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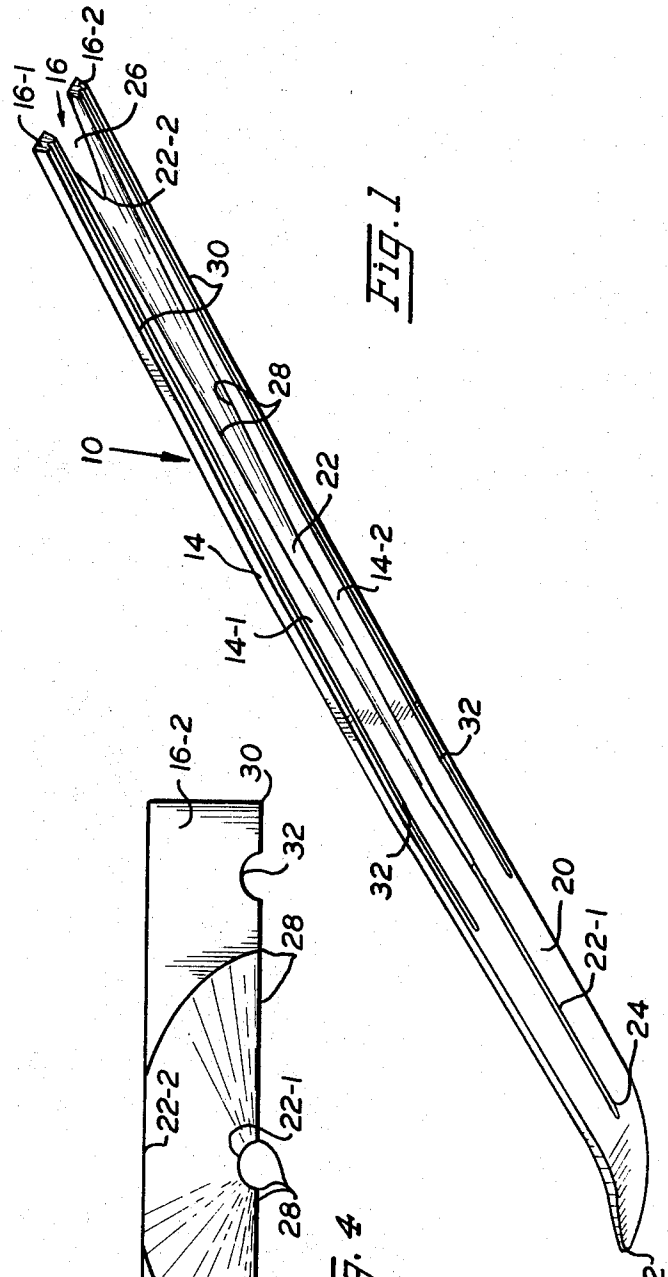


Fig. 1

Fig. 4

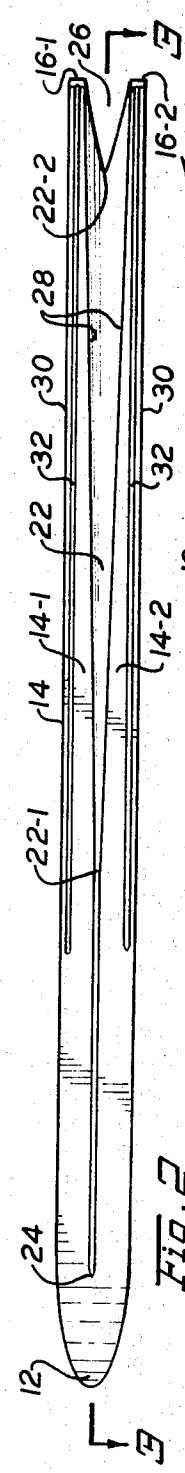


Fig. 2

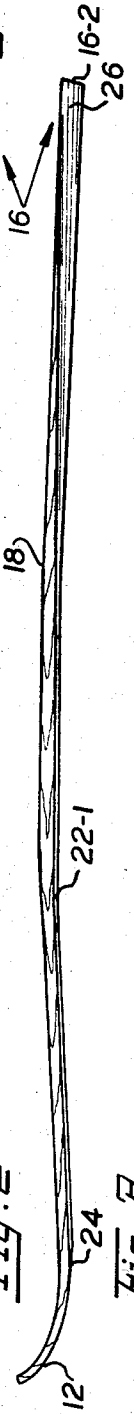


Fig. 3

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ABSTRACT OF THE DISCLOSURE

A snow ski formed with a central groove extending from a short distance behind the front tip of the ski and continuing rearwardly over the remaining length of the ski. The groove becoming progressively wider in the lateral direction and deeper in the vertical direction and opening through the top surface of the ski near the rear end thereof to divide the rear of the ski into two separate prongs which flex independently.

THE PRIOR ART

Many skiers, even including some who are relatively experienced, have found that control is a problem in the sport of snow skiing, and that such problems on occasion can lead to spills and possible serious injury. The factors which determine the degree of control which a skier can obtain, include the capacity of the skis to conform flexibly to uneven snow contours, to bite into the snow on turns, to develop a rail-like engagement with the snow on straightaways, and to generate lift, particularly at the rear of the ski.

The problem of flexible accommodation to uneven surfaces requires that the ski be flexible with respect to both its longitudinal and its transverse axes. In addition, it is desirable that different parts of the ski be able to flex independently of each other. Prior art skis have not had two-axis flexibility, nor have they exhibited the capacity for independent flexure.

Prior art devices have used grooves in the underside of the ski to provide a rail-like engagement with the snow, and to provide extra longitudinal biting edges which are helpful on turns. But in the past such ski grooves have not been optimally shaped to provide extra lift, particularly at the rear of the ski. Also, it was not heretofore realized that the configuration of such a groove can be selected to achieve multi-axis flexibility and independent flexure of the various parts of the ski.

SUMMARY AND OBJECTS OF THE INVENTION

It is therefore a general object of this invention to provide a snow ski which achieves greater control and stability. More specifically, an object of the invention is to provide a ski which is more flexible, particularly about both the longitudinal and transverse axes of the skis. Another objective of the invention is to provide a ski, the parts of which can flex independently of each other, so as to conform to uneven surface contours. Another objective is to provide an improved underside groove for a ski which, in addition to providing a rail-like engagement with the snow surface and extra biting edges, also provides extra lift, particularly at the rear of the ski.

In accordance with the invention, these objectives are achieved by providing a ski which has a forked rear end comprising two separate prongs which are able to flex independently of each other. More specifically, the invention contemplates a ski with a longitudinal central groove formed in the underside, which begins at a point near the front or forward of the mid point of the ski and extends all the way to the rear of the ski, widening and deepening as it approaches the rear end. Such a groove enables the ski to flex about its longitudinal axis, and also provides

additional biting edges to engage the snow. The groove has an elliptical cross-sectional shape which draws in snow from the surface and allows it to expand into the groove, thus giving the ski extra lift, particularly at the rear of the ski where the central groove widens and deepens. Near the rear end of the ski the groove intersects the top surface of the ski to form a tapered notch dividing the ski into two separate rear prongs which can flex independently of each other for greater stability. In addition, there are side grooves which run along the ski and the two separate prongs; these side grooves provide additional biting edges and additional rail-like snow engagement surfaces to the ski as a whole, and to the two separate prongs individually.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view of a snow ski in accordance with this invention, looking from the underside thereof,

FIG. 2 is a bottom plan view of the same ski,

FIG. 3 is a longitudinal section of the same ski, taken along the lines 3—3 of FIG. 2, looking in the direction of the arrows, and

FIG. 4 is a rear elevational view of the same ski.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

The ski **10** of this invention is formed with a conventional upwardly curved forward tip **12**, from which an elongated ski body **14** extends rearwardly, terminating in a rear end **16**. The upper ski surface **18** is provided with conventional ski bindings, not shown, by means of which the ski is secured to the boot of the skier.

In accordance with this invention, the underside **20** of the ski is formed with a long central groove **22** which begins at a point **24** not far behind the curved front tip **12** forward of the longitudinal mid point and extends longitudinally along the entire ski **10** and opens through the rear end **16** thereof. As the groove **22** extends rearwardly from the point **24**, it becomes progressively wider, and also extends progressively deeper into the ski body **14**. In FIGS. 1, 2 and 4, for example, the reader can compare the relatively narrow lateral width of the groove **22** at forward location **22–1**, with the substantially greater lateral width of the groove at rearward location **22–2**. The relatively small vertical depth of the groove at forward location **22–1** can also be compared to FIGS. 3 and 4 to the substantially greater depth at rearward location **22–2**. The further the groove **22** approaches to the rear end **16** of the ski, therefore, the wider it gets laterally, and the deeper it extends upwardly into the ski body **14**.

At location **22–2**, the groove intersects the top surface **18** of the skis and thus merges into a notch **26** which completely divides the rear end **16** into two separate legs or prongs **16–1** and **16–2**. Note that the notch **26**, starting from its apex at the point **22–2** where it merges with the groove **22**, also widens out as it extends rearwardly, to produce a substantial separation between the legs or prongs **16–1** and **16–2**.

By thinning out the middle of the ski body **14**, the groove **22** enables the two longitudinal halves or portions of the ski body **14–1** and **14–2** on either side of the groove **22** to flex more easily relative to each other, about the longitudinal center line of the ski **10**. As a result, when the ski passes over a snow contour which is curved transversely to the direction of travel, the two ski halves **14–1** and **14–2** are able to flex relative to each other about the longitudinal center line of the ski **10** and thereby conform to the surface curvature. The two rear legs or prongs **16–1** and **16–2** are, of course, extensions of the two ski halves **14–1** and **14–2** respectively, and are even more easily able to flex relative to each other about the longitudinal axis, by virtue of their complete separation on either side of the notch **26**.

An additional function served by the central groove **22** is that the edges **28** of the groove **22** provide an additional capability for biting into the snow surface, along with the outer edges **30** of the ski body **14**. The groove **22** also provides a channel which becomes filled with a "rail" of snow, the engagement between the snow rail and the groove providing additional engagement with the snow surface. Both of these factors contribute to stability and control of the ski **10**, much in the same manner as did prior art grooves formed on the underside of a ski.

But in the case of the groove **22** of the present invention, an additional important effect takes place. Because of the fact that the groove widens and deepens as it extends towards the rear end **16**, the snow which enters the groove at point **24** subsequently expands both upwardly and laterally as it proceeds along the remaining length of the groove. This expansion is particularly explosive, since the snow entering the groove **22** at the entrance point is first packed and compressed by the curved ski tip **12** which initially rides thereover. Consequently, the sudden opportunity to expand into the progressively widening and deepening volume along the length of the groove **22** causes the packed snow to press outwardly and upwardly against the interior surface of the groove. This provides increased lift over the length of the ski body **14**, but the lift effect becomes pregressively stronger toward the rear end **16** as the snow expansion becomes progressively greater.

Note that the upward lift force provided by the expanding snow is exerted along the longitudinal center line of the ski **10**, owing to the central location of the groove **22**, a factor which contributes to lateral stability. Note also that the expanding snow pushes against the entire curved surface of the groove **22**, so that it presses sidewardly against the edges **28**, as well as upwardly against the roof of the groove, thus increasing lateral interaction between the snow and the ski and giving the edges **28** a greater opportunity to bite into the snow surface.

The cross-sectional shape of the groove **22**, as best seen in FIG. 4, is elliptical, preferably a 30° conical ellipse. The advantage of this shape is that it provides a large surface area for the interior of the groove **22** against which the expanding rail of snow can engage to provide a lifting force and a lateral engagement. The same elliptical configuration is maintained over the length of the groove **22**, from its start at point **24** to the merger point **22–2** where the top of the ellipse breaks through the upper surface **18** of the ski, but the scale of the ellipse increases progressively from point **24** to point **22–2**.

The beginning of the groove **22** at point **24** should be located well forward of the skier's foot. Since the skier's foot is substantially in the center of the ski **10** and his toes extend some distance forward of the center, the point **24** should be located well toward the front of the ski and preferably just behind the curved tip **12** as shown. This gives the ski body **14** greater flexibility in the area under and in front of the skier's foot, so that the ski can flex in response to foot and toe movements, a factor which contributes to the overall increase in control and stability.

The notch **26**, by separating the prong **61–1** and **16–2**, allows them to flex through an additional degree of freedom relative to each other. For example, one of these prongs can flex upwardly about the transverse axis of the ski **10**, while the other can flex downwardly whenever this is required by unevenness in the snow surface. The action is somewhat analogous to that of an independent rear wheel suspension for an automobile, and it is recognized that this type of automotive suspension provides greater control and stability.

An additional feature of the invention involves the provision of side grooves **32** on either side of the central groove **22**. These side grooves, like the central groove, provide additional biting edges for lateral engagement with the snow surface, and also draw in "rails" of snow which increase directional stability. Although this behavior in itself is not unusual, the provision of the side grooves **32** on either side of the central groove **22** provides a unique three-point suspension which, combined with all the other advantages of the present ski, gives unprecedented stability and control. This is particularly true since in effect in each ski half **14–1** or **14–2** and its rear extension, prong **16–1** or **16–2** respectively, has its own groove **32** to provide individual biting edges and rail-like engagement with the snow. This enhances the effect of two independently movable ski elements, joined together only by a progressively wider but thinner flexible webbing, i.e. that portion of the ski body **14** which is above the central groove **22**.

Therefore, it will now be appreciated that the present invention provides a novel ski which demonstrates improved stability and control in several important respects. In particular, the two halves of the ski can flex relative to each other about the longitudinal axis of the ski, and they terminate in entirely separate rear prongs which are equivalent to an independent rear suspension in terms of their flexibility about the transverse axis. The improved ski structure also provides additional biting edges to engage the snow surface, as well as a unique upward and outward force exerted by the snow as it expands in those directions by virtue of the progressively increasing volume of the central groove.

When skiing on soft or watery snow surface, there is often a loss of stability and directional control because of the apparent absence of coherence of their molecules and the creation of a suction on the undersurface of the skis as they move over such surface. However, in the use of the present invention, such suction effect is obviated by permitting the snow to expand up and out of the enlarging groove thereby providing greater surface engagement between the ski and the soft surface beneath it to result in increased stability and directional control. On hard icy surfaces the edges **28** benefit stability and directional control by providing additional edges to cut into the ice.

Since the foregoing description and drawings are merely illustrative, the scope of protection of the invention has been more broadly stated in the following claims; and these should be liberally interpreted so as to obtain the benefit of all equivalents to which the invention is fairly entitled.

What is claimed is:

1. A ski comprising

an elongated body,

a rearward end of said ski formed with a notch dividing said rearward end into two separate legs each relatively movable on said ski,

said notch extending a distance forwardly of said rearward end with the lateral width of said notch tapering to an apex in the forward direction,

said notch extending from the bottom surface of said ski upwardly into the vertical thickness of said ski, the vertical depth of said notch extending entirely through said vertical ski thickness over a length of said ski from said rearward end to said apex, said notch merging at said apex into a substantially central groove extending along said bottom ski surface forwardly from said apex, the vertical depth of said groove decreasing forwardly from said apex,

the lateral boundaries of said notch merging into those of said central groove with the relative lateral spacing of the upper edges of said notch being less than the lower edges at which the same merge with said central groove, and said central groove tapering forwardly.

2. A ski as in claim **1**, wherein said central groove terminates at a point well forward of the transverse median of said ski.

3. A ski as in claim **2**, further comprising a pair of longitudinal side grooves formed on said bottom ski surface on opposite sides of said central groove.

4. A ski as in claim 3, wherein said side grooves extend rearwardly along the underside of said separate legs.

5. A ski as in claim 1, wherein the cross-sectional shape of said central groove is elliptical.

6. A ski comprising

an elongated body,

a plurality of longitudinal relatively movable portions defined on the underside of said ski body, said portions flexing relative to each other about the longitudinal center line of the ski body,

and a longitudinal groove separating said body into a plurality of separate relatively movable legs,

said movable portions each having surface engaging edges independent of the edges of the outer surfaces of said ski body, and said engaging edges of said portions moving independently of each other with their respective movable portions,

said movable portions being formed by a notch extending forward from the rear of said body and defining an enlarged termination of said groove,

the lateral spacing of said notch being less at the upper edges thereof than at the lower edges with said lateral spacings decreasing as the notch extends forward from the rear of said body.

7. In a ski body,

a groove designed on the underside of said body extending longitudinally from a point forward of the mid point of the length of said body to the rear thereof to reduce the thickness of said body progressively from the beginning of said groove to the rear of said body to define longitudinal portions extending along the sides of said body,

said longitudinal portions flexing relative to each other about the longitudinal center of the ski body,

said longitudinal portions each having surface engaging edges defined along the outer edge of said body and along said groove,

said longitudinal portions each terminating in separate legs movable independently of the other on said ski body,

and said separate legs being formed by a notch tapering toward an apex extending forward from the rear of the ski body with the notch merging with said groove and the relative lateral spacing of the upper edges of the notch being less than the lower edges thereof merging with said groove.

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