

Jan. 10, 1939.

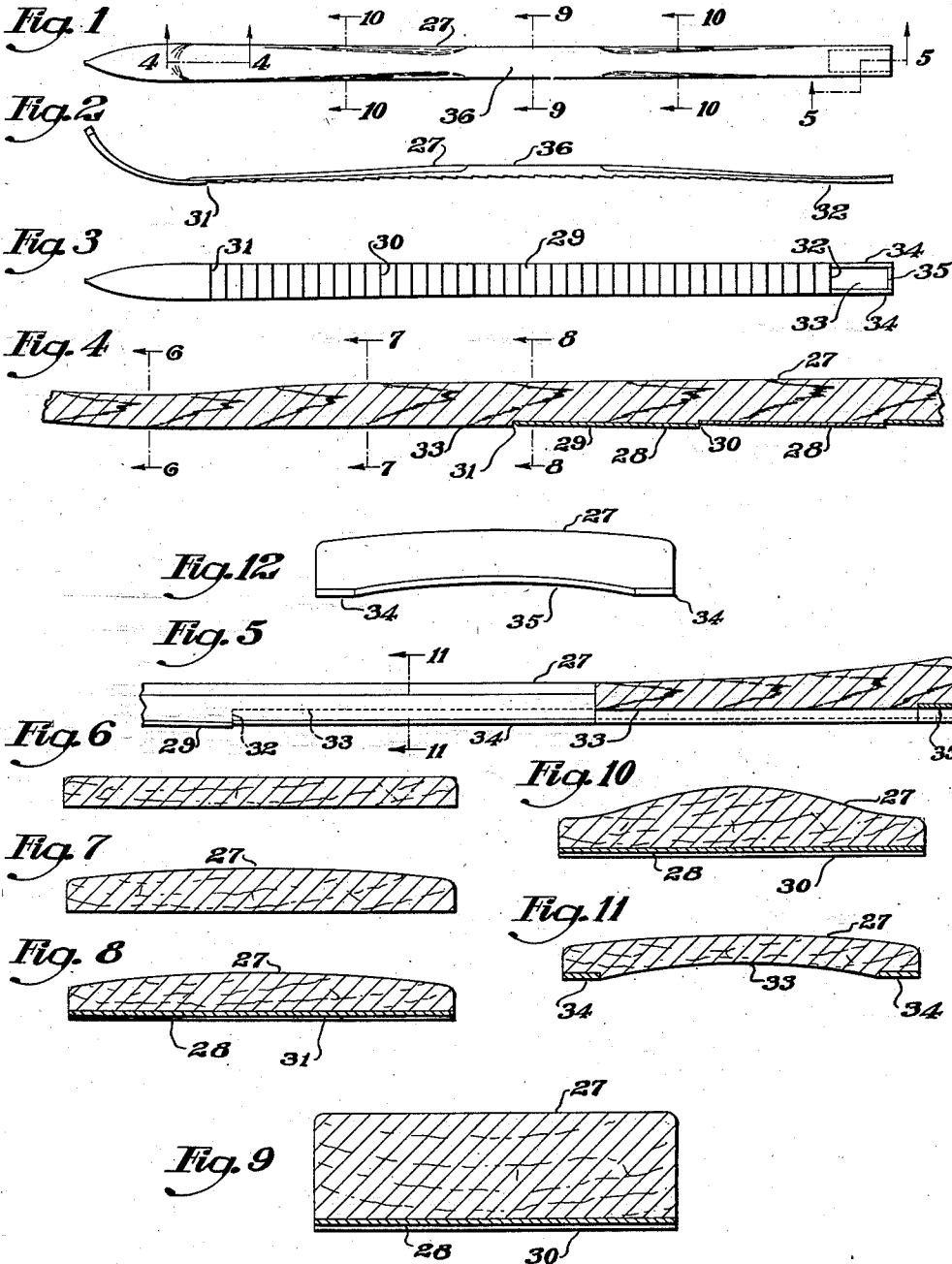
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2,143,545

SKI

Filed Oct. 9, 1935

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 13

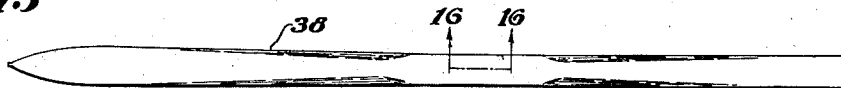


Fig. 14

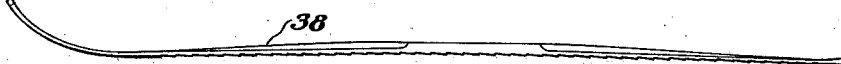


Fig. 15

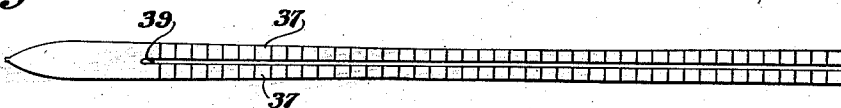


Fig. 16

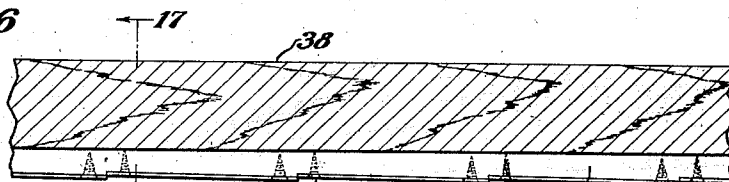


Fig. 17

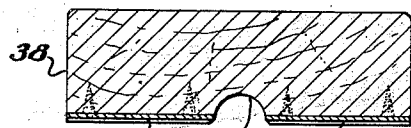


Fig. 18

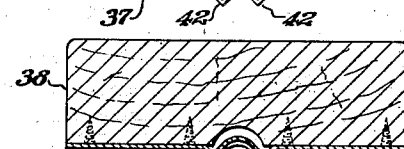
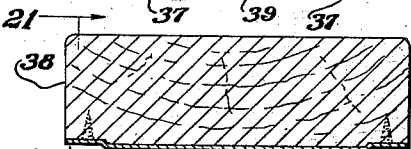
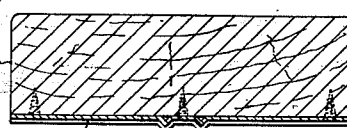


Fig. 20



Fig. 21

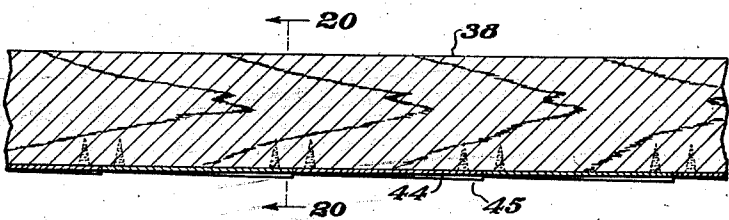


Fig. 21

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UNITED STATES PATENT OFFICE

2,143,545

SKI

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Application October 9, 1935, Serial No. 44,241

3 Claims. (Cl. 280—11.13)

The present invention relates to skis, and particularly to an improved running or gliding surface for the same.

The conventional form of ski requires careful and frequent waxing of the wooden underbody not only to afford a running surface which will glide easily over the snow without sticking, but also to protect the wood to some extent from the abrasive action of snow and ice. With every change in the condition or texture of the snow, a different wax must be applied.

Another fault of the conventional type of ski is its pronounced tendency to slip backwards, making it difficult and tiresome to ascend even a slight grade. It is usually necessary either to apply a special climbing wax or to attach strips of sealskin or canvas to the underside of the ski in order to provide a surface which will engage the snow and prevent backslip. Considerable time is lost in waxing, and in attaching and removing the climbing devices, and the weight and expense of this extra equipment is appreciable.

A further drawback relates to the unsatisfactory distribution of the weight of the skier with respect to the ski running surface both when running straight and when turning or stopping. It has been established that for maximum speed and steadiness in straight downhill running, when the ski is substantially flat on the snow, the point of application of the weight of the skier should be considerably to the rear of the center of the effective bearing surface of the ski, while for maximum control in turning and stopping, when the ski is in edged position, the skier's weight should be applied at substantially the center of the effective bearing surface of the ski in such edged position. In the absence of any construction which affords the proper variation in weight distribution in the different ski positions, general practice has been to attach the ski harness at a point somewhere between the location that is best for downhill running and the one that is best for turning, with the result that the ski is improperly balanced under all conditions of use.

The principal object of the invention herein-after described is to provide a ski having a running surface which will not require waxing for easy gliding in the forward direction, and which will not require the use of climbing wax, sealskins, or other supplementary devices to prevent backslip when going uphill or on the level. Another object of the invention is to provide a ski having a veneer running surface of a material different from the main body of the ski, having improved qualities of durability and resistance to

wear, and yet in no way affecting the flexibility of the ski. It is a further object of the invention to provide a ski which makes possible the proper distribution of the weight of the skier with respect to the ski bearing surface both when the ski is flat in running downhill and when it is edged for turning and stopping, thereby affording maximum speed, steadiness, and control.

With these and other objects in view, the principal feature of the present invention is a ski having a running surface comprising a plurality of steps, the snow-contacting faces of which are of a material harder than the main body of the ski. The steps are so formed as to present toward the front of the ski a multiplicity of small surfaces having a slight downward inclination from front to rear with respect to the general running surface, and toward the rear a multiplicity of small shoulders substantially perpendicular to the general running surface.

Preferably the invention is embodied in a ski by cutting steps in the underside of a wooden ski and attaching thin plates or veneers of aluminum alloy, celluloid, or other suitable material to the surfaces of the steps to form snow-contacting faces. An alternative construction consists in attaching wedge-shaped plates of the hard veneer material directly to the flat, unstepped under-surface of a ski. The plates of hard material form a wear resistant veneer which constitutes practically the entire running surface of the ski.

Instead of using one or more separate plates for each step, two or more inclined surfaces may be formed from a single section of the veneer material, the ski running surface being made up of several of these sections.

The smooth, hard and non-absorbent nature of the veneer material eliminates any need of waxing in order to provide a surface which will glide easily for downhill running, while the shoulders or steps at the rear of each inclined surface engage the snow in climbing and prevent backslip, thereby avoiding the use of any supplementary device. The slope of the inclined surfaces is insufficient to diminish the speed of the ski in running downhill; in fact at medium and high speeds such a stepped surface is faster than the conventional flat surface, due to the tendency of the steps to draw air under the ski. By forming the running surface from a plurality of plates or sections, there is no loss of flexibility of the ski, nor is there any tendency for the plates to loosen due to flexing of the ski or to the expansion and contraction caused by temperature changes. Since the hard veneer surfaces extend transversely the

entire width of the ski, no other hardened edges are necessary to afford a grip on crust or icy surfaces.

Another feature of the invention consists in forming the rear portion of the running surface of the ski with a concave transverse section so that when the ski is flat, as in downhill running, only the edges of the ski at this portion are in contact with the snow. The harness or binding is attached to the ski at such point that the weight of the skier is applied substantially halfway between the base of the upturn at the front end of the ski and the extreme rear end of the ski.

When the ski is in edged position for side-slipping, the weight of the skier is applied at the midpoint of the longitudinal edge portion which is bearing on the snow, thus giving proper balance for turning and stopping. When the ski is flat on the snow, the portion of the ski having the concave transverse section is out of contact with the snow, and this reduction in the bearing surface at the rear of the ski causes the center of total effective bearing surface to be located forward of the point of application of the weight of the skier, affording the proper balance for maximum speed and steadiness in downhill running.

Furthermore, the concave transverse section at the rear portion of the ski permits the elimination of the conventional longitudinal groove in the bottom of the ski, the narrow strips of running surface at the rear of the ski acting like rudders to steady the ski and keep it on a true course.

A further feature of the invention consists of a modification of the longitudinal section, near the base of the upturn at the fore end of the ski, so as to adapt the ski to the use of the inset veneer running surface without loss of strength at the point where the first plate of the veneer is set into the under-body of the ski.

Another feature of the invention consists of the provision of one or more V-shaped projections or ridges extending longitudinally along the approximate center line of the running surface in connection with or in place of the customary groove, thereby increasing the steadiness of the ski in downhill running on hard or ice snow.

Other objects and features will more fully appear from the following description in connection with the accompanying drawings in which Fig. 1 is a plan view of a ski embodying the preferred form of the invention; Fig. 2 is a side elevation of the ski shown in Fig. 1; Fig. 3 is a bottom view showing the running surface of the ski; Fig. 4 is a section taken along the line 4-4 of Fig. 1; Fig. 5 is a view partly in section taken along the line 5-5 of Fig. 1; Figs. 6, 7 and 8 are transverse sections taken respectively along the lines 6-6, 7-7 and 8-8 of Fig. 4; Figs. 9 and 10 are transverse sections taken respectively along the lines 9-9 and 10-10 of Fig. 1; Fig. 11 is a transverse section taken along the line 11-11 of Fig. 5; Fig. 12 is an end view of the ski; Fig. 13 is a plan view of a conventional form of ski embodying the main feature of the invention; Fig. 14 is a side elevation of the ski shown in Fig. 13; Fig. 15 is a bottom view showing the running surface; Fig. 16 is a longitudinal section taken along the line 16-16 of Fig. 13; Fig. 17 is a transverse section taken along the line 17-17 of Fig. 16; Figs. 18 and 19 are transverse sections illustrating modified forms of the running surface; Fig. 20 is a transverse section taken along the line 20-20

of Fig. 21, and illustrating a further modification; and Fig. 21 is a longitudinal section taken along the line 21-21 of Fig. 20.

The ski illustrated in Figs. 1 to 12 is composed essentially of a wooden ski body 27 and an applied, inset veneer 28, the exposed surface of this veneer forming the major portion of the actual running surface of the ski. The wooden body 27 conforms to the general proportions of a conventional wooden ski except for a modification of the lower surface to receive the veneer, and certain other modifications fully described below. The veneer 28, in the preferred form illustrated, is composed of a multiplicity of sections extending longitudinally in continuous succession from the point 31 to the point 32, each section consisting of a thin, substantially rectangular plate of suitable hard, lightweight material, preferably a heat treated aluminum alloy, and extending transversely the entire width of the ski. The lower surface of the ski body 27 is so formed that the lowest surface of each of the aforesaid section plates has a slight downward inclination from front to rear, with its fore edge slightly above and its rear edge slightly below the general, or mean, running surface. The fore edge of the first section plate, at the point 31, is set slightly above the surface 33 which is even with, and forms a part of, the general running surface. The veneer 28 is firmly and permanently attached to the ski body 27 by waterproof glue or cement, or by countersunk screws or other suitable means, the illustration assuming the use of waterproof cement.

It will be readily seen that the result of the construction above described is to produce a waxless running surface composed of a multiplicity of small forward surfaces 29 slightly inclined to the general surface and a multiplicity of small rearward shoulders 30 more or less at right angles to the general surface. The success of this construction derives from the small dimensions and multiplicity of number of the inclined surfaces 29 and shoulders 30, which in turn has been made possible only by the incorporation of the hard veneer 28. Without this veneer, the ski would require waxing for free gliding, and the form of the surface would make the application of the wax very difficult, in addition to causing the wax to wear off very rapidly. Furthermore, without the veneer, the shoulders 30 would quickly wear away unless cut much more deeply, with their number correspondingly reduced, in which case the ski would be seriously weakened and also caused to run very unevenly. And however deeply cut, the lower edges of the wooden shoulders would soon wear rounded and lose their efficiency for climbing on hardened snow.

The individual form of the plates, with their separate attachment to the ski body 27, besides preserving the flexibility of the ski, allows of easy replacement of any unit that accidentally becomes damaged, or after long wear, the entire veneer surface may be renewed. In the case of slight wear only, the construction allows of re-polishing of the forward surfaces 29 or resharpening of the edges 30 at will, without removal of the veneer from the ski.

The ski body 27, from the point 32 to the rear end of the ski, is modified with respect to the conventional form by the provision of a transverse concavity 33, in the lower surface, extending substantially the entire width of the ski, as illustrated in longitudinal section in Fig. 5, in transverse section in Fig. 11 and in end view in

Fig. 12. The amount of this concavity is just sufficient for the purpose that, in straight downhill running, the surface 33, following in the track of the surface 29, does not effectively bear upon the snow except at and near the longitudinal edges 34, which are even with, and form a part of, the general running surface. These longitudinal edges, in the preferred forms illustrated, consist of inset longitudinal reinforcing strips of hard material cemented into place. Figs. 5 and 12 show how an inset transverse member 35, of aluminum alloy or other suitable material, may be provided at the extreme rear of the surface 33 as a protection against splitting.

In straight downhill running, each ski lies flat on the snow surface and maximum speed and steadiness are attained when the center of application of the skier's weight is substantially to the rear of the center of the effective bearing surface of the ski. However, frequently the skier desires to progress by sideslipping, which is a useful means for descending very steep slopes, and an essential element of most skiing turns, including stop turns. In sideslipping, the leading longitudinal edge of each ski is slightly lifted and the skier's weight is concentrated on that portion of the running surface at, and immediately adjacent to, the following edge. For steadiness and good control in sideslipping, it is highly desirable that the center of application of the skier's weight should be at the approximate center of length of the bearing edge of the ski.

From the description above given, it may be seen that the footplate 36 and the point 32 may be so located, and in the ski illustrated they are so located, as to fulfill the desirable conditions above mentioned. Also, in straight downhill running, the longitudinal edges 34, as rearward extensions of the general running surface, act like rudders to assist in maintaining the ski in a true line, thus making possible the elimination of the customary longitudinal groove in the running surface proper. Further, the shoulder at 32 is somewhat deeper than the shoulders 30 and adds materially to the climbing ability of the ski.

The cut or shoulder 31 for the first plate of the inset veneer running surface tends to cause a weakening of the ski and liability to breakage at this point. To counterbalance this weakening effect and maintain uniform strength and flexibility throughout the length of the ski, the body 27 of the ski is further modified with respect to the conventional form, as illustrated in profile in Fig. 2, in longitudinal section in Fig. 4, and in transverse section in Figs. 6, 7, 8, 9 and 10. From the normal section 6-6 at the base of the upturn, the thickness increases toward the rear until the section 7-7, somewhat forward of the point 31, is reached. From the section 7-7 to the section 8-8, the thickness and shape of the section remain substantially constant. From this point to the fore end of the foot plate 36, the shape of the section changes to the conventional ridge top style, shown in Fig. 10.

Figs. 13 to 17 illustrate the application of the inset veneer running surface 37 to a conventional wooden ski 38 having the customary longitudinal groove 39. The plates which form the veneer running surface are attached to the ski by screws 40, this being the preferred method of attachment when the wood has previously been treated with oil or wax. As illustrated in Fig. 17, each section of the veneer comprises two pieces, one on each side of the groove 39.

Fig. 18 illustrates a modification in which the plates of the veneer are formed with longitudinal ridges 42 to engage the snow and to afford steadiness on crust or icy snow, the usual groove being effective only on soft snow where in fact it is much less needed. It is essential that the ridges 42 project only slightly below the running surface.

Fig. 19 shows a form of surface having downwardly projecting ridges 42 in combination with an upwardly projecting groove 43.

Figs. 20 and 21 illustrate a modification intended for the advanced skier, who requires the maximum degree of control in turning and stopping. The longitudinal edge portions 44 of the veneer running surface are formed without the inclined surfaces and shoulders, so as to give a smooth continuous edge which is somewhat more effective than the non-continuous stepped edge for turns and stops at high speed on crust or hard-packed snow. The plates of the veneer are formed by stamping so that the central portion 45 of the plate is angularly disposed longitudinally with respect to the edge portions 44, there being a progressively increasing offset 46 from front to rear. One or more inclined surfaces may be stamped in a single section of veneer. The ski body is formed by cutting inclined surfaces and shoulders and then planing down a strip along each edge to the depth of the shoulder so that the straight edge portions and the inclined central portion of the plates fit against corresponding portions of the ski underbody.

A simpler construction results if the unstepped edge portions consist of strips of veneer material separate from the plates which compose the stepped portion of the running surface, thus eliminating the stamping operation required to form the one-piece type of plate. Alternatively, if the formed plates are used, they may be attached directly to a ski under surface without cutting inclined surfaces and shoulders. In this modification the plates will be fastened at their edge portions to the ski, the central step-forming portions 45 retaining their shape through the inherent stiffness of the veneer material.

In addition to the variations herein described or suggested, numerous modifications and adaptations of the several features of the invention are possible. Except as limited by the appended claims, all such modifications and adaptations are deemed to be within the scope of the invention.

Having thus described the invention, what is claimed is:

1. A ski having a substantial portion of its running surface composed of a plurality of pairs of laterally spaced metal plates, the snow-contacting face of each plate being inclined downwardly from front to rear with respect to the general running surface of the ski.

2. A ski having a substantial portion of its running surface composed of a plurality of plates having plane outer edge portions and an inclined middle longitudinal portion.

3. A ski having a running surface composed of a middle and two marginal portions, the middle portion comprising a plurality of plates of hard material inclined to the plane of the marginal portions, and the marginal portions comprising strips of hard material forming continuous plane surfaces.

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