March 17, 1970 H. E. HOLMBERG ET AL 3,501,161

HEEL PROTECTOR FOR SNOW SKIS

Filed March 18, 1968

FIG 1

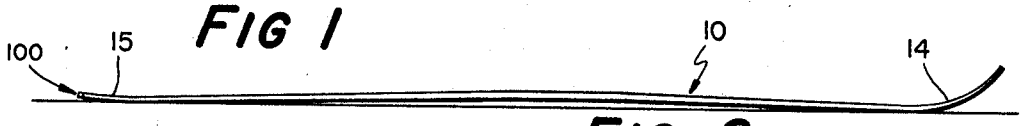


FIG 2

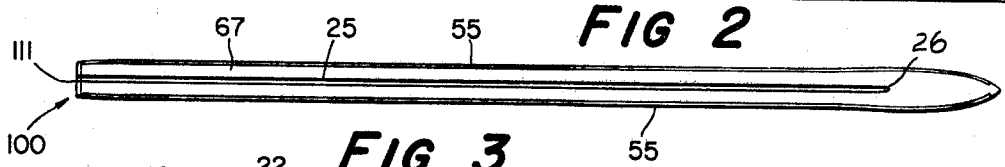


FIG 3

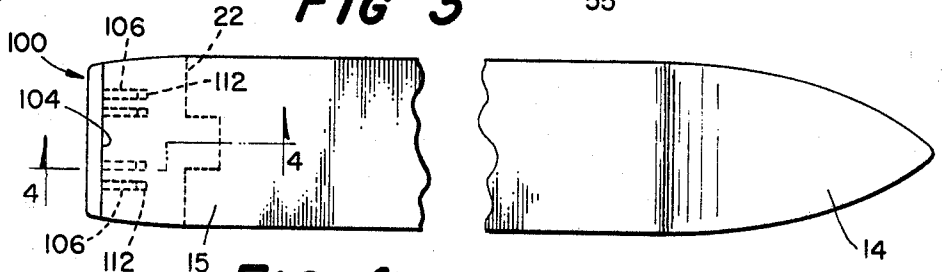


FIG 4

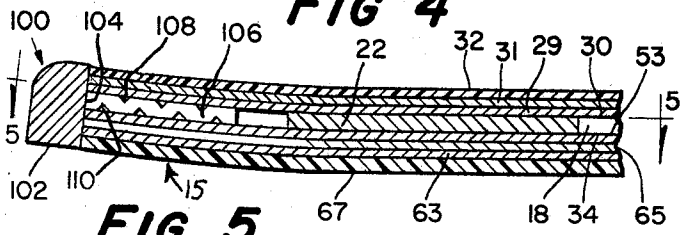


FIG 5

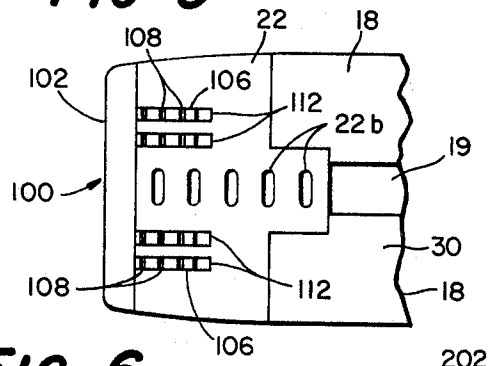


FIG 6

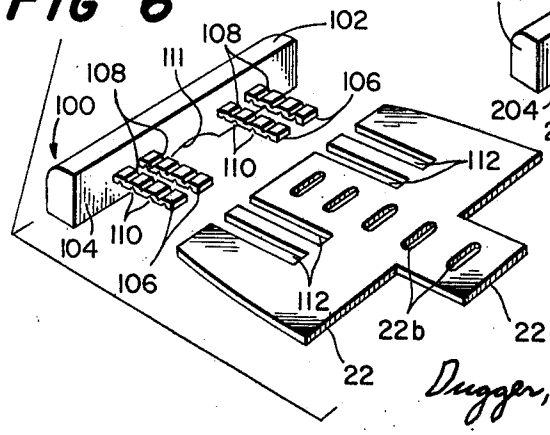


FIG 7

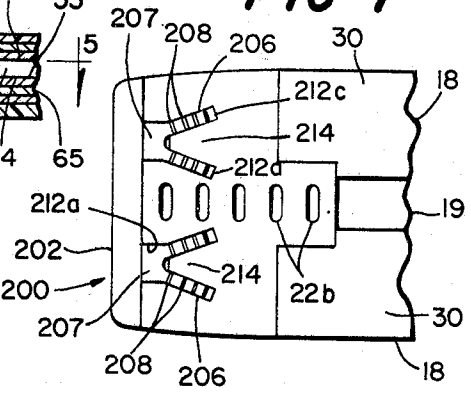
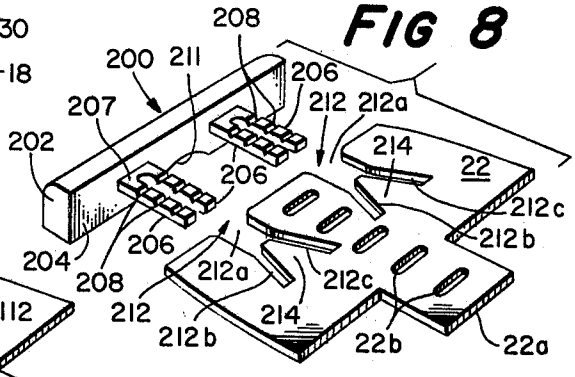


FIG 8



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United States Patent Office 3,501,161
Patented Mar. 17, 1970

3,501,161

HEEL PROTECTOR FOR SNOW SKIS

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Filed Mar. 18, 1968, Ser. No. 713,863
Int. Cl. A63c 11/00, 5/00
U.S. Cl. 280—11.13 13 Claims

ABSTRACT OF THE DISCLOSURE

A heel protector for a ski has parallel fingers that are press fitted into slots provided in the heel plate of the ski, thereby allowing the protector to be detached and readily replaced. In a second embodiment, the fingers on the protector are inserted into slots in the heel plate having diverging portions so that the fingers are forcibly spread apart, thereby fixedly retaining the protector in place and effectively preventing removal.

BACKGROUND OF THE INVENTION

Field of the invention

This invention relates generally to metal skis of the laminated type, and pertains more particularly to a heel protector for such skis.

Description of the prior art

U.S. Patent No. 3,145,998 for Bottom Structure for Laminated Ski, issued Aug. 25, 1964 to us, is illustrative of prior art constructions where the present invention will find utility. In such types of skis, the laminations thereof terminate at the heel of the ski with their rear edges exposed, much in the same manner as if the ski had been transversely cut. While such constructions have been generally satisfactory, nonetheless, frequently the skier will force the heel or rear end of his skis into the ground when not using them. This tends to mutilate the heel end of the ski and in some instances causes at least a partial delamination to occur which can become progressively worse. In any event, even where the damage is slight, the skis become marred and unsightly by the abuse to which they are unwittingly subjected.

SUMMARY OF THE INVENTION

Accordingly, one object of the present invention is to provide a protector for the heel or rear end of a laminated metal ski.

Another object of the invention is to provide a heel protector that can be removed and replaced if circumstances so dictate.

Another embodiment of the invention provides for the more permanent retention of the heel protector, thereby giving the particular ski manufacturer a choice when practicing our invention in the selection of the type of heel protector that will best suit the manufacturer's requirements and the expected desires of the skiers themselves.

A further object of the invention is to provide a heel protector of the foregoing character that can be easily installed at the factory in a minimum amount of time, thereby enhancing the desirability of using such a protector because of the minimum amount of extra time required to attach the protector.

Still another object of the invention is to provide a heel protector for skis that will be inexpensive to manufacture and which will require virtually no extra material as far as the ski's construction is concerned.

A further object of the invention is to provide a heel protector for skis that will readily conform to the upward curvature of the rear end portion of the ski.

Yet another object of the invention is to provide a protector having a construction such that a relatively soft and inexpensive metal, such as aluminum, may be used, and where a similar metal is used for the heel plate of the ski, the press fit retention of the heel protector can be achieved without requiring close tolerances as long as such tolerances are on the positive side.

Briefly stated, the invention envisages the employment of an aluminum protector comprised of a transverse rib with forwardly projecting fingers. In one embodiment, the fingers are not only initially parallel with respect with each other, but remain so when press fitted into parallel slots formed in the heel plate of the ski. In a second embodiment, the fingers, while originally parallel, enters slots having diverging portions so that the fingers are bent into a divergent relationship so as to provide virtually a permanent retention of the protector with respect to the ski.

BRIEF DESCRIPTION OF THE DRAWING

FIGURE 1 is a side elevational view of a ski having our protector mounted thereon;

FIGURE 2 is a bottom plan view of the ski in FIGURE 1;

FIGURE 3 is a top plan view with the central portion of the ski removed so as to illustrate the toe and heel portions of the ski on a larger scale, especially the latter since the present invention is concerned with the protection of the heel portion;

FIGURE 4 is a sectional view taken in the direction of line **4—4** of FIGURE 3 for the purpose of illustrating how the protector is anchored;

FIGURE 5 is a view taken in the direction of line **5—5** of FIGURE 4;

FIGURE 6 is a perspective view of our protector in an exploded relationship with the heel plate (shown planar but actually slightly curved in a longitudinal direction) that is normally present in a ski of the metal laminated type, the protector being as though its integral fingers are about to be inserted into the slots provided in the heel plate;

FIGURE 7 is a view corresponding to FIGURE 5 but illustrating another embodiment of the invention, and

FIGURE 8 is a perspective view corresponding to FIGURE 6 but illustrating the embodiment of FIGURE 7.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Due to the fact that a more complete description of the ski itself can be found in said U.S. Patent No. 3,145,998, only a general description of the ski need herein be given. However, in order to facilitate a comparison of the ski components mentioned at this time with those to be found in said patent, the same reference numerals will be employed as far as the construction of the ski itself. However, different reference numerals, quite obviously, will be utilized in order to illustrate the protector and the manner in which it is anchored to the heel of the ski.

Accordingly, describing now the general constructional makeup of the ski, a ski such as that shown in our aforesaid patent has been generally denoted by the reference numeral **10**. It will be discerned from FIGURE 1 that the ski is bent upwardly at **14** to form the toe or shovel of the ski, and the rear end terminates in the heel portion labeled **15**, which preferably curves slightly upwardly as is more clearly shown in FIGURE 4; such curvature has been found desirable in actual practice to allow backward motion even through this curvature does not appear in our previously mentioned patent.

Core members, preferably composed of randomly oriented wood particles and a suitable binder, have been

indicated by the numeral **18**, being laterally separated to provide an open medial portion **19** therebetween. The medial portion **19** extends substantially the length of the ski from a rearward termination at **20**.

Particular attention should be devoted to the presence of an aluminum insert or heel plate **22** which is modified in a manner hereinafter explained. The heel plate **22**, however, has a forwardly projecting tongue **22***a* which preferably has a centrally disposed groove (not shown) extending completely to the rear edge of the plate **22**. Such a groove matches the shape of a tracking groove **25** (FIGURE 2) that extends from the rear end **15** of the ski to a termination point **26** near the forward end of the ski as can be seen in FIGURE 2. As is conventional, the tracking groove **25** assists in the straight line tracking of the ski in use. A series of transverse slots **22***b* are provided so that the plate **22** can be curved as illustrated in FIGURE 4 without buckling or distortion, particularly when of sufficient thickness to warrant the provision of a groove on the underside of the plate **22** and its tongue **22***a* as explained above.

As can be seen in FIGURE 4, the ski **10**, which is of laminated construction as already pointed out, includes a first upper sheet **29**, preferably of aluminum, which is secured to the upper surface **30** of the core members **18** as well as to the upper surface of the heel plate **22**. To the top of the aluminum sheet **29** is secured a second upper sheet **31** which is preferably of a thin steel composition and which is coextensive with the general area of the aluminum sheet **29**. A final third upper sheet **32**, preferably of a hard plastic material, is bonded to the upper surface of the steel sheet **31** and is coextensive with the area of the steel sheet **31**. Adhesively secured to the lower surface **34** of the core members **18** and to the underside of the heel plate **22** is a first lower sheet **53**, preferably of aluminum. Although not readily understood from the drawings of this application, it is clear from our previously identified patent that running edges **55** having an angular configuration underlie the edge margins of the sheet **53**. The horizontal flanges of these running edges **55** overlie and are welded to a steel sheet **63**, a plate **65** occupying the space that would otherwise exist between the horizontal flanges in a lateral direction and between the sheets **53** and **63** in a vertical direction. A sheet or layer **67** of wax modified polyethylene plastic completes the bottom structure of the ski, this sheet or layer providing the actual running surface for the ski.

Having presented the foregoing information, which has dealt specifically with the ski construction depicted in our Patent No. 3,145,998, it is though that the construction illustrated in FIGURE 4 will be more understood and that a basis has now been afforded for an understanding of the heel protector **100** that will now be described in detail. The protector **100**, which is preferably of aluminum or other relatively soft material, includes a guard rib **102** having a forward vertical flat surface **104**. As best seen from FIGURE 6, there are four parallel fingers **106** that are integral with the rib **102** and which project from the face **104**. In the illustrated situation, there are four such fingers **106**, but it will be appreciated that the number may vary. FIGURE 6 shows quite clearly the presence of three transverse grooves **108** in the upper surface of each of the fingers **106**, and close inspection of this same figure will reveal the formation of similar grooves **110** in the lower face of each finger **106**, there being four such grooves **110** which are offset or displaced with respect to the upper grooves **108** as can be easily seen.

At this time, attention is directed to a number of slots **112** in the previously mentioned heel plate **22**. It is by reason of these slots **112** that the heel plate is modified from the construction described in our Patent No. 3,145,998. From FIGURES 3 and 4 it will be perceived that the slots **112** are somewhat longer than the length of the fingers **106**, thereby assuring complete reception

of the fingers **106** without the possibility of the end of the fingers abutting against the closed ends of the slots **112**. From FIGURE 4 it can be readliy seen that the thickness of the various fingers **106** correspond to the thickness of the heel plate **22**. It will also be perceived from FIGURE 4 that the flat face **104** extends upwardly from the top of each finger a distance corresponding to the sum of the thicknesses of the previously referred to sheets **29**, **31** and **32**. Also, it can be appreciated that the surface **104** extends downwardly from the bottom of the various fingers **106** a distance equivalent to the sum of the thicknesses of the lower sheets **53**, **63**, **65** and **67**. At the bottom of the rib **102** is an arcuate notch or groove **111**, conforming to the size and configuration of the tracking groove **25** so as to provide a smooth continuation thereof (FIGURE 2).

What cannot readily be learned from the drawings, however, is the relative width of the fingers **106** with respect to the slots **112**. In inserting the fingers **106**, a press fit is intended and when the heel plate **22** is of aluminum and the protector **100** is of aluminum, then a width of each finger **106** approximately 0.002 inch greater than the width of the slot in which it is to be received provides the requisite fit, yet permits deliberate detachment or removal of the protector **100** if later desired. It will perhaps be helpful to present a specific finger width and a specific slot width. A finger width of 0.22075 inch has been found satisfactory when utilizing a slot width of 0.21875 inch, but these widths may be varied as tolerances. It will be appreciated that the depth of the various grooves **108** and **110** will depend upon the thickness of the fingers **106** for a given material, as well as the amount of curvature that the heel portion **15** assumes; the fingers, it will be understood, conform to the curvature and the various grooves **108** and **110** allow the fingers to curve to whatever degree is necessary as they are forced into the slots **112**.

With the foregoing information in mind, the manner in which our protector **100** is installed should be apparent. Assuming that the ski **10** is first assembled as pictured in our aforesaid patent, but with an insert or heel plate **22** modified as herein explained, the fingers **106** are forced into the slots **112** and the press fit retains the protector in place. The excess material, if any, of the protector **100** can then be trimmed away. If it later becomes necessary or desirable to replace the protector, such as after it becomes scratched from prolonged and rough usage, pliers or other suitable tool can be employed to pull the protector **100** from the ski so that another protector can be pressed into place in lieu thereof.

In some instances, the heel protector should be considered a permanent part of the ski and provision is made for the more permanent anchoring of the protector to the ski as illustrated in FIGURES 7 and 8. The modified heel protector has been designated by the reference numeral **200**. Hereagain, it includes a guard rib **202**, a forward flat face **204** and projecting fingers **206**. However, the fingers **206** differ in that they are somewhat shorter, projecting from a base or bight portion **207** that is integral with the rib **202**. The fingers **206**, in this way, are made stronger than the previously decribed fingers **106**. In this embodiment, a series of transverse grooves **208** are provided in only the upper surface of the fingers **206**. They can be made somewhat deeper than the grooves previously mentioned and thus obviate the need of the lower grooves. A notch **211** is formed in the bottom of the rib **202** which corresponds to and functions the same as the groove **111**.

The heel plate **22** appearing in FIGURES 7 and 8 is altered in a different fashion from the heel plate appearing in the other views. In this situation, slots **212** are provided, there being two such slots. In this instance, though, there are parallel portions **212***a* at the rear and additional portions **212***b* and **212***c* that diverge at an acute angle with respect to the rear portion **212***a* in each

instance. This forms a camming portion **214** having a generally pointed free end which engages between the fingers **206** as they enter the slots **212**, the portion **214** causing the fingers **206** to be forcibly spread into the diverging relationship appearing in FIGURE 7. The fingers **206**, as can be seen from the exploded relationship in FIGURE 8 are initially parallel with each other. In this way, the fingers **206**, by reason of the relatively ductile characteristic of the metal (aluminum) remain in their deflected relation and the protector **200** is thus firmly held in place.

The fabrication of the protectors **100** and **200** is readily achieved on a mass production basis by extruding the protectors in each instance and then fabricating them by stamping the fingers and the grooves that have been described. In other words, the protectors **100** and **200**, as the case may be, are initially in long strips resulting from their having been extruded and are cut into the shorter lengths at the time that the fingers are stamped. The protectors, it can be appreciated, are press fitted into the ski at substantially the completion of the manufacture of the ski. Of course, as already pointed out, the protector **100** can be extracted or pulled from the ski and replaced if needed be. The protector **200**, it should be understood, is not intended to be replaced, but can be if a sufficient extraction force is applied to the rib **202** thereof.

We claim:

1. In a ski having upper and lower laminations, a heel plate member secured between said laminations adjacent the rear end thereof having a plurality of slots extending forwardly from its rear edge, and a heel protector member including a transverse rib and a plurality of integral fingers projecting from said rib into said slots in a press fit relation.

2. A ski in accordance with claim **1** in which said fingers have flat upper and lower surfaces.

3. A ski in accordance with claim **1** in which said fingers are shorter than said slots.

4. A ski in accordance with claim **1** in which said rib has a flat forward surface, and flat surface projecting both upwardly and downwardly from said fingers.

5. A ski in accordance with claim **4** in which said he plate member is curved in the lengthwise direction the ski and said fingers constitute strips having tran verse grooves across their upper surfaces so that sai finger assume a curvature conforming to that of sai heel plate member.

6. A ski in accordance with claim **1** in which least one of said members is metallic.

7. A ski in accordance with claim **6** in which sai metallic member is aluminum.

8. A ski in accordance with claim **7** in which both said members are aluminum.

9. A ski in accordance with claim **8** in which eac finger before insertion into its slot has a width approx mately 0.002 inch greater than that of the slot.

10. A ski in accordance with claim **8** in which sai slots are parallel to each other.

11. A ski in accordance with claim **8** in which sai slots each have a rear portion parallel to each other an a forward portion diverging at an acute angle with respe to its rear portion.

12. A ski in accordance with claim **11** in which eac slot has a second forward portion diverging at an acut angle forming a pointed camming means for deflectin said fingers.

13. A ski in accordance with claim **12** including tw integral bight portions, each bight portion having a pai of flat fingers extending therefrom for deflection into diverging relationship by said camming means.

References Cited

UNITED STATES PATENTS

3,145,998	8/1964	Holmberg et al.

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248,928	8/1966	Austria.
1,415,662	9/1965	France.

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