United States Patent

Simon

[15] **3,637,226**

[45] **Jan. 25, 1972**

[54] **SKI**

[72] Inventor: **Peter Simon,** Schramberg, Germany

[73] Assignee: **Karl Simon,** Schramberg, Germany

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[30] **Foreign Application Priority Data**

Feb. 10, 1969 Germany ..... P 19 06 576.0

[52] **U.S. Cl.** ..... **280/11.13 V**

[51] **Int. Cl.** **A63c 5/04**

[58] **Field of Search** 280/11.13

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Primary Examiner—Benjamin Hersh
Assistant Examiner—Milton L. Smith
Attorney—Edwin E. Greigg

[57] **ABSTRACT**

A ski structure wherein the longitudinal edge strips are formed, at least in part, of a plurality of short-length elements made of a hard material.

9 Claims, 33 Drawing Figures

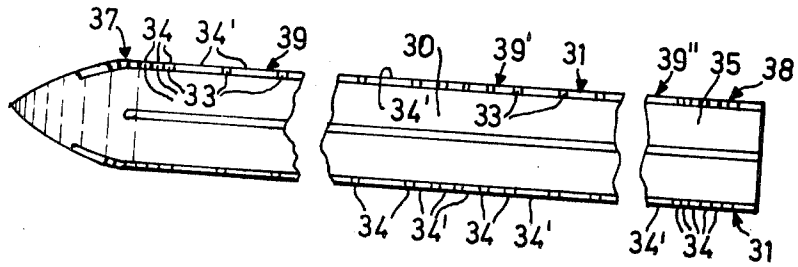
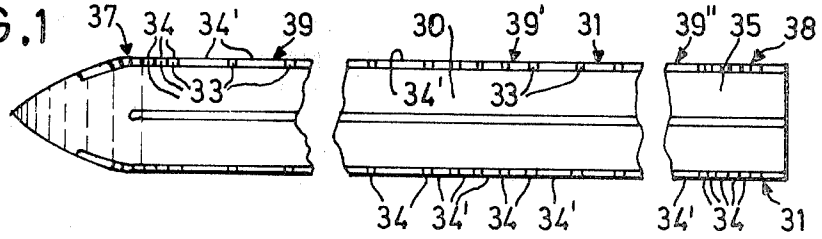


FIG. 1



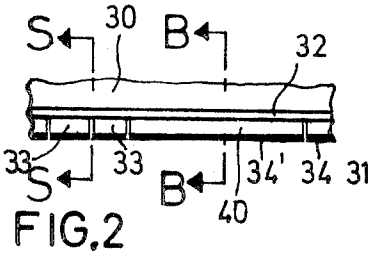


FIG. 2

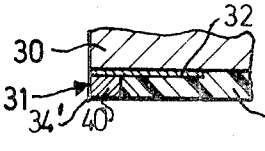


FIG. 3

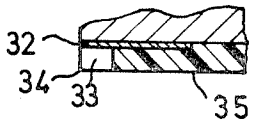


FIG. 4

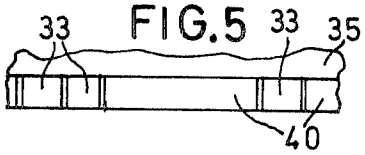


FIG. 5

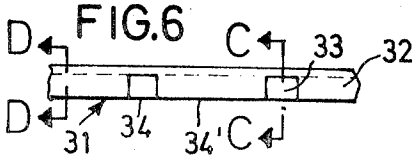


FIG. 6

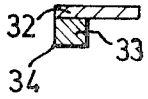


FIG. 7

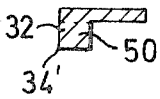


FIG. 8

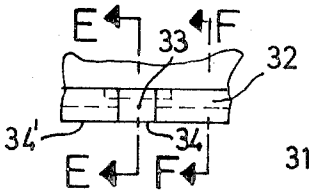


FIG. 9

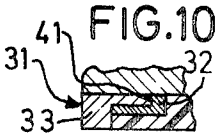
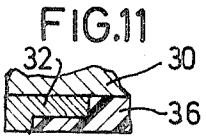


FIG. 10



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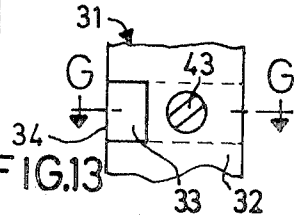

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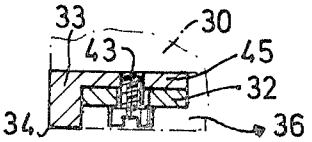

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FIG. 12

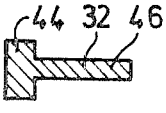
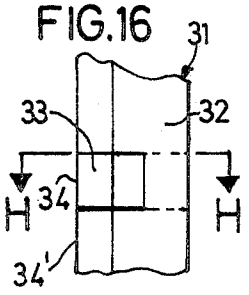


FIG. 15

INVENTOR.
Peter Simon
BY
Edson E. Iseman

FIG.16



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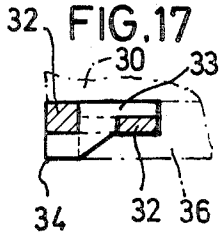

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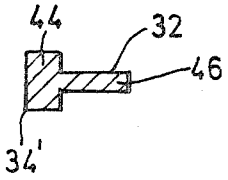

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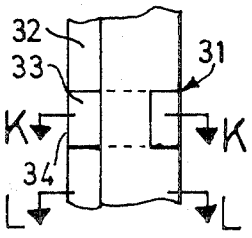

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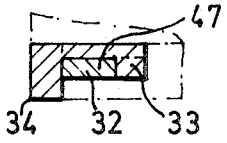

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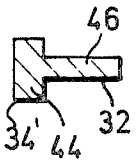

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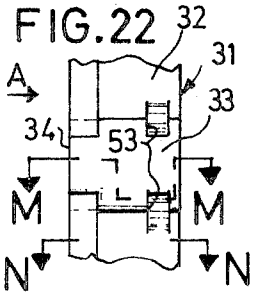

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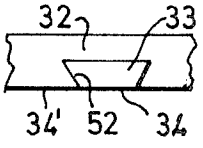

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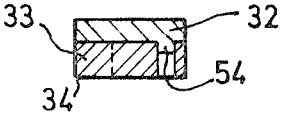

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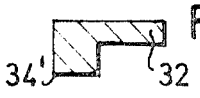

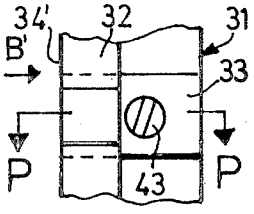

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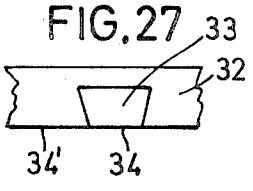
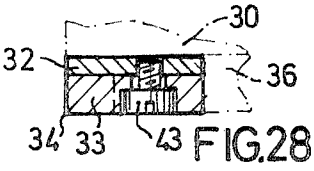
FIG.27





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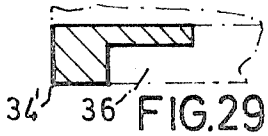


FIG.29

INVENTOR.
Peter Simon
BY
Edwin E. Greigg

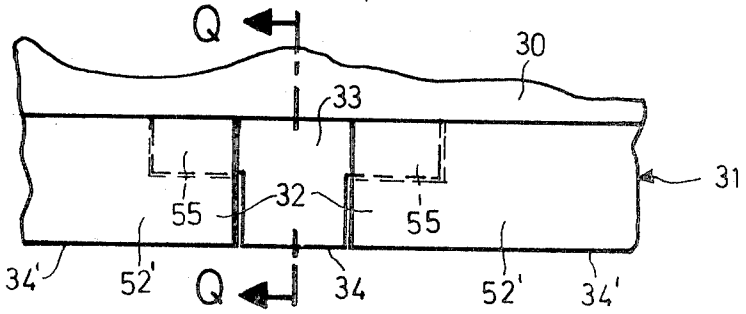


FIG. 30

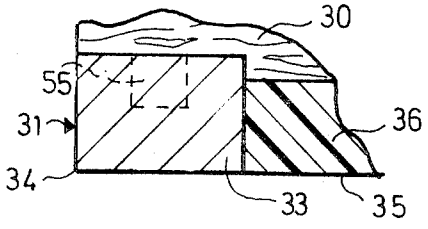


FIG. 31

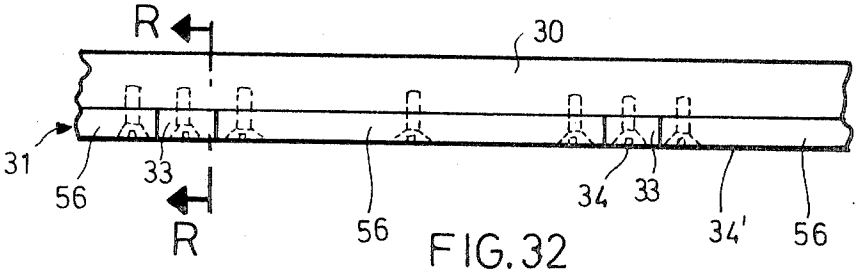
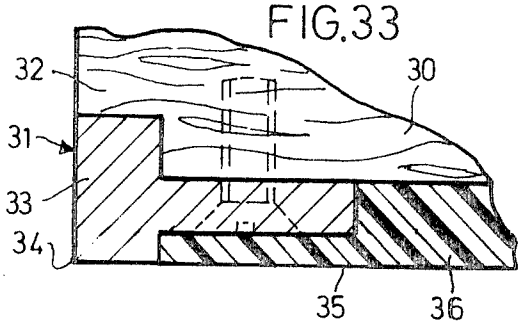


FIG. 32

FIG. 33



INVENTOR.

BY Peter Simon

Edwin L. Greigg

SKI

BACKGROUND OF THE INVENTION

This invention relates to a ski provided with two lateral edge strips each having a running edge lying in the plane of the running face of the ski. The purpose of the edge strips is to protect the lateral marginal areas of the ski and to ensure better gliding properties and, particularly, to provide an improved lateral guidance.

OBJECT AND SUMMARY OF THE INVENTION

It is a principal object of the invention to provide improved edge strips on skis to ensure superior lateral guiding properties on ice and packed snow and to further ensure durability even in prolonged use.

Briefly stated, according to the invention, short portions of the running edge of at least one edge strip are formed of the outer edges of short-length elements made of a hard material. Said elements are in engagement with a carrier body or support strip which may be a single-piece or a multipiece component.

The lateral strips, according to the invention are, notwithstanding the use of hard materials, easily and inexpensively manufactured and mounted.

The invention will be better understood as well as further objects and advantages will become more apparent from the ensuing detailed specification of several exemplary embodiments taken in conjunction with the drawing.

BRIEF DESCRIPTION OF THE DRAWING

FIG. 1 is a bottom plan view of a ski provided with lateral edge strips according to the invention;

FIG. 2 is a fragmentary side elevational view of a ski provided with a lateral edge strip according to the invention;

FIG. 3 is a sectional view along line B—B of FIG. 2;

FIG. 4 is a sectional view along line S—S of FIG. 2;

FIG. 5 is a fragmentary bottom plan view of the ski structure shown in FIG. 2;

FIG. 6 is a fragmentary side elevational view of an edge strip according to another embodiment of the invention;

FIG. 7 is a sectional view along line C—C of FIG. 6;

FIG. 8 is a sectional view along line D—D of FIG. 6;

FIG. 9 is a fragmentary side elevational view of a ski provided with a lateral edge strip according to still another embodiment of the invention;

FIG. 10 is a sectional view along line E—E of FIG. 9;

FIG. 11 is a sectional view along line F—F of FIG. 9;

FIG. 12 is a fragmentary bottom plan view of the ski structure shown in FIG. a;

FIG. 13 is a fragmentary bottom plan view of a lateral edge strip according to a further embodiment of the invention;

FIG. 14 is a sectional view along line G—G of FIG. 13;

FIG. 15 is a cross-sectional view of a support strip associated with the lateral edge strip shown in FIG. 13, in ranges externally of a hard element;

FIG. 16 is a fragmentary bottom plan view of a lateral edge strip according to a further embodiment of the invention;

FIG. 17 is a sectional view along line H—H of FIG. 16;

FIG. 18 is a cross-sectional view of the support strip associated with the lateral edge strip shown in FIG. 16, in ranges externally of a hard element;

FIG. 19 is a fragmentary bottom plan view of a lateral edge strip according to still another embodiment of the invention;

FIG. 20 is a sectional view along line K—K of FIG. 19;

FIG. 21 is a sectional view along line L—L of FIG. 19;

FIG. 22 is a fragmentary bottom plan view of an edge strip according to still a further embodiment of the invention;

FIG. 23 is a side elevational view in the direction of arrow A of an edge strip shown in FIG. 2;

FIG. 24 is a sectional view along line M—M of FIG. 22;

FIG. 25 is a sectional view along line N—N of FIG. 22;

FIG. 26 is a fragmentary bottom plan view of an edge strip according to still another embodiment of the invention;

FIG. 27 is a side elevational view in the direction of arrow B′ of the edge strip shown in FIG. 26;

FIG. 28 is a sectional view along line P—P of FIG. 26;

FIG. 29 is a cross-sectional view of the support strip associated with the edge strip shown in FIG. 26 in ranges externally of a hard element;

FIG. 30 is a fragmentary side elevational view of a ski provided with an edge strip according to still a further embodiment of the invention;

FIG. 31 is a sectional view along line Q—Q of FIG. 30;

FIG. 32 is a fragmentary side elevational view of a modified structure of the embodiment depicted in FIG. 2; and

FIG. 33 is a sectional view on an enlarged scale along line R—R of FIG. 32.

GENERAL CHARACTERISTICS OF THE INVENTION

Turning now to FIG. 1, the ski shown therein is provided with two lateral edge strips generally indicated at 31, secured to the main ski body 30 and extending substantially along the entire length of the narrow marginal areas of the running face 35 of the ski. The outer edges of the edge strips constitute the running edges of the ski and determine the lateral guiding properties thereof on packed snow and ice. For an optimal performance, the edge strips should be elastic so that they can follow and in no way impede the sometimes very substantial bending deformations of the skis. At the same time, the edge strips should be of sufficiently strong structure so that they will suffer no damage.

In order to unite these two requirements, that is, to provide a running edge having particularly good lateral guiding properties on ice and packed snow without disturbing the required flexible or elastic properties of the edge strip, according to the invention, the edge strip is at least partially formed of a plurality of short-length elements 33 made of hard material, each having an outer edge forming a short running edge 34.

By short-length elements of hard material there are meant hard elements which, due to their small length, do not disadvantageously affect the elasticity of the edge strips.

The said hard elements may be made of a suitable inelastic hard material having a hardness of at least 1,000, and optimally 1,400 vickers. Further, the material should be highly wear resistant so that the superior lateral guiding properties may be maintained even under heavy-duty conditions in a prolonged use. Hard materials well adapted for such a purpose are metal carbides or metal carbide alloys, preferably hard metals, particularly sintered hard metals. The latter may comprise tungsten carbide powder sintered with a powder of a metal in the ferric groups such as cobalt. These materials are generally known as cemented carbides. Further, ceramic or mixed ceramic (cermets) hard materials, such as metal oxides, may be used. The invention, however, is not limited to the aforenamed materials; other materials of elevated hardness and wear resistance may be used.

In the structure according to FIG. 1, the individual edge strip 31 has, in the ranges 37 and 38 in which it is particularly exposed to loads and relied on for lateral guidance, a plurality of short-length hard elements 33 arranged in series and slightly spaced from one another. In the interim ranges 39, 39′ and 39″, on the other hand, the hard elements are spaced more substantially from one another. Between each adjacent hard element 33, the running edge 34′ of the edge strip 31 is made of a softer material (e.g., steel). The distances between adjacent hard elements 33 in the ranges 39, 39′ and 39″ may vary in such a manner that in the range 39′ of the ski binding, the length of the softer running edge 34′ is shorter than in the adjoining ranges 39 and 39″.

The edge strip 31 has superior lateral guiding properties, although the total length of the hard running edges 34 is substantially smaller than the total length of the softer running edges 34′. The short length of the hard elements has a favorable effect on the lateral guiding properties. Similarly, the softer running edges disposed between two adjacent hard ele-

ments 33 are also advantageous in that they wear faster so that the effect of the hard running edges may become even stronger.

An inelastic hard element 31 having a hard running edge 34 may be inserted between two running edges 34' made of elastic or flexible material such as steel without any spacing since the elastic or flexible lengths of the edge strips provide a sufficient elasticity or flexibility of the edge strips.

If, on the other hand, as depicted in FIG. 1 at 37 and 38, a running edge range is made exclusively of a series of immediately succeeding hard elements which are practically inelastic, it is expedient to arrange the latter slightly spaced from one another. The gaps thus formed may be left unfilled to form airgaps or may be filled with a soft material, for example, an elastomer or the like, as will be described as the specification progresses. Such an arrangement ensures that the hard elements do not affect the flexibility or elasticity of the lateral edge strips. Also, the edge strip bends practically in only one direction whereby the hard elements spread and thus enlarge the spacings in the height of the running face. This has an additional advantageous effect on the lateral guiding properties, since a more substantial spreading may generate a sawtoothlike effect of the short-length hard elements, whereby the lateral guidance is further amplified.

It is to be understood that often it is sufficient and advantageous if the hard elements are arranged equidistantly spaced along the entire length of the edge strip and alternate with running edge ranges made of a softer material, such as steel. Or, it may be advantageous to form the entire edge strip exclusively of short-length hard elements.

DESCRIPTION OF THE EMBODIMENTS

Turning now to the embodiment depicted in FIGS. 2–5, there is provided a support strip 32 made of a one-piece or multipiece elastic steel band which is bonded to or screwed on the main ski body 30. To the underside of support strip 32 there is affixed, for example, soldered, a plurality of serially arranged edge strip elements 33 and 40. The elements 33 are made of a hard material, while the elements 40 arranged flush with the hard elements 33 are made of a softer material, preferably steel. Both elements 33 and 40 have a rectangular section. The running face insert 36 abuts laterally the edge strip elements 33, 40 (FIGS. 3 and 4) and extends over the support strip 32. The hard elements 33 are relatively short, for example, 3–5 mm., while the softer edge strip elements 40 may be substantially longer, for example, 30 mm. or more.

In the embodiment according to FIGS. 6–8, the steel support strip 32 has, as shown in FIG. 8, a substantially L-shaped sectional configuration. The support strip 32 includes a leg portion 50 which has a running edge 34' and in which there are provided equidistantly spaced, narrow rectangular cutouts. Each of the latter receives a rectangular hard element 33 in a formfitting manner (FIG. 6). The elements 33 are permanently affixed to the leg portion 50 of the support strip 32 by means of soldering, glueing or the like.

In the embodiment according to FIGS. 9–12, the hard elements 33 have a cross section as shown in FIG. 10. FIG. 11 shows the cross-sectional configuration of the support strip 32 at locations where no hard elements 33 are present. Comparing FIGS. 10 and 11, it is thus seen that for accommodating a hard element 33, the support strip 32 is provided, on the top, with a depression 41 adjacent to which a portion from the outer side of the support strip 32 is stamped out. As seen in FIG. 10, into each opening thus formed in the support strip 32 there is inserted from above a hard element 33 in a formfitting manner and is, by virtue of its shape, prevented from being displaced in a plane parallel to the running plane. To prevent displacement in an axial direction, the disclike head of the hard element 33 is inserted in a formfitting manner between the main ski body 30 and the support strip 32. Thus, each hard element 33, although not fixedly secured to the support strip 32, is securely held in the ski upon insertion.

According to the embodiment shown in FIGS. 13–15, the hard element 33, forming part of the edge strip 31, is affixed removably to the support strip 32 by means of a securing screw 43. Except for those length portions into which the hard elements 33 are inserted, the support strip 32 has along its entire length a T-shaped sectional configuration as illustrated in FIG. 15. In those ranges which contain the hard elements 33, the flange 44 is stamped out for forming a rectangular opening so that the leg 45 of the L-shaped hard element 33 may be inserted between the main ski body 30 and the support strip 32 and secured to the latter in a manner shown in FIGS. 13 and 14.

By exposing the head of the screw 43 (which is normally embedded into the running face insert 36), each hard element 33 may be replaced without removing the support strip 32 from the ski by unscrewing the screw 43. Thereafter, the hard element 33 may be pulled out laterally and replaced. Subsequently, the screw 43 is reinserted and tightened and the running face insert smoothened over the screw head. In this embodiment, as best seen in FIG. 14, the leg 45 of each hard element 33 overlies the leg 46 of the support strip 32. The space between each adjacent leg 45 may be filled with a suitable filling material or the like. The same applies to all embodiments wherein one part of the hard element projects beyond the upper surface of the support strip.

In the embodiment according to FIGS. 16–18, the cross-sectional configuration of the support strip 32 externally of a hard element 33 is, as shown in FIG. 18, again of a T-shape. The hard elements 33 have an S-shaped profile as shown in FIG. 17 and are hooked in place in a formfitting manner. For the latter purpose, in the range of each hard element 33, there is provided a cutout in the middle leg 46 of the support strip 32 and in the lower portion of the flange 44. The hard element 33 is secured in its position, subsequent to the mounting of the edge strips in the ski, by the main ski body extending adjacent the upper side of the hard element or by means of an intermediate layer.

In the embodiment according to FIGS. 19–21, the sectional configuration of the support strip 32, as shown in FIG. 21, is of a T-shape at locations between hard elements 33. Where a hard element 33 is to be inserted, the support strip 32 has rectangular cutouts which on the one side eliminate the entire flange 44 and on the other side extend into the middle leg 46. The individual hard element 33 is inserted from above in a form-locking manner onto the remaining band 47 of the middle leg 46 as shown in FIG. 20. Subsequent to the insertion of all hard elements 33, the edge strip may be secured to the ski, for example, by glueing. As mentioned hereinbefore, the ski-side gaps in the edge strips between adjacent hard elements 33 may be filled with a suitable filling material.

In the embodiment shown in FIGS. 22–25, the support strip 32 has, at locations where no hard elements 33 are present, an L-shaped section as shown in FIG. 25. It includes, similarly to the embodiments discussed in connection with FIGS. 6–21, relatively soft running edges 34' alternating with relatively hard running edge ranges 34 of each inserted individual hard element 33. The latter has, as shown in FIG. 23, a dovetail-shaped profile. The leg portion of the support strip 32 containing the running edge 34' is provided with a complemental dovetail shaped cutout 52 into which the individual hard element 33 is inserted normal to the length dimension of the edge strip 31 and interlockingly with the outer side of the support strip 32. The inserted individual hard element 33 is secured against displacement by means of projections 54 which extend into lateral openings 53 of the hard element 33. The said projections 54 of the support strip 32 are formed by a tool, subsequent to the insertion of the hard elements 33, by deforming the support strip 32. Each individual hard element 33 is permanently bonded to the support strip.

Turning now to FIGS. 26–29, the embodiment depicted therein is comparable to that discussed in connection with FIGS. 22–25, except that the attachment between any hard element 33 and the support strip 32 is disconnectable. The

hard elements 33 according to the embodiment of FIGS. 26–29 have no lateral openings, but are provided with a bore for a countersunk disposition of a securing screw 43 engaged in a threaded bore of the support strip 32. Any individual hard element 33 may be replaced without damaging the running face insert 36 of the ski, since the hard elements 33 are not covered thereby. Parts of the support strip, on the other hand, are covered by the running face insert 36 as shown in FIG. 29.

In some case it may be expedient to form the support strip of a plurality of serially arranged pieces which are secured to the ski body preferably in a spaced manner, for example, by bonding or by securing screws. According to the invention, at least between two adjacent support strip pieces, there is disposed at least one hard element which is preferably force fitted into the butt joint between the two support strip pieces. Or, the hard element arranged in the butt joint may be secured directly to the ski, for example, by means of securing screws. In such cases, at least one piece of the support strip may form the corresponding portion of the edge strip and has no further hard elements. Such an embodiment is shown in FIGS. 30 and 31. The edge strip 31 is formed here of a plurality of steel elements 52′ (two shown in a fragmentary manner) and hard elements 33 (one shown). The latter is held in the butt joint between two adjacent steel elements 52′ in a form-locking manner and is provided with two arms 55 which extend into associated openings in the back side of the steel elements 52′ and which are held by means of the adjoining main ski body 30. The steel elements 52′ form together the support strip 32. Even if a hard element is not disposed within the butt joint between two adjacent pieces of the support strip, it may be advantageous to attach it with one or more securing screws to the main ski body. In such a case said screws may simultaneously serve to tighten the support strip to the main ski body. Stated in different terms, said screws penetrate both the hard element and the support strip.

Generally, the support strip is a separate component and is secured to the main ski body subsequent to the manufacture of the latter. The invention, however, is not limited to such a solution. The support strip may be an integral part of the main ski body. Such an embodiment is shown in FIGS. 32 and 33. As seen, the hard element 33 is directly screwed on the marginal portion 32 of the main ski body 30. Thus, in this embodiment, the said marginal portion 32 forms the support strip. The edge strip 31 is formed of hard elements 33 and steel elements 56 arranged serially in an alternating manner. Both elements 33 and 56 have the same cross-sectional configuration. It is seen that each element 33 and 56 is directly screwed on the main ski body 30 and that the elastic steel elements 56 are substantially longer than the practically inelastic hard elements 30.

What is claimed is:

1. In a ski of the type provided with two lateral edge strips extending substantially along the entire length of the main ski body and each having a running edge forming the outer longitudinal edges of the running face of said ski, the improvement in at least one of said strips comprising,

A. a support strip affixed to the main ski body,

B. a plurality of short-length, hard elements secured to said support strip and having a short-length running edge and

C. a plurality of soft elements affixed to said support strip and having a running edge, said soft elements being made of a material having a hardness inferior to that of said hard elements, the running edges of said hard elements and the running edges of said soft element constituting the running edge of said edge strip.

2. An improvement as defined in claim 1, wherein said support strip is a one-piece member extending substantially along the entire length of the main ski body.

3. An improvement as defined in claim 1, wherein said support strip is formed of a plurality of serially arranged pieces.

4. An improvement as defined in claim 1, wherein said hard elements are made of cemented carbide.

5. An improvement as defined in claim 1, wherein said soft elements are made of steel.

6. An improvement as defined in claim 4, wherein said soft elements are formed as portions of said support strip made of steel.

7. An improvement as defined in claim 1, wherein said support strip is made of steel.

8. An improvement as defined in claim 1, wherein said hard elements and said soft elements have a section of rectangular configuration.

9. In a ski of the type provided with two lateral edge strips extending substantially along the entire length of the main ski body and each having a running edge forming the outer longitudinal edges of the running face of said ski, the improvement in at least one of said edge strips, comprising,

A. a support strip affixed to the main ski body and provided with at least one opening having a dovetail shape and extending normal to the length dimension of said edge strip,

B. a plurality of short-length, hard elements secured to said support strip and having a short-length running edge, at least one of said hard elements having a dovetail-shaped outline complemental to the dovetail shape of said opening, the last-named hard element being received in said opening in a formfitting manner and

C. means for preventing said last-named hard element from being displaced in said opening.

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