United States Patent [19]

Kaplan

[11] **3,724,866**

[45] **Apr. 3, 1973**

[54] SKI ESPECIALLY ADAPTED FOR USE BY SKIERS TOWED BY A SNOWMOBILE OR THE LIKE

[75] Inventor: **Irving Leonard Kaplan,** Cleveland Heights, Ohio

[73] Assignee: **Skijor Manufacturing Company,** Cleveland, Ohio

[22] Filed: **June 4, 1971**

[21] Appl. No.: **150,034**

[52] **U.S. Cl.** ....**280/11.13 W,** 280/11.3, 280/11.35 R

[51] **Int. Cl.**.....**A63c 5/00**

[58] **Field of Search** ..280/11.13 A, 11.13 L, 11.13 S, 280/11.13 R.11.13 M, 11.3, 11.35 R

[56] **References Cited**

UNITED STATES PATENTS

2,164,604	7/1939	Whiteford	280/11.13 M
1,678,579	7/1928	Vincent	280/11.13 A
1,087,745	2/1914	Ellis	280/11.13 A
2,929,636	3/1960	Jones et al.	280/11.13 A
2,642,677	6/1953	Yates	280/11.3 UX

FOREIGN PATENTS OR APPLICATIONS

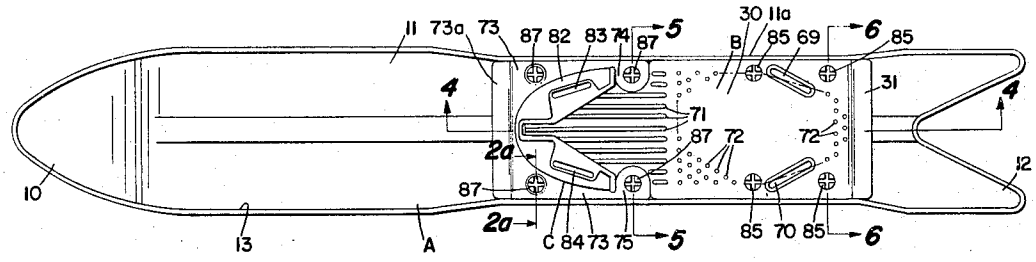
1,071,142	3/1954	France	280/11.13 A
94,544	8/1959	Norway	280/11.13 J

Primary Examiner—Kenneth H. Betts
Assistant Examiner—Milton L. Smith
Attorney—Isler & Ornstein

[57] **ABSTRACT**

A ski is provided which is of lightweight rugged construction, consisting of parts which are molded of suitable fiber-glass reinforced resins and easily and quickly assembled. The ski is so designed as to make it especially adapted for use in the sport of skijoring in which the skier is towed by a horse or vehicle, and more particularly, by a snowmobile. The design and construction are such as to enable the skier to achieve easy maneuverability and control of direction of the ski while being thus towed.

12 Claims, 13 Drawing Figures



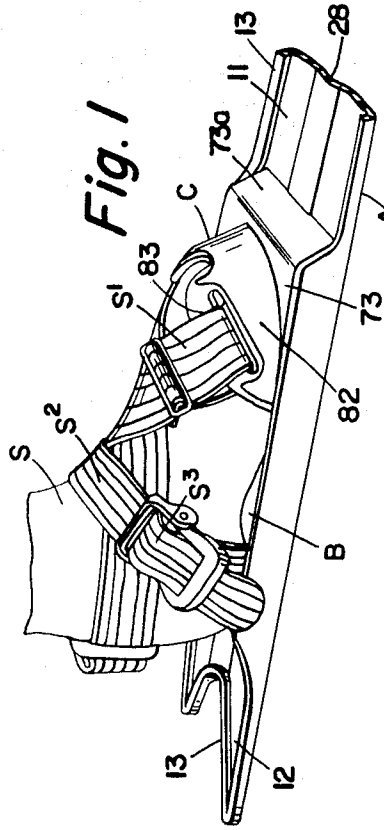


Fig. 1

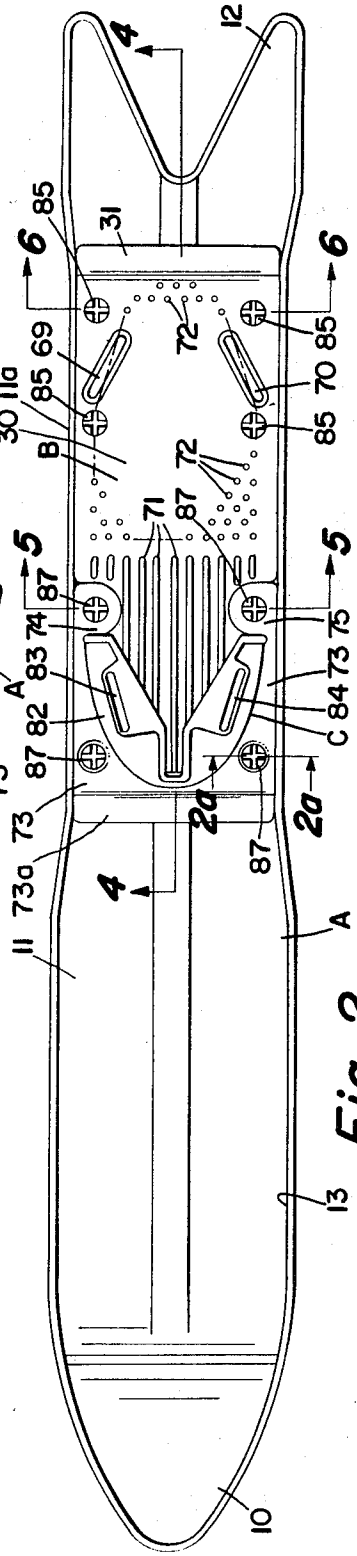


Fig. 2

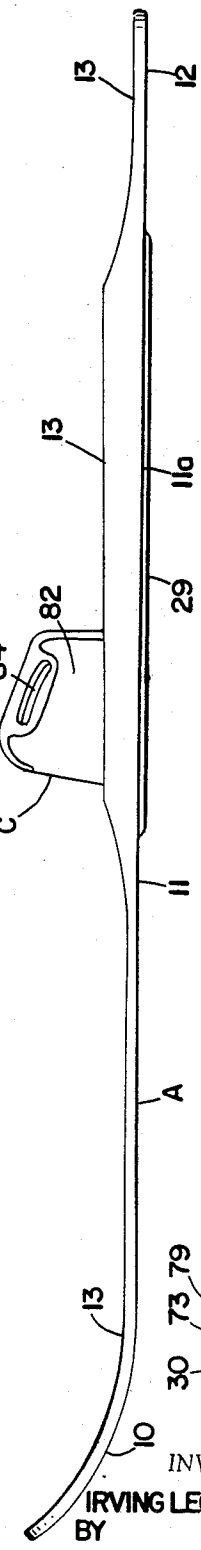


Fig. 3

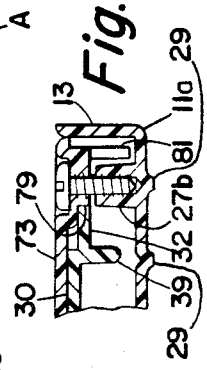


Fig. 2a

INVENTOR.
IRVING LEONARD KAPLAN
BY
Isler & Ornstein
ATTORNEYS

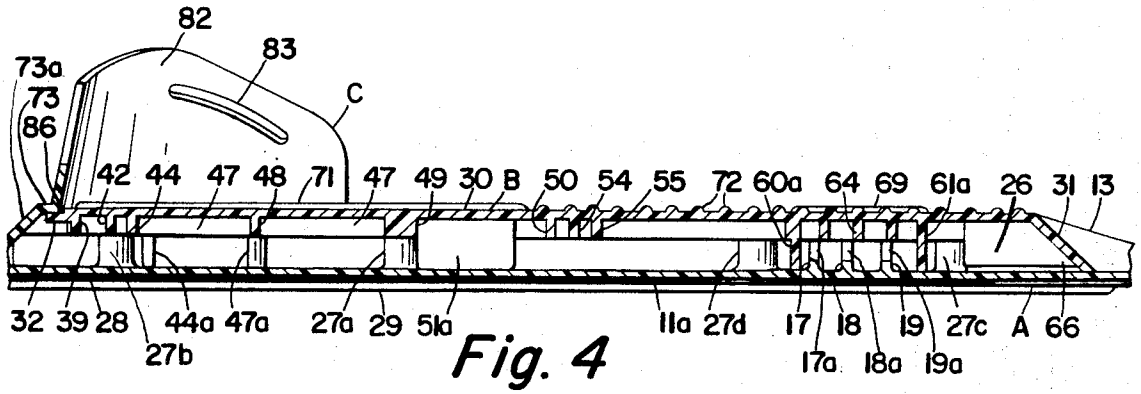


Fig. 4

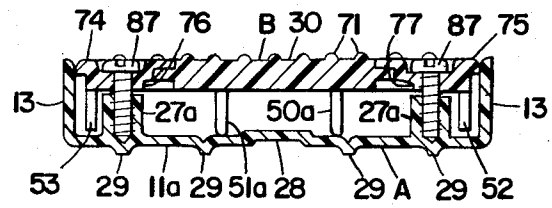


Fig. 5

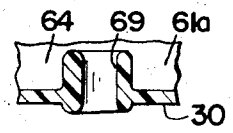


Fig. 8

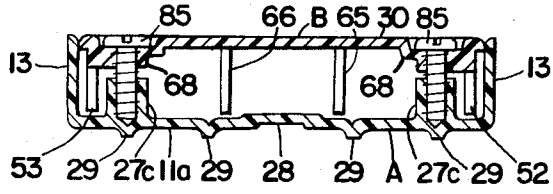


Fig. 6

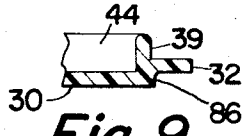


Fig. 9

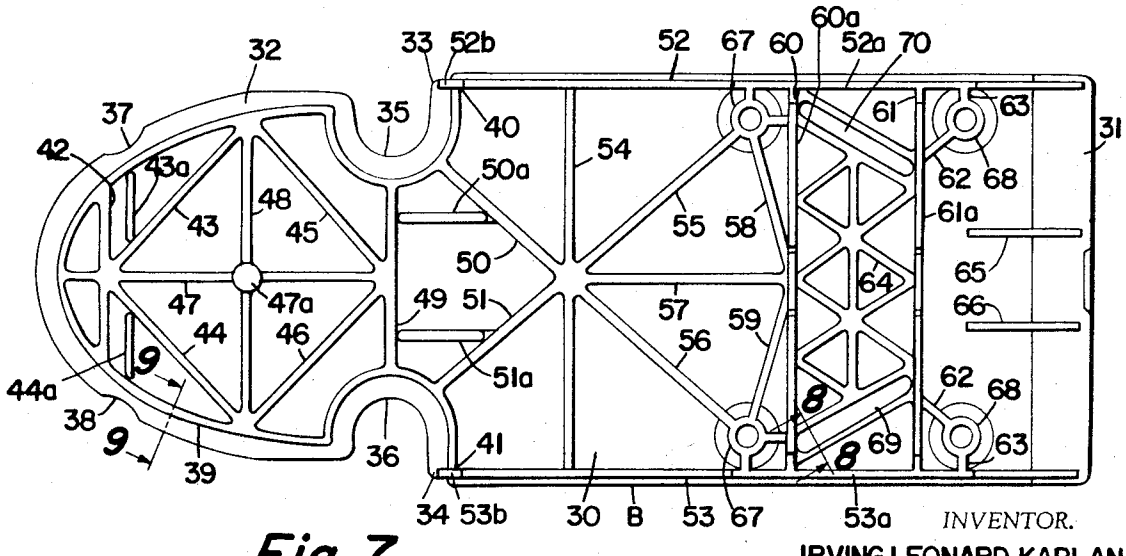


Fig. 7

INVENTOR.
IRVING LEONARD KAPLAN

BY

Isler & Aronstein

ATTORNEYS

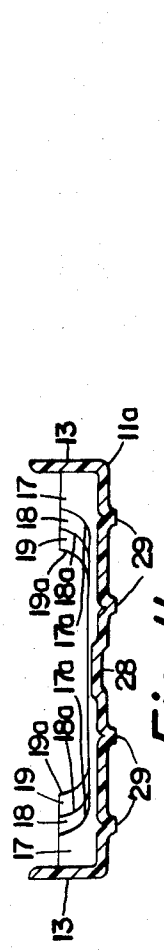


Fig. 11

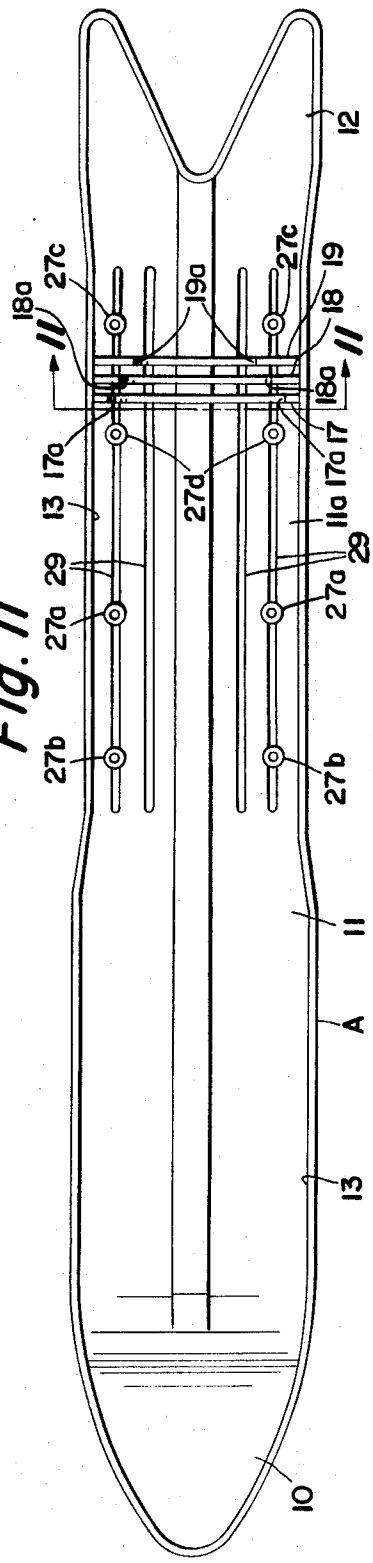


Fig. 10

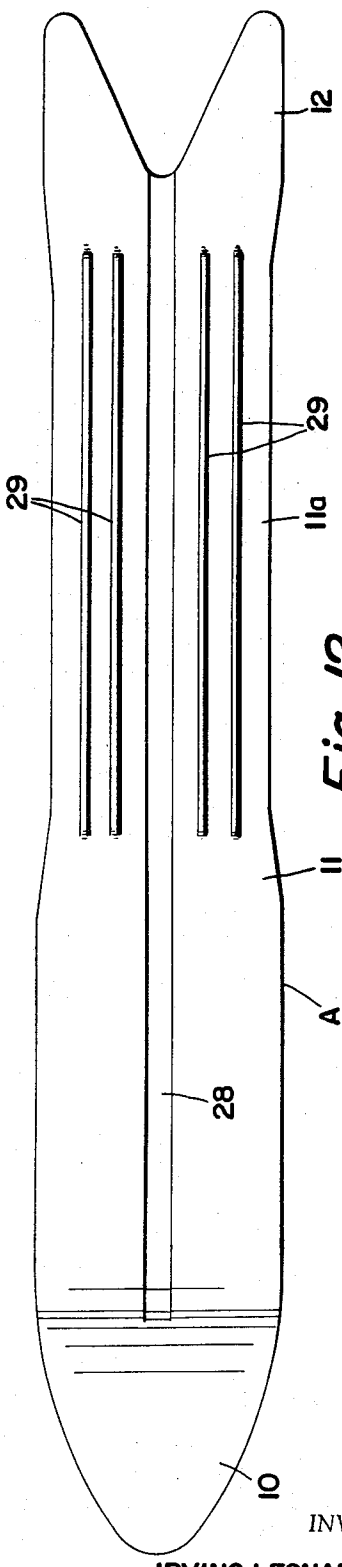


Fig. 12

INVENTOR.
IRVING LEONARD KAPLAN
BY
Isler & Ornstein
ATTORNEYS

SKI ESPECIALLY ADAPTED FOR USE BY SKIERS TOWED BY A SNOWMOBILE OR THE LIKE

This invention relates generally to skis, but has reference more particularly to a ski which is especially designed for use by skiers in the sport of skijoring.

In the sport of skijoring, it has been customary to use skis of conventional design and construction, which are extremely long and narrow, to an extent such that it is difficult for the skier to properly maneuver the skis or control their direction, this difficulty being compounded by the fact that the snow-covered terrain between the towing vehicle and the skier is somewhat limited in area, and the terrain ahead of the towing vehicle is partially concealed from the skier's view by the vehicle.

The present invention has, as its primary object, the provision of a ski which has been so designed and constructed as to enable a skier using the skis in the sport of skijoring to easily maneuver the skis and control their direction, irrespective of the limited area of terrain between him and the towing vehicle, and irrespective of the condition or contour of that terrain.

Another object of the invention is to provide a ski of the character described, which is substantially shorter in length but wider than a conventional ski, whereby the ski may be easily maneuvered and directionally controlled in the sport of skijoring.

Another object of the invention is to provide a ski of the character described which consists of a minimum number of parts, molded of lightweight resins, which parts can be quickly and easily assembled by means of conventional types of fasteners.

A further object of the invention is to provide a ski of the character described, having embodied therein a body or body portion having tip and tail portions of a desired degree of flexibility, and an intermediate or foot-supporting portion which is relatively rigid or inflexible, whereby to enable the skier to move more readily over ruts and uneven snow surfaces.

A further object of the invention is to provide a ski of the character described, embodying a body and a sole plate or foot-supporting platform, wherein the sole plate and that area of the body to which the sole plate is attached, are provided with a system of ribbing, such that when the sole plate is attached to said area, a rigid base is provided for the skier, on which his weight is well supported, and enables him to have excellent control of direction and deceleration, when desired, and permits him to roll, twist and shift his weight, during skijoring.

A further object of the invention is to provide a ski of the character described in which the sole plate or foot-supporting platform is in such close proximity to the flexible tail of the ski body, as to enable the skier to shift his weight rearwardly to thereby quickly stop or decelerate the skiing action.

A still further object of the invention is to provide a ski of the character described having rib features which are so designed as to enable an instep strap to be quickly and easily guided into and out of the ski and to be properly oriented for the purpose of binding or securing the skier's boot to the ski.

A still further object of the invention is to provide a ski of the character described, embodying a cowl or toe-receiving member, which can be quickly and easily assembled with the sole plate, and which coacts with the latter in a manner to greatly facilitate attachment or binding of the ski to the boot, and to accommodate footwear of various types.

Other objects and advantages of my invention will be apparent during the course of the following description.

In the accompanying drawings forming a part of this specification, and in which like numerals are employed to designate like parts throughout the same,

FIG. **1** is a fragmentary perspective view of a ski embodying the invention, and showing how the ski is bound to a ski boot or the like;

FIG. **2** is a top plan view of the ski, with the bindings omitted;

FIG. **2***a* is a fragmentary cross-sectional view, taken on the line **2***a*—**2***a* of FIG. **2**;

FIG. **3** is a side elevational view of the ski;

FIG. **4** is a fragmentary cross-sectional view, taken on the line **4**—**4** of FIG. **2**;

FIG. **5** is a transverse cross-sectional view, taken on the line **5**—**5** of FIG. **2**;

FIG. **6** is a transverse cross-sectional view, taken on the line **6**—**6** of FIG. **2**;

FIG. **7** is a bottom plan view of the sole plate of the ski;

FIG. **8** is a fragmentary cross-sectional view, taken on the line **8**—**8** of FIG. **7**;

FIG. **9** is a fragmentary cross-sectional view, taken on the line **9**—**9** of FIG. **7**;

FIG. **10** is a view similar to FIG. **2**, but with the sole plate and cowl omitted;

FIG. **11** is a transverse cross-sectional view, taken on the line **11**—**11** of FIG. **10**, and

FIG. **12** is a bottom plan view of the ski.

In connection with this invention, and for the purpose of clearly understanding the same, the construction of the components or parts of the ski will first be described, without particular reference to the functions or advantages of such components, after which the method of assembling the parts will be described, followed by a description of the manner of binding the ski boot to the ski, and a description or listing of the properties and advantages of the components and the ski as a whole.

CONSTRUCTION

Referring more particularly to the drawings, the ski will be seen to comprise three separate and distinct units or parts, namely, a body, designated generally by reference character A, a platform or sole plate, designated generally by reference character B, and a cowl or toe-receiving member, designated generally by reference character C.

The body A of the ski is molded, in a single piece, of a thermo-setting resin, such, for example, as a fiberglass-reinforced polyester, and has an overall length of about 42 inches, this length being substantially less than that of a conventional ski.

The body A comprises an upwardly curved forward tip **10**, from which an elongated substantially flat portion **11** extends rearwardly, terminating in a bifurcated rear end or tail **12**. As best seen in FIGS. **2**, **10** and **12**, the portion **11** of the body A is constricted slightly in width in that part **11***a*, to which the sole plate B, to be presently described, is to be attached, and the rear end

or tail 12 is of substantially the same width as the forward part of the portion 11 of the body A.

The body A is provided at its periphery with a continuous upstanding flange or rib 13, which imparts a desired stiffness or rigidity to the body, as a whole, but the height of which, as best seen in FIG. 3, is varied, longitudinally of the ski, so that the portions thereof at the tip 10, forward part of the portion 11, and the rear end or tail 12, are relatively small in height, permitting these portions of the body to have a desired flexibility, and the portions thereof at the portion 11*a* of the body are relatively great in height, imparting to the portion 11*a* of the body a desired rigidity of inflexibility.

This flexibility of the tip 10 and forward part of the portion 11 of the body enables the skier to move more readily over ruts and uneven snow surfaces, while the rigidity of the portion 11*a* imparted by the height of the flange 13 at this part of the body is of importance in conjunction with other rigidifying factors to be presently described, to provide certain advantages to which reference will later be made.

As best seen in FIGS. 4, 5 and 10, the portion 11*a* of the body A is further characterized by the provision on its upper surface of reinforcing ribbing, comprising longitudinally spaced transversely extending ribs 17, 18 and 19, all of which are of a uniform height, which is substantially less than that of the portions of the flange 13 between which these ribs extend, these ribs serving an auxiliary purpose to be presently described.

The portion 11*a* of the body A is further characterized by the provision on its upper surface of longitudinally spaced pairs of cored mounting bosses 27*b*, 27*a*, 27*d* and 27*c*, which are of substantially the same height as the ribs 17, 18 and 19, and which serve a purpose to be presently described.

Portions of the ribs 17, 18 and 19, as best seen in FIGS. 4, 10 and 11, are removed to provide curved surfaces 17*a*, 18*a* and 19*a*, respectively, for a purpose to be presently described.

The lower or bottom surface of the body A is provided with a centrally disposed tracking groove 28 (see FIGS. 4, 5, 6, 11 and 12), which extends from a point adjacent the rear of the tip 10 to the forward end of the tail 12. This tracking groove functions to provide stability for the skier and enables him to maintain the ski in a straight course.

The lower or bottom surface of the body A is also provided with a series of longitudinally extending ribs 29 (see FIGS. 2*a*, 3, 4, 5, 6, and 11), which extend from points adjacent the forward end of the portion 11*a* of the body to points adjacent the rear end of this portion 11*a*. These ribs also serve to provide stability for the skier, and enable the ski direction to be well controlled.

The platform or sole plate B of the ski is preferably molded, in a single piece, of a resin, such, for example, as polypropylene, having high-impact properties.

The sole plate B, which is best seen in FIGS. 1, 2, 2*a*, 4, 5, 6, 7, 8 and 9, is substantially coextensive in length and width with the part 11*a* of the body A, and comprises a substantially flat upper platform portion 30, of the contour shown in FIG. 7, and having a downwardly inclined ramp 31 at its rear edge, which, when the sole plate is attached to the body, as seen in FIG. 4, extends to the body A and provides a finished appearance for the ski, as a whole.

The forward portion of the sole plate has a flange-like extension 32 (see FIGS. 4, 7 and 9), which is offset downwardly from the platform portion 30 and extends rearwardly to points 33 and 34 (FIG. 7), this extension being contoured to provide recesses 35, 36, 37 and 38, which serve a purpose to be presently described.

Spaced inwardly of the periphery of the extension 32 is a downwardly extending flange 39, which terminates at points 40 and 41. This flange has a depth such as to stiffen the perimeter of the flange extension 32.

This flange 39 is further rigidified or reinforced by means of a system of cross-ribbing consisting of components 43, 43, 44, 45, 46, 47, 48, 49, 50 and 51 (see FIG. 7), all of the same depth as the flange 39.

Spaced inwardly from the lateral edges of that portion of the sole plate which extends rearwardly of the recesses 35 and 36 are downwardly extending parallel ribs 52 and 53, which extend to the ramp 31. These ribs are of a depth substantially greater than that of the flange 39, except for portions 52*a* and 53*a* respectively thereof, which are of substantially the same depth as the flange 39.

These flanges 52 and 53 are rigidified or reinforced by means of a system of cross ribbing consisting of components 54, 55, 56, 57, 58, 59, 60, 61, 62 and 63. All of these components are of substantially the same depth as the flange 39, with the exception of the portion 60*a* of the rib 60 and a portion 61*a* of the rib 61, which are of the same depth as the ribs 52 and 53. The ribs 60 and 61 are, in turn, reinforced by a system of diagonal and transverse bracing ribs, generally designated by reference numeral 64 and which are also of substantially the same depth as the flange 39. Additional ribs 65 and 66 extend from points spaced rearwardly of the ribs 61 to the ramp 31.

Additional ribs 43*a*, 44*a*, 50*a* and 51*a* are provided, as shown in FIG. 7, which are of substantially the same depth as the portions 60*a* and 61*a* of the ribs 60 and 61. The forward ends 52*b* and 53*b* of the ribs 52 and 53 are slightly greater in depth than the ribs 52 and 53, having a depth which is substantially that of the ramp 31.

The points at which the ribs 55 and 56 intersect the ribs 58 and 59 respectively provide countersunk cored bosses 67, and the points at which the ribs 62 and 63 intersect provide similar countersunk cored bosses 68.

At the point at which the ribs 47 and 48 intersect each other, a pin 47*a* is provided, which serves a purpose to be presently described.

As best seen in FIGS. 2, 7 and 8, slots 69 and 70 are provided in the rear portion of the sole plate platform 30, which slots serve a purpose to be presently described.

The sole plate platform 30 is further provided at its forward portion with a series of longitudinally extending spaced parallel upstanding ribs 71, and is provided at its rearward portion with a multiplicity of spaced upstanding protrusions 72 which serve purposes to be presently described.

The cowl or toe-receiving member C is best seen in FIGS. 1, 2, 2*a*, 3, 4 and 5, and like the sole plate B, is preferably molded, in a single piece, or a resin, such, for example, as polypropylene.

It comprises a flat base portion 73, of the contour best seen in FIG. 2, having a downwardly inclined ramp 73*a*, at its forward edge, which, when the cowl is at-

tached to the body A and sole plate B, extends to the flat portion **11** of the body, and is provided at the rear with ears or tongues **74** and **75** having countersunk cored bosses **76** and **77** depending therefrom (see FIG. **5**), which nest in the recesses **35** and **36** of the sole plate B.

The base portion **73** of the cowl is also provided adjacent its forward edge with countersunk cored bosses **79** depending therefrom (see FIG. **2***a*), which nest in the recesses **37** and **38** of the sole plate B.

Spaced inwardly from the lateral edges of the base portion **73** of the cowl are downwardly extending parallel ribs or flanges **81** (FIG. **2***a*), which extend from points adjacent the ears or tongues **74** and **75** to the ramp **73***a*. These ribs are of a depth substantially the same as the depth of the ribs **52** and **53** of the sole plate.

The cowl C is further provided with an upstanding hollow portion **82**, which, as best seen in FIGS. **2**, **3**, and **4**, is contoured both longitudinally and laterally to receive the toe of a skier's boot. It is provided with slots **83** and **84**, which serve a purpose to be presently described.

METHOD OF ASSEMBLY

In assembling the parts of the ski, the platform or sole plate B is placed upon the body A in the manner shown in FIG. **2**, so that the ribs **52** and **53** thereof lie adjacent the inboard faces of the flange **13**, as shown in FIGS. **5** and **6**, and the inclined ramp **31** extends to the flat portion **11** of the body, as shown in FIG. **4**. The portions **52***a* and **53***a* of the ribs **52** and **53**, being of the same depth as the flange **39**, will clear the ribs **17**, **18** and **19** of the body A.

This placement of the sole plate B, as shown in FIG. **4**, also causes the portion **60***a* of the rib **60** to enter the space adjacent to the rib **17** of the body A and the portion **61***a* of the rib **61** to enter the space adjacent to the rib **19** of the body A.

This placement of the sole plate B also causes the ribs **43***a*, **44***a*, **50***a*, **51***a*, ends **52***b* and **53***b* of the ribs **52** and **53** respectively, portions **60***a* and **61***a* of the ribs **60** and **61**, ribs **65** and **66**, and the ramp **31** to rest directly on the upper surface of body A, and the pin or post **47***a* to rest on the slightly elevated portion of the body above the tracking groove **28**.

At the same time, the cored bosses **68**, as shown in FIG. **6**, are axially aligned with the mounting bosses **27***c* of the body A, and the bosses **67** are axially aligned with the mounting bosses **27***d* which lie adjacent the rib **17**. Stainless steel self-tapping screws **85** are then inserted in the holes in these axially aligned bosses, to thereby firmly secure the sole plate to the body. The heads of these screws, as seen in FIG. **6**, are countersunk into the bosses **68**, so as to lie flush with the upper surface of the platform portion **30** of the sole plate.

With the sole plate thus secured to the body of the ski, the base **73** of the cowl or toe-receiving member C is placed upon the flange-like extension **32** of the sole plate in the manner shown in FIGS. **2**, **2***a* and **4**, with the base of the inner surface of the upstanding portion **82** of the cowl disposed against the shoulder **86** (see FIGS. **4** and **9**) at the rear of the upper surface of the flange-like extension **32**, and the inclined ramp **73***a* of the cowl extending downwardly to the flat portion **11** of the body.

This placement of the cowl, as shown in FIG. **5**, brings the cored bosses **76** and **77** into axial alignment with the mounting bosses **27***a*, and the cored bosses **79**, as shown in FIG. **2***a*, into axial alignment with the mounting bosses **27***b*. Stainless steel self-tapping screws **87** are then inserted in the holes in these axially aligned bosses to thereby firmly secure the cowl and sole plate to the body. The heads of these screws, as seen in FIGS. **2***a* and **5**, are countersunk into the bosses **76**, **77** and **79**, so as to lie flush with the upper surface of the base **73** of the cowl.

BINDING OF BOOT TO SKI

In binding the ski boot S, which is shown somewhat diagrammatically in FIG. **1**, to the sole plate B, the toe of the boot is inserted into the cowl C, and a belt or strap S^1 is passed through the slots **83** and **84**, crossed over the instep of the boot, and the ends adjustably secured together at the rear of the boot.

An instep securing belt or strap S^2 is then passed through the slots **69** and **70** of the sole plate, and its ends adjustably secured together, as at S^3 (FIG. **1**).

The passage of the belt or strap S^2 through the sole plate is greatly facilitated by reason of the fact that as one end of the strap is passed into one of the slots **69** or **70**, the strap is guided into and out of the sole plate by the curved surfaces **17***a*, **18***a* and **19***a* of the ribs **17**, **18** and **19** respectively, while, at the same time, the inward offsetting of these curved surfaces is such as to cause the strap to be oriented or inclined toward the instep of the boot, so that the ends of the strap can be quickly brought together for the purpose of securing such ends to each other.

PROPERTIES AND ADVANTAGES

As previously stated, the gradation in height of the flange **13** of the body of the ski is such that the tip and tail portions have a desired degree of flexibility, while the foot-supporting portion is relatively rigid of inflexible. This flexibility of the front portion or toe enables the skier to move more readily over ruts and uneven snow surfaces.

The rigidity of the foot-supporting portion of the body, combined with the reinforcing ribbing in this area of the body and the ribbing of the sole plate, and the manner in which the sole plate is secured to the body, provides a rigid platform for the skier, on which his weight is well supported, and enables him to have excellent control of direction and deceleration, when desired, and permits him to roll, twist, and shift his weight.

The close proximity of this platform to the tail **12** of the ski body enables the skier to shift his weight rearwardly, to thereby quickly stop or decelerate the skiing action.

The provision of the ribs **17**, **18** and **19**, as previously stated, and particularly the curved surfaces or edges **17***a*, **18***a* and **19***a* thereof, enables the instep strap to be quickly and easily guided into and out of the sole plate, and the ends of the strap to be bound to the boot.

The construction of the sole plate is such as to enable the sole plate to be quickly and easily seated on the ski body and assembled with the latter.

Similarly, the construction of the cowl is such as to enable the cowl to be quickly and easily assembled with the sole plate and ski body, the mechanical seating and

inter-relation of the sole plate and cowl being such as to accomplish a very complex function with only two parts, and made in an injection mold, which is simple, and has no mechanically pulled cores.

The protrusions or buttons **72** on the sole plate provide a desirable non-skid surface and afford longitudinal stability for the skier, while the provision of the ribs **71** facilitate entry of the toe of the boot into the cowl while still affording lateral stability for the skier, once the foot is seated on the sole plate.

The system of ribbing on the sole plate is designed to coact with the system of ribbing on the ski body, and this coaction or relationship provides a solid structure, in which the close spacing of the ribs enables the length or span of the load-bearing surface of the sole plate to be reduced to a minimum.

The inclined ramps **31** and **73***a* serve to close in or conceal the ends of the platform structure, and provide a finished appearance for the ski as a whole.

The molded recesses or counterbores permit the heads of the fasteners to lie flush with the upper surface of the sole plate on which the foot rests.

The cowl is designed to accommodate a conventional overshoe or boot, or footwear of any type or size.

It is to be understood that the form of my invention, herewith shown and described, is to be taken as a preferred example of the same, and that various changes may be made in the shape, size and arrangement of parts thereof, without departing from the spirit of the invention or the scope of the subjoined claims.

Having thus described my invention, I claim:

1. A ski of the character described, comprising a body portion having an upwardly curved forward tip, and a tail at the rear of said body portion, said body portion provided at its perimeter with an upstanding continuous flange, said body portion having longitudinally spaced ribs extending between portions of said flange, and having longitudinally spaced upstanding cored bosses, a sole plate overlying said ribs and cored bosses, a toe-receiving member overlying the forward portion of said sole plate, and means securing said sole plate and toe-receiving member to said cored bosses.

2. A ski, as defined in claim **1**, wherein said ribs have curved edges adjacent their ends adapted to guide an instep strap through said body.

3. A ski, as defined in claim **2**, wherein said sole plate is provided on its lower surface with a system of ribbing comprising ribs adapted to overlie the ribs of said body and to coact with the latter to rigidify the area of the ski to which said sole plate is secured.

4. A ski, as defined in claim **3**, wherein certain of said sole plate ribs intersect to provide depending cored bosses axially aligned with some of the bosses of said body, and fasteners are provided which interconnect the axially-aligned bosses, to interconnect the sole plate with said body.

5. A ski, as defined in claim **4**, wherein said sole plate is provided with slots adjacent said curved edges for the passage through said slots of said instep strap.

6. A ski, as defined in claim **5**, wherein said sole plate is provided at its rear end with an inclined flange or ramp extending to the base of said body portion of the ski.

7. A ski, as defined in claim **6**, in which said sole plate is provided adjacent its forward portion with an upstanding shoulder against which said toe-receiving member abuts, whereby to facilitate proper placement of said member in relation to the sole plate.

8. A ski, as defined in claim **7**, wherein said toe-receiving member is provided with depending cored bosses axially aligned with some of the bosses of said body, and fasteners are provided which interconnect the axially-aligned bosses, to interconnect the toe-receiving member with said body.

9. A ski, as defined in claim **8**, wherein said toe-receiving member is provided at its forward end with a depending inclined flange or ramp extending to the base of said body.

10. A ski of the character described, comprising a body portion having an upwardly curved forward tip, and a tail at the rear of said body portion, said body portion being provided at its perimeter with an upstanding continuous flange which is relatively high at an area of said body portion which is adjacent said tail, whereby to render said area of said body portion relatively inflexible in a vertical direction, while leaving the remaining areas of said body portion relatively flexible in a vertical direction, the area of said body portion between said relatively high portions of said flange having spaced upstanding cored bosses, a sole plate secured to said body portion of the ski at a position overlying said cored bosses, said sole plate having depending cored bosses aligned with the cored bosses of said body portion, and fasteners extending into the cored bosses of the sole plate, and the cored bosses of said body portion for securing said sole plate to said body portion.

11. A ski, as defined in claim **10**, wherein said sole plate has a relatively flat upper surface which is substantially coplanar with the upper edges of said high portions of said flange.

12. A ski, as defined in claim **11**, including a toe-receiving member having a relatively flat base portion secured to cored bosses of said body portion and disposed adjacent the forward portion of said sole plate, said toe-receiving member having a hollow portion extending upwardly from said base portion and contoured longitudinally and transversely to receive the toe portion of a skier's boot.

* * * * *