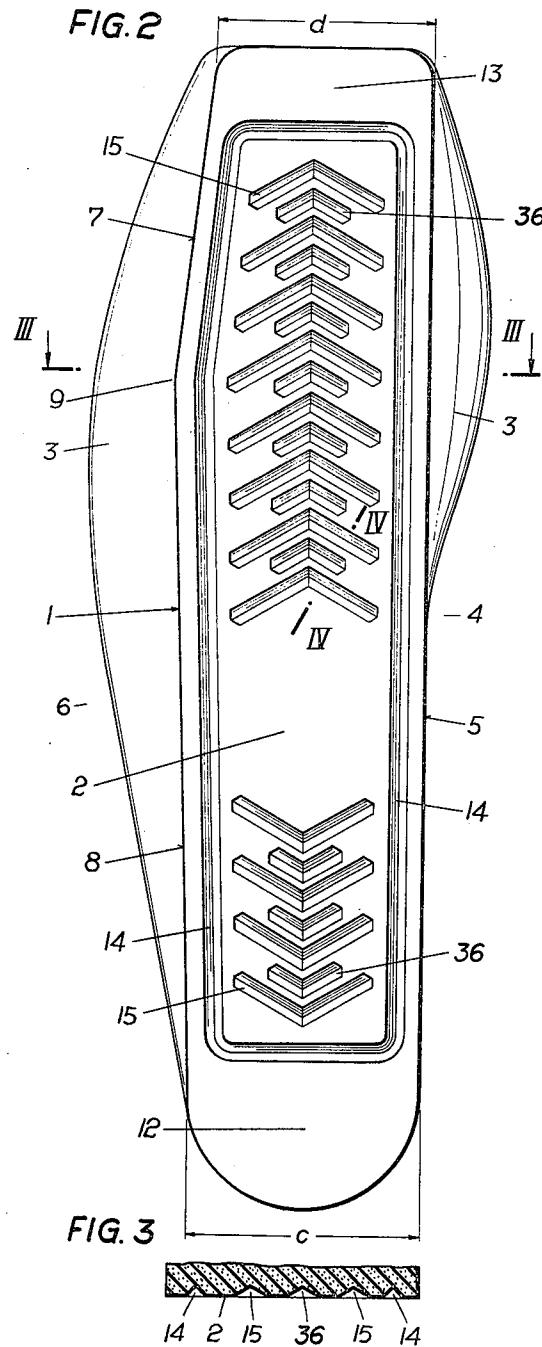
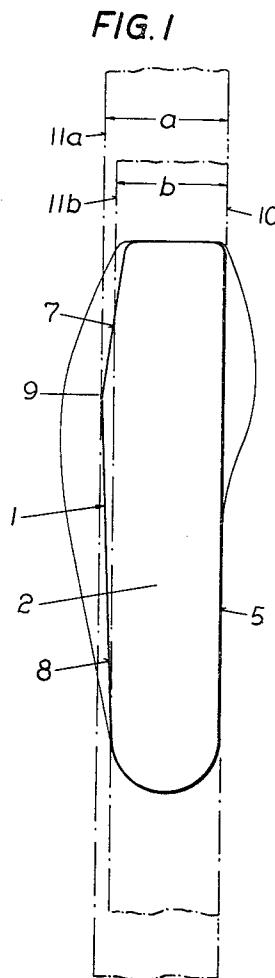
F. HERUNTER

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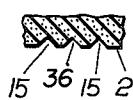
SOLE FOR SKI BOOTS

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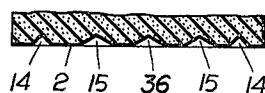
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**FIG. 4**



**FIG. 3**



INVENTOR

Franz Herunter  
BY  
Cushman, Darby & Cushman  
ATTORNEYS

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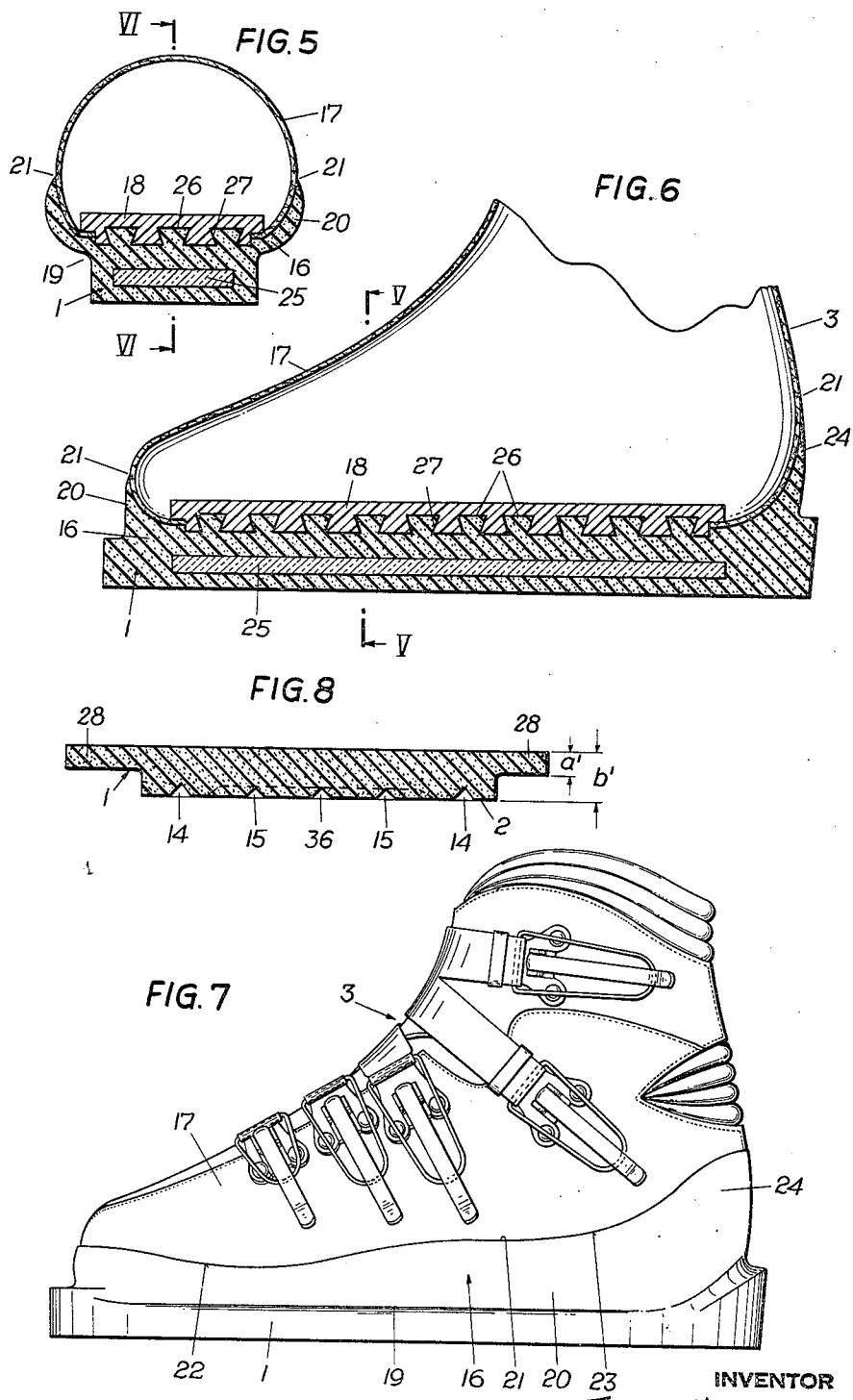
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INVENTOR

FRANZ HERUNTER  
BY

Cushman, Derby & Cushman  
ATTORNEYS

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## SOLE FOR SKI BOOTS

Franz Herunter, Vienna, Austria, assignor to Schuhfabrik  
Koflach F. Herunter O.H.G., Vienna, Austria  
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11 Claims

### ABSTRACT OF THE DISCLOSURE

A sole for ski boots is described having a substantially rectangular base member narrower than the width of the ski boot upper and attached to the lower portion of the ski boot upper. The substantially rectangular base member is defined by two parallel relatively shorter edges forming the front and rear edges of the base member and relatively longer edges forming the lateral edges of the base member. In a first preferred embodiment the width of the front and rear edges are equal to or less than the width of a narrower standard width ski. In a second preferred embodiment the width of the front edge is less than the width of the narrower standard width ski and the width of the rear edge is equal to the width of the narrower standard width ski. The inner lateral edge of the base member extends from the front edge to the rear edge in a straight line. The outer lateral edge forms a line extending from the front edge rearwardly and outwardly of the boot and a second line extending from the rear edge forwardly and outwardly of the boot, said lines converging at a point substantially in the region of the ball of the foot. The width of the base member at the point where these lines converge is equal to or greater than the width of a wider standard width ski.

There are known soles for ski boots, which have a narrower base than the shoe and have straight edges. These straight edges improve the guidance of the ski and cause a minimum of contact with the snow, thus avoiding the braking action of the sole in the snow. Within the known soles of this type, the edges which limit the base are parallel to each other, so that the base has an elongated rectangular shape. There are two standard widths of skis. Up to a certain length the skis have a standard width of 65 mm. and over this length they have a standard width of 70 mm. But the length of the ski does not depend on the shoe size, but it rather depends on the height of the skier, his weight and talent. It is thus impossible to predestinate for which width of ski the ski boot is to be. Thus the width of the base of the boot sole had to be adapted to the lower standard width, because otherwise the sole would protrude over the ski, which is a disadvantage. However, when using the broader ski with the narrow sole base the guidance of the ski is deteriorated.

The object of this invention is to avoid these disadvantages. The invention consists essentially in providing the sole base with a break at the outer edge and being straight at the inner edge, in such a manner having the greatest width in the region of the ball of the foot. It has been proved that the guidance of the ski is mainly done with the inner edge of the ski. For this reason it is important that the inner top edge of the ski aligns with the inner edge of the sole base. This is why the inner edge of the

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sole base is straight. On the outer edge it is not necessary for the sole and the ski to be in alignment, but it is enough if use is made of the entire supporting width. In consideration of having a forward-leaning posture when skiing, most of the weight of the body is concentrated in the region of the ball of the foot, and according to this invention the supporting width provided is greatest there. By the angular shape of the outer edge confining the sole base in the region of the ball a snow-plow-like shape is created by which the disturbances caused by the side base sections protruding over the ski edge are eliminated. The invention has also the advantage of giving a greater stability when walking without skis because of its broader supporting area. According to a preferred embodiment of this invention the front end width of the sole and the back end width of the sole are as wide or smaller than the smaller standard ski width (which is 65 mm.) and the width at the break is as great or greater than the greater standard ski width (which is 70 mm.). Thus, when using skis of greater standard width the support is granted by the whole width of the ski, while when using skis of the smaller standard width only a snow-plow-like part of the sole base protrudes over the ski which is admissible.

It is an essential feature that the outer edge of the sole is broken. There can also be two breaks. In this case the greatest width of the ski stretches along a short distance along which the outer edge of the sole base is parallel with the inner edge of the sole base. In this case it is necessary, however, that the slanted edges enclose a greater angle with the longitudinal direction, even though this does not bring any advantage, because it is sufficient when the greater supporting width occurs just in one cross-section. Therefore, the sole base according to the invention is confined at its outer edge by two straight lines which meet in an angle at about the ball of the foot.

The inventive sole can be fabricated as an outer sole having the contour according to the invention and can be fixed to an intermediate sole of the ski boot by means of an adhesive. In that case the intermediate sole, too, shows the contour of the inventive sole. However, the inventive sole can also be made of one piece with the lower section of the upper or with a part of it. This is appropriate e.g. for ski boots of plastic or rubber. According to the invention it is also possible that the sole is formed unitary with the walls of a trough-like space enclosing the lower part of the upper on all sides, the upper being pinched (pulled) on the last using an insole. In this manner it is possible to use any sort of quilt upper of leather or plastic and to adapt the shape of the shoe to the shape of a foot, still having the advantage of the inventive sole. Thus, the part of the foot or the upper, respectively, extending over the sole can be supported by the space in which the lower part of the upper is positioned. According to the invention, it is also possible to form the inventive sole by an elevated middle zone of an outer sole adhesively fixable to the intermediate sole of a ski boot, the outer sole in the region of the middle zone being  $1\frac{1}{2}$  to 3 times thicker than in the border zones.

Consequently, ski boots provided with an intermediate sole having conventionally the width of the foot can also be equipped with the inventive sole.

In the accompanying drawings embodiments of the invention are shown by way of examples.

FIG. 1 shows schematically the shape of the sole, FIG. 2 is a view of the sole, FIG. 3 shows the cross-section along the line III—III of FIG. 2 and FIG. 4 shows a

section through the profile of the sole along the line IV—IV of FIG. 2. FIG. 5 shows a cross-section through a ski boot provided with the inventive sole along the line V—V of FIG. 6, which in turn shows a longitudinal section through a ski boot along the line VI—VI of FIG. 5. FIG. 7 shows a side view of the ski boot according to FIGS. 5 and 6. FIG. 8 illustrates a cross section of a modification of the preferred embodiment shown in FIG. 2, said cross section being taken along a line corresponding to the line III—III in FIG. 2.

As can be seen from FIGS. 1 to 3, the inventive sole comprises a base 2 which is narrower than the shoe 3. At the inner side of the foot 4 the base is confined by a straight edge 5, and at the outer side of the foot 6 it is confined by broken edges 7 and 8 which meet in the region of the ball in a point 9. At this point the base 2 is widest, and in the embodiment shown in the drawing this width equals the bigger standard width  $a$  of skis. This standard width, which is shown in FIG. 1, is 70 mm. In the point 9 the base protrudes beyond the smaller standard width of the ski, signified by  $b$ . The shoe 3 fits, as FIG. 1 shows, so in the binding that the inner edge 5 aligns with the dash-dotted line, which represents the inner ski edge 10. When using the bigger standard ski width, the break in the outer sole base edge 9 cuts off with the outer edge of the ski 11A. When using the smaller standard width of ski the breaking point 9 extends beyond the outer ski edge 11b. Consequently, the whole supporting sole base width is made use of when the bigger standard ski width  $a$  is used whilst when using the smaller standard ski width  $b$  the edge 7 acts snow-plow-like.

In the embodiment according to FIG. 2 the width  $c$  at the back end of the sole 12 corresponds to the smaller standard ski width and the width  $d$  at the front end is smaller than this standard ski width. In this way, protruding of the front end of the boot sole base beyond the smaller standard ski width is prevented, even in case of incorrect fit in the bindings. It is also taken into account that there is hardly any burden on the toes and that the smaller width fits better to the foot.

Parallel to the edges there is an endless groove 14 which together with fishbone-like grooves 15, 36 gives more security against skidding.

In the embodiment according to FIGS. 5, 6 and 7 the sole 1 is formed in one piece with the walls 20 of a cavity 16 which embrace the lower part of the upper 17 of the ski boot 3. The upper 17 is pinched over the last using an insole 18. The bottom wall 19 of the cavity is thicker than the walls 20 extending upwardly so that the bottom wall 19 supports the upper 17 and thus the foot, whilst the thinner walls 20 engage the upper 17 elastically. The cross-section of these walls 20 tapers towards the upper rim 21. In the region 22 of the forefoot and in the region 23 of the ankle the upper rim 21 of the walls is extended upwardly so that it lies in equidistance from the insole. There, the top of the cavity 16 is about 10 mm. to 20 mm. higher than the bottom thereof. In the region of the heel the wall 24 is extended upwardly so that it forms a heel pad. 25 is an insertion member, e.g. of plywood or similar material, which stiffens the sole 1 and lessens its weight.

When manufacturing, the upper 17 put together with the insole 18 over the shoe last together with the shoe last is connected to a mould confining the outer surface of the sole 1 and the cavity 16. The insertion member 25 is laid in, and plastic is sprayed into the mould. The upper thus forming part of the mould, is contacted by the plastic sprayed into the mould so that after hardening of the plastic the sole 1 and the walls of the cavity 16 are fixed to upper 17 and the insole 18. For better anchorage there are recesses 26 in the insole 18, into which the plastic enters. As is shown in FIG. 5, these recesses may be enlarged at the tops 27 thereof so that the protrusions formed by the plastic of the sole 1 and the bottom wall of the cavity 16 firmly engages the recesses 26.

In the embodiment according to FIG. 8, the inventive sole 1 is constituted by an elevated middle zone of an outer sole which can be adhesively fixed to an intermediate sole of a ski boot 3. This outer sole comprises border zones 28 extending from the middle zone, the border zones corresponding to the shape of the ski boot. Consequently, ski boots having a conventional intermediate sole can be equipped with the inventive sole. The border zones 28 have a thickness  $a'$  which is about 4 mm. to 5 mm. and the middle zone has a thickness  $b'$ . The thickness  $a'$  is about  $\frac{2}{5}$  through  $\frac{3}{5}$  or about half of the thickness  $b'$  of the middle zone. This sole, too, has grooves 14, 15, 36 for security against skidding.

What I claim is:

15. 1. A sole for a ski boot comprising a substantially rectangular base member of a width narrower than the upper of said boot and means attaching said base member to said upper, said base member being defined by two parallel relatively shorter edges forming the front and rear edges of said base member, respectively, the lengths of said front and rear edges being equal to or smaller than the width of a narrower standard width ski, an inner lateral edge forming a straight line longitudinally of said boot extending from said front edge to said rear edge and an outer lateral edge forming a line extending rearwardly of said front edge and outwardly of said boot and a line extending forwardly of said rear edge and outwardly of said boot, said lines converging at a point intermediate the length of said base member, the width of said base member at said point of convergence of said line being equal to or greater than the width of a wider standard width ski.

2. The ski boot sole defined in claim 1 wherein said point of convergence of said line formed by said outer lateral edge coincides substantially with the region of said upper which will be adjacent the ball of a human foot when said ski boot is fitted thereon.

3. The ski boot sole defined in claim 1 wherein the length of said front edge of said base member is less than the width of a narrower standard width ski and the length of the rear edge of said base member is equal to the width of a narrower standard width ski.

4. The ski boot sole defined in claim 1 wherein said means for attachment is integral with a lower portion of said upper of said ski boot and is integral with said base member.

5. The ski boot sole defined in claim 1 wherein said means for attachment comprises means defining a cavity extending upwardly of said base member, said means defining a cavity being adapted to substantially encircle and grasp the lower portion of said upper of said ski boot and an insole clamping said lower portion of said upper to said base member.

6. The ski boot sole defined in claim 5 wherein said means for attachment includes a relatively stiff member extending longitudinally of said sole within said means for attachment for stiffening said sole and providing additional support for the human foot.

7. The ski boot sole defined in claim 5 wherein the portion of said base means defining a cavity adjacent the forward portion of said boot and the portion of said means defining a cavity adjacent the portion of said boot which will be adjacent the human ankle are of a greater height than the remainder of said means defining a cavity.

8. The ski boot sole defined in claim 1 wherein said means for attachment is a substantially flat rectangular member integral with said base member and of a width greater than said base member, said flat rectangular member being adapted to be adhesively attachable to an intermediate sole of said ski boot.

9. The ski boot sole defined in claim 8 wherein the thickness of said flat rectangular member and said base member combined is in a range from  $1\frac{1}{2}$  times to 3 times greater than the thickness of said flat rectangular member alone.

10. The ski boot sole defined in claim 8 wherein said front edge of said base member is defined by a straight line and the rear edge of said base member is defined by an arcuate line conforming to the rounding of the heel portion of said boot.

11. The ski boot sole defined in claim 8 wherein said base member includes a groove defined in the surface of said base member away from said boot upper, said groove extending continuously parallel said front and rear edges and said lateral edges of said base member and spaced inwardly of said edges.

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ALFRED R. GUEST, Primary Examiner

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