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Simmons et al.

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(54) **SNOW MACHINE SKI**

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Related U.S. Application Data

(63) Continuation-in-part of application No. 12/727,204, filed on Mar. 18, 2010, now abandoned, which is a continuation of application No. 11/687,416, filed on Mar. 16, 2007, now abandoned.

(60) Provisional application No. 60/783,458, filed on Mar. 17, 2006, provisional application No. 60/846,983, filed on Sep. 25, 2006.

(51) **Int. Cl.**
B62B 9/04 (2006.01)

(52) **U.S. Cl.**
USPC **280/28**; 280/22

(58) **Field of Classification Search**
USPC 280/28, 609, 21.1, 22.1, 14.2, 608, 606, 280/602, 22; 180/182, 190
See application file for complete search history.

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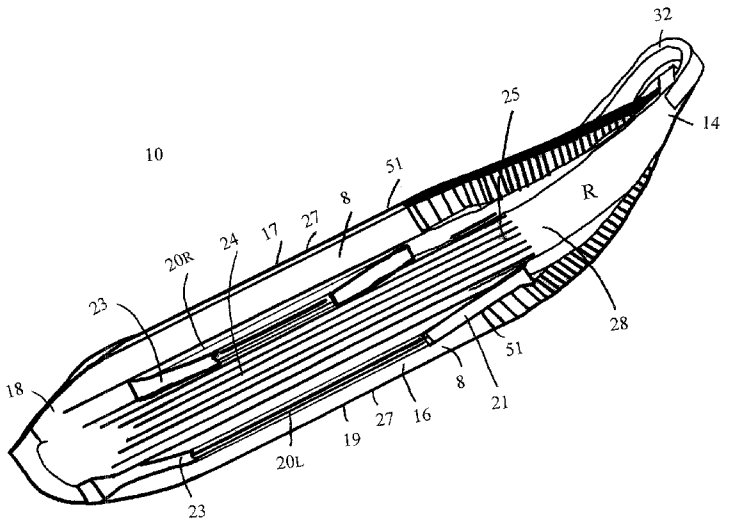
(57) **ABSTRACT**

A ski for a snowmobile is provided with a pair of lateral wings and a central channel for increasing the flow of snow under a gliding surface at the bottom of the ski. The increased flow of snow enhances flotation of the ski. The channel may be formed by two downwardly extending keels. The wings are defined between the keels and outer edges of the ski. The keels may be asymmetric with a shorter keel being positioned toward an outer edge of the snowmobile to improve handling characteristics of a snowmobile.

19 Claims, 22 Drawing Sheets



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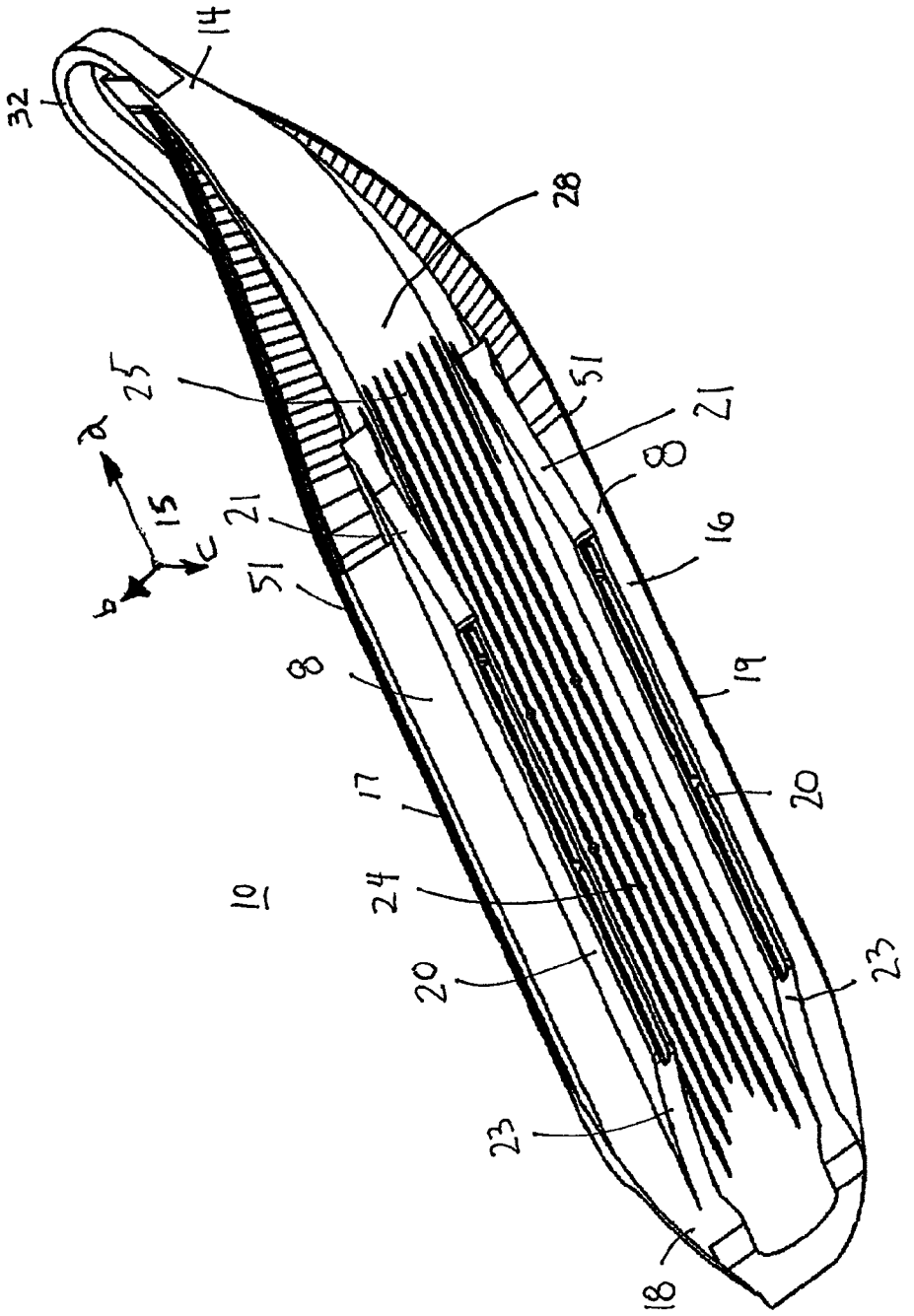

FIG. 1

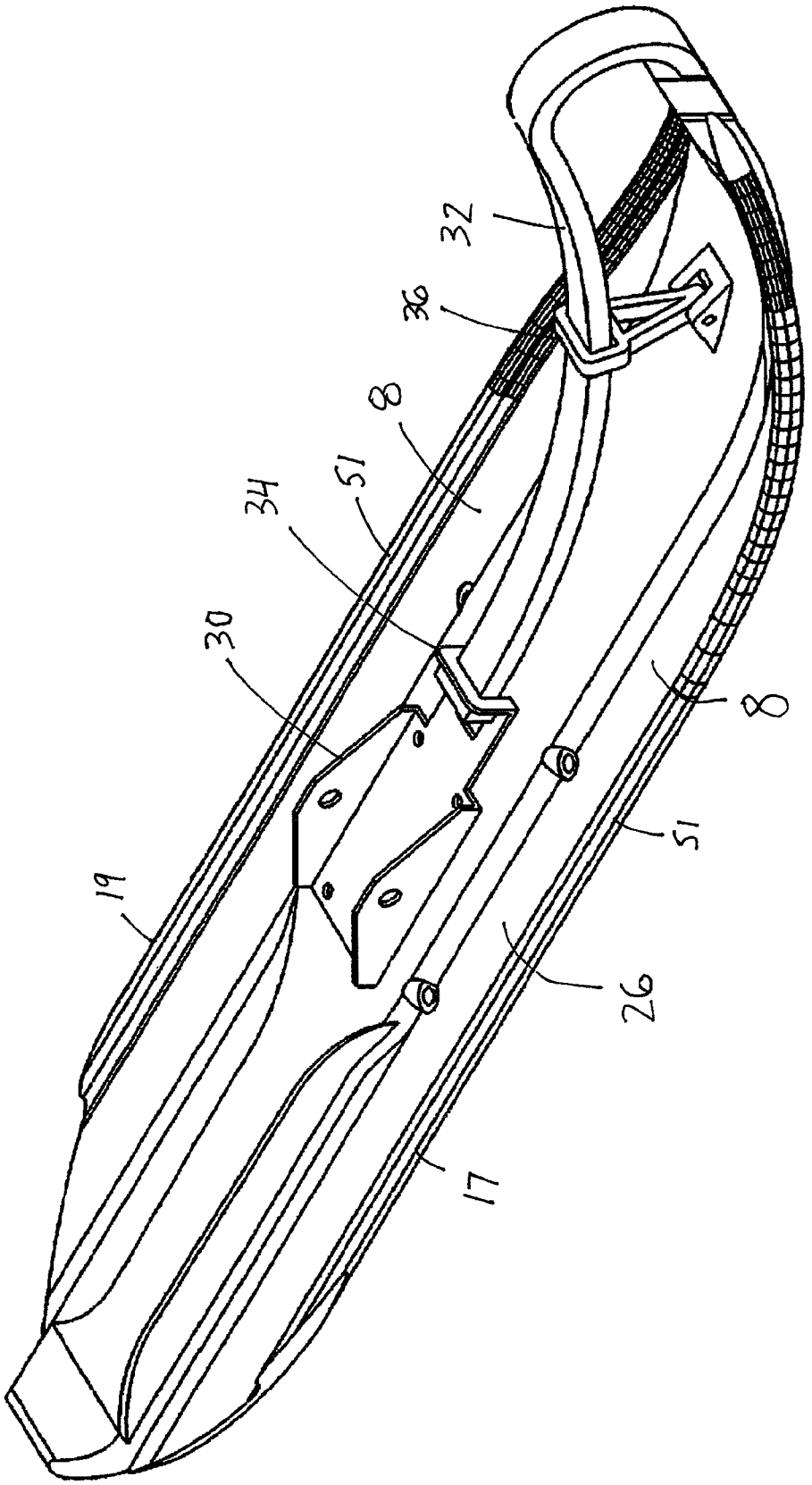

FIG. 2

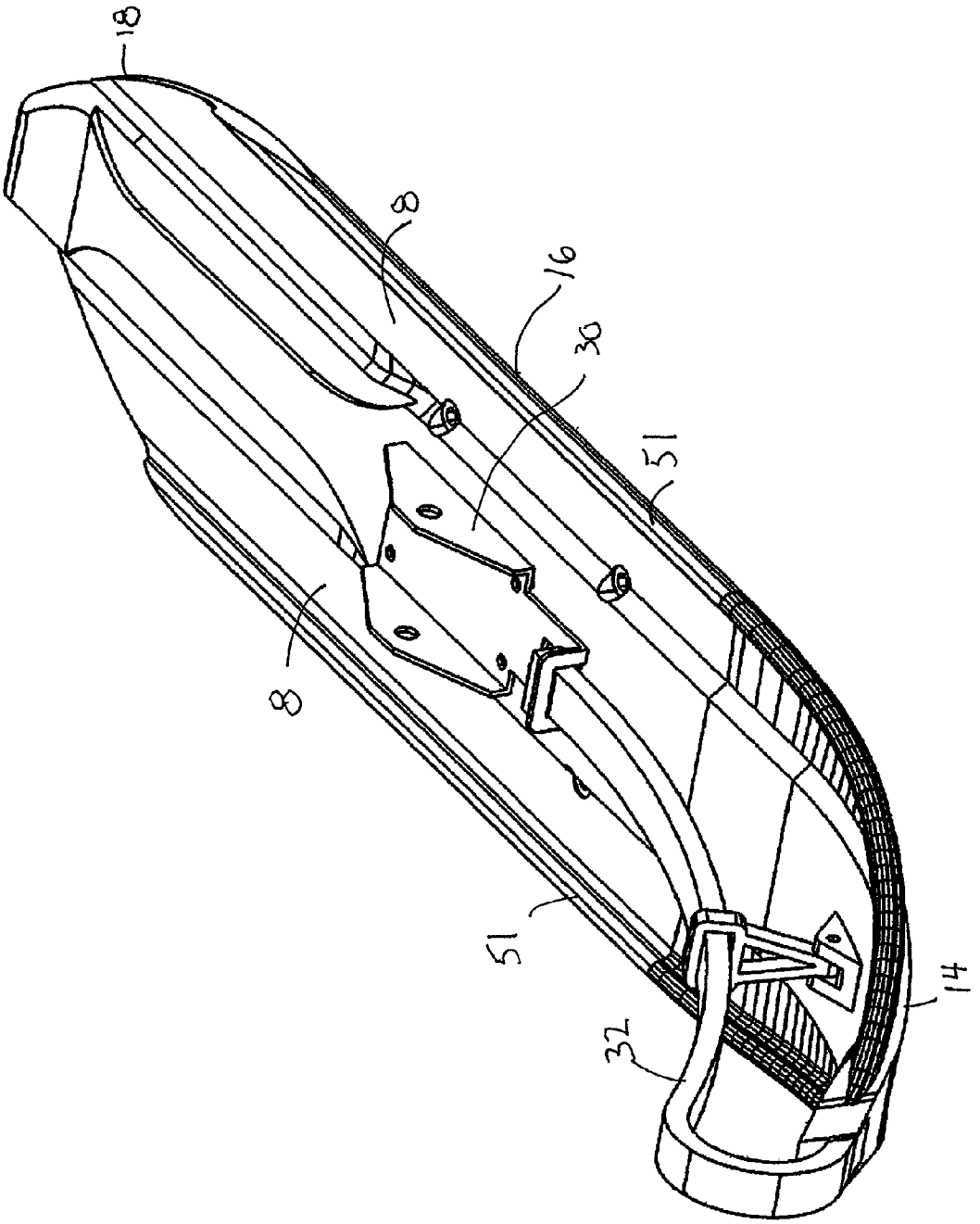

FIG. 3

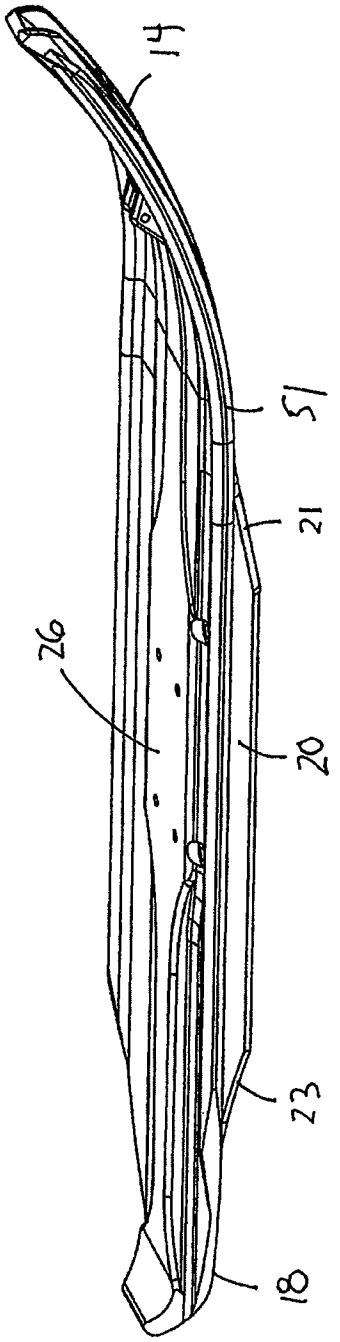

FIG. 4

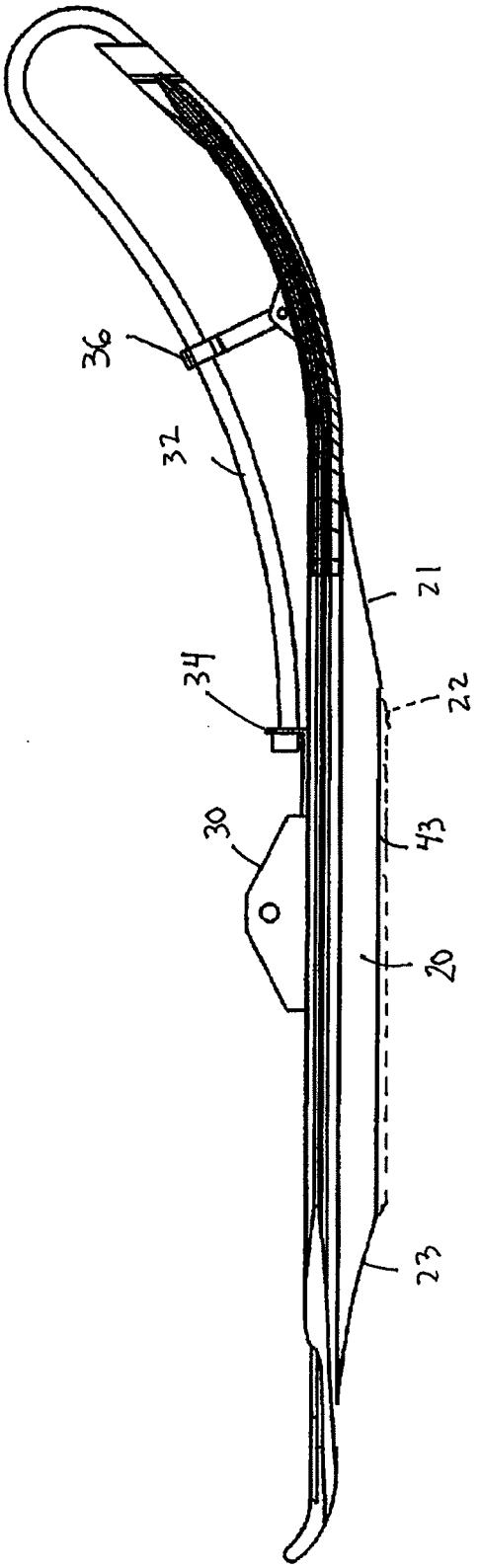

FIG. 5

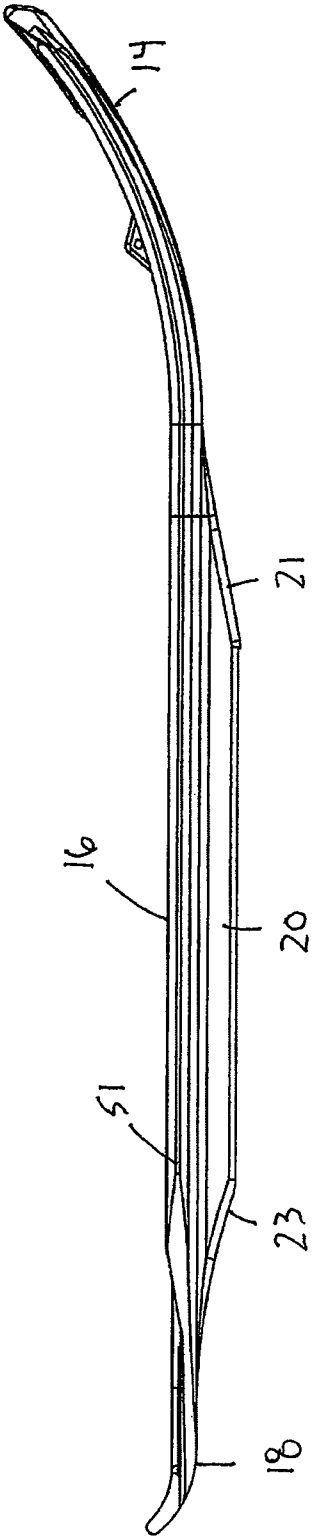

FIG. 6

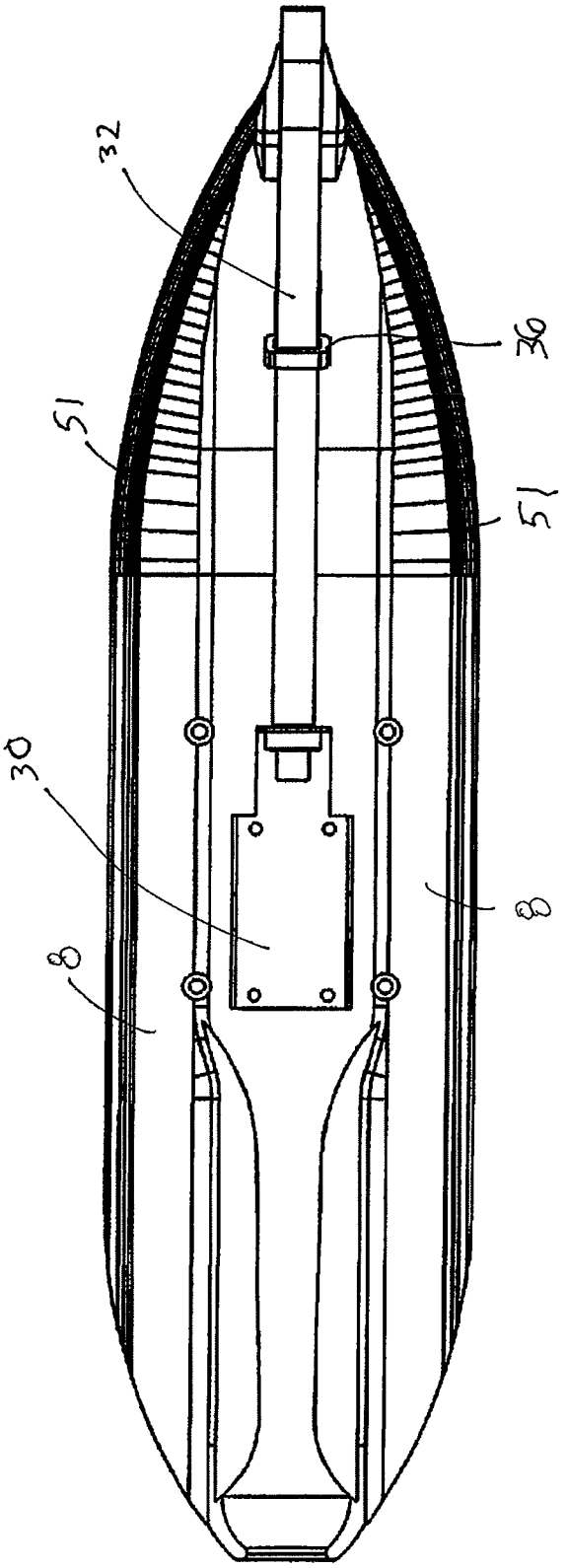

FIG. 7

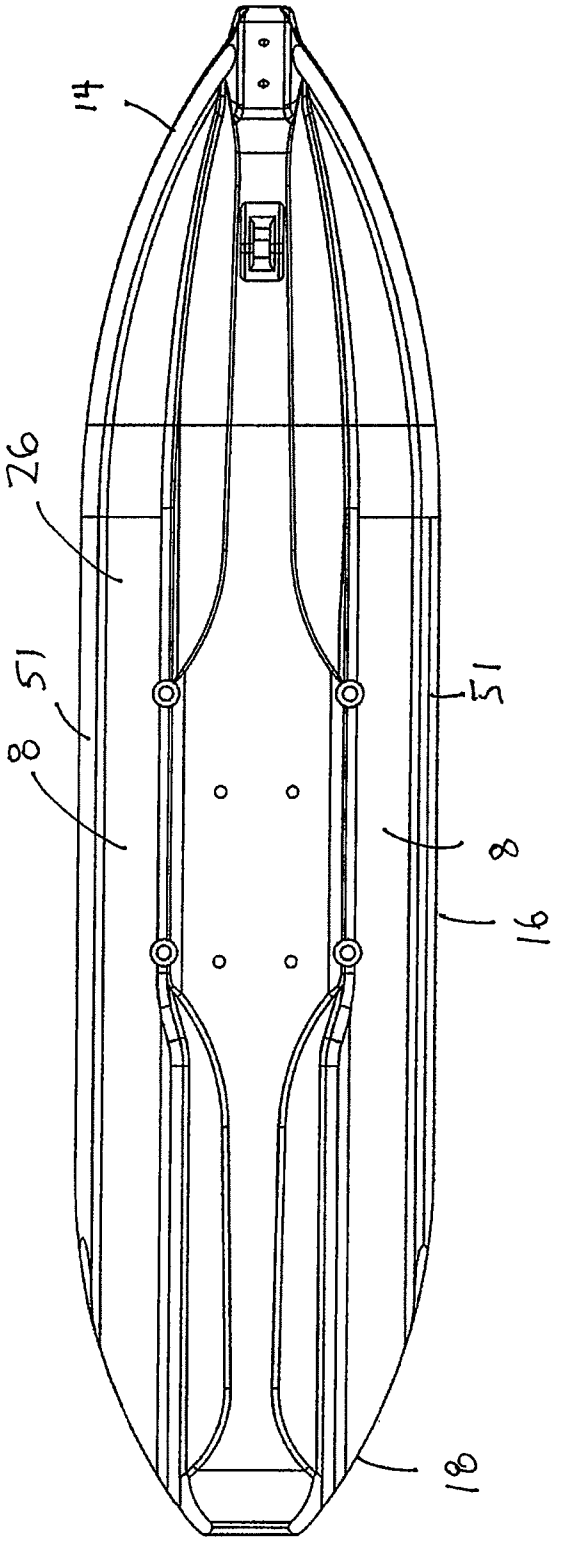

FIG. 8

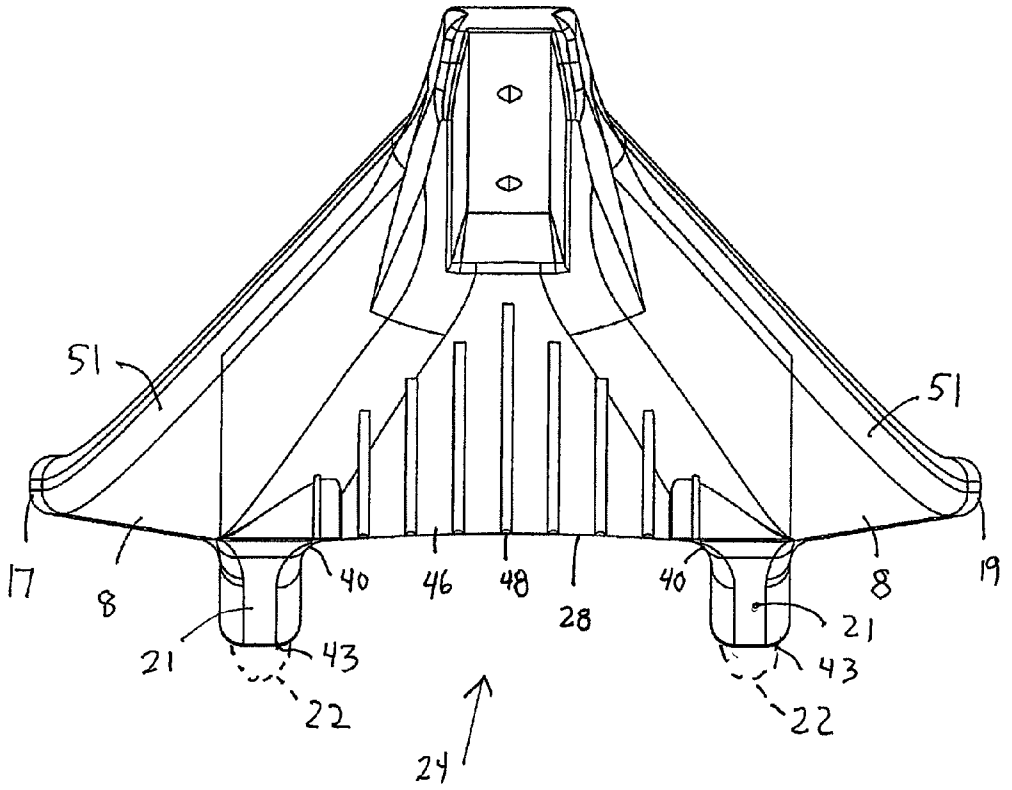

FIG. 9

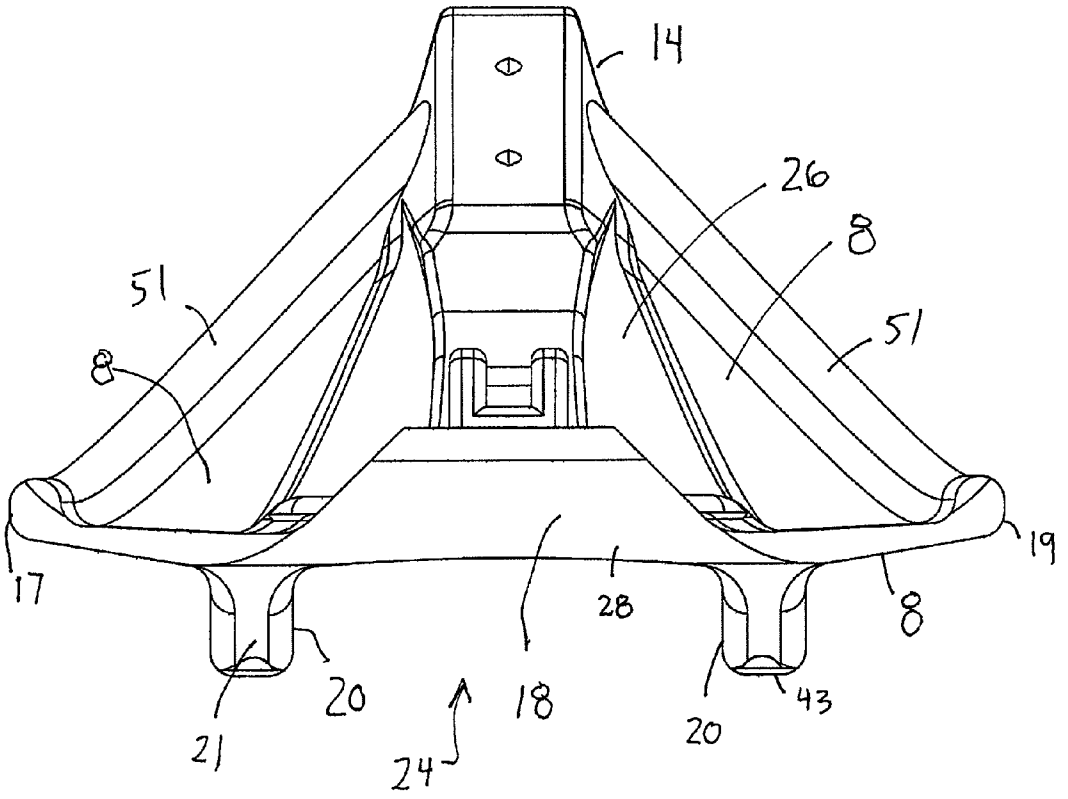

FIG. 10

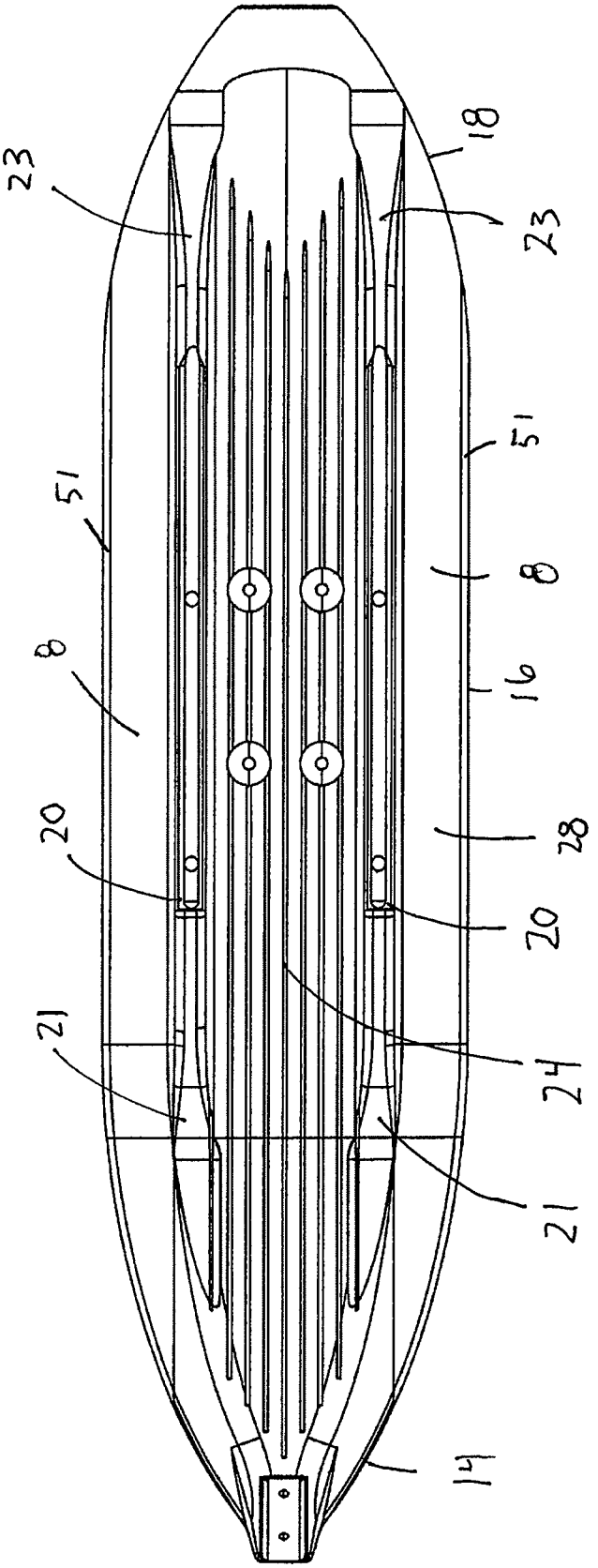

FIG. 11

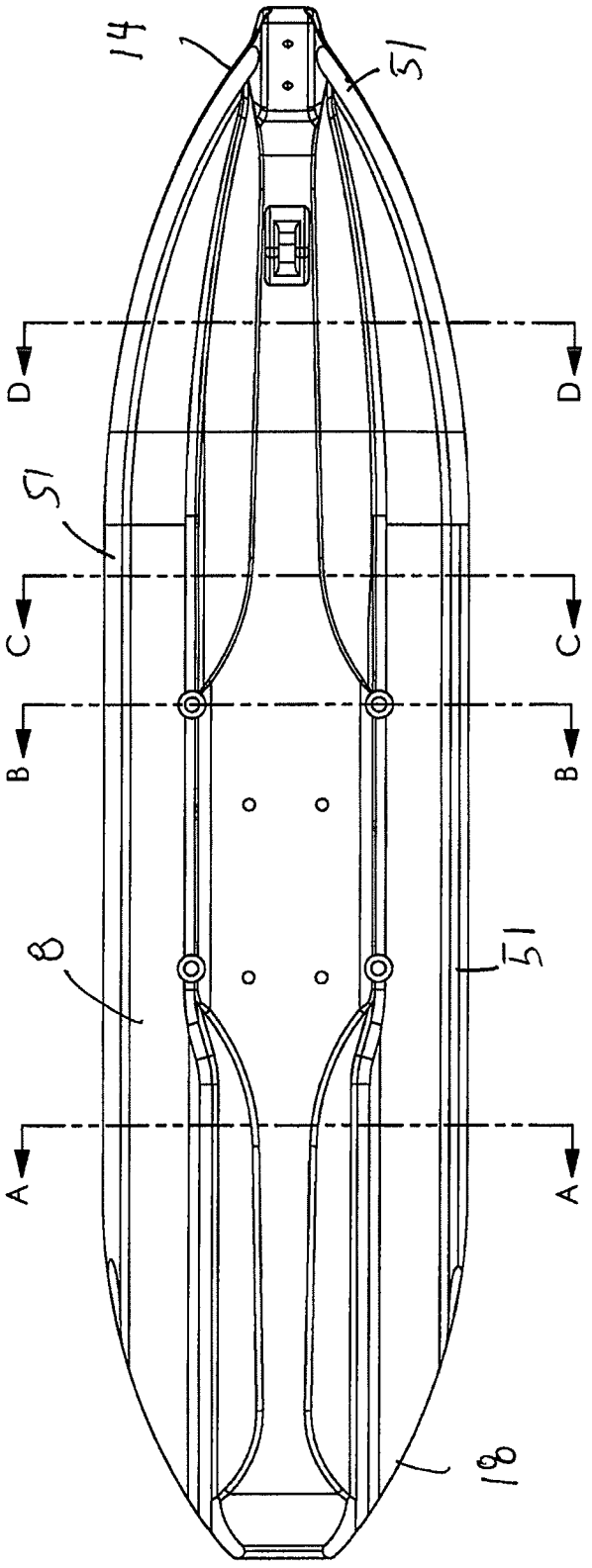

FIG. 12

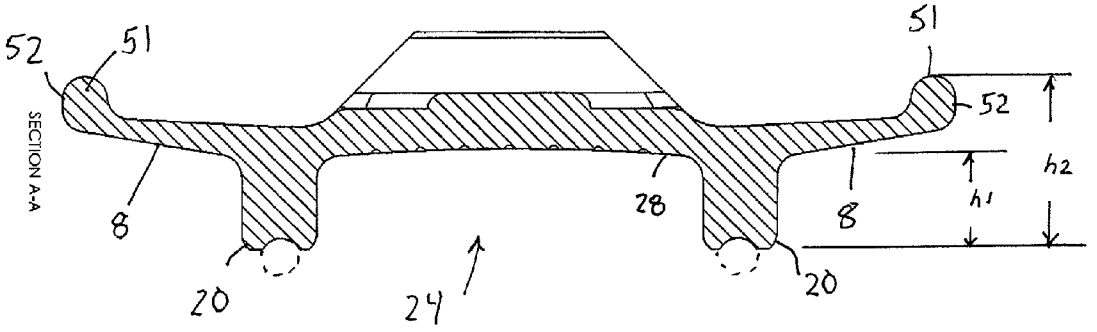

FIG. 13

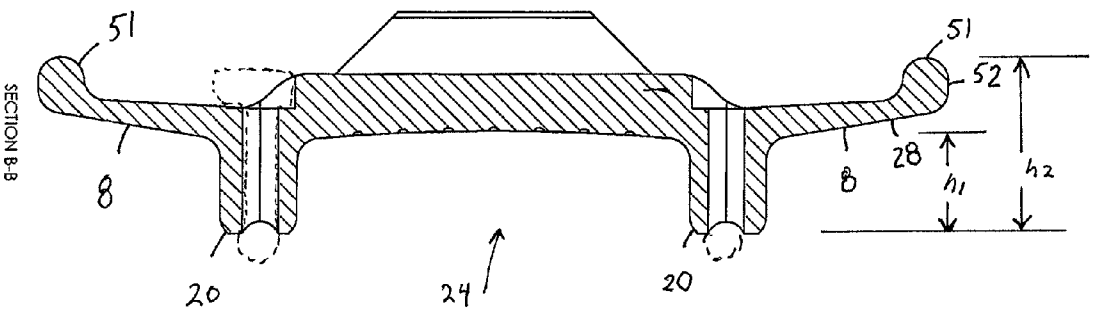

FIG. 14

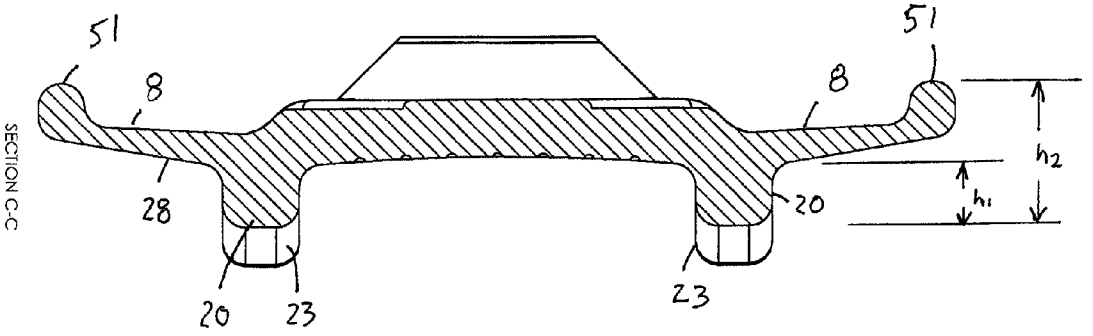

FIG. 15

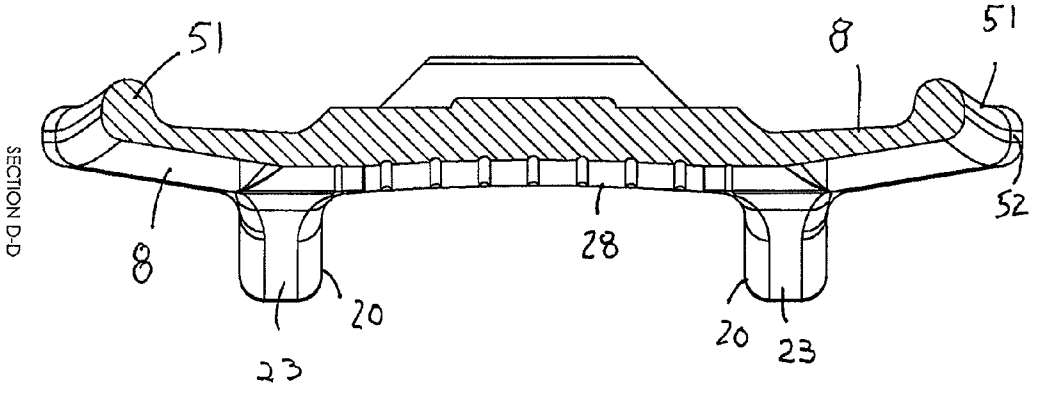

FIG. 16

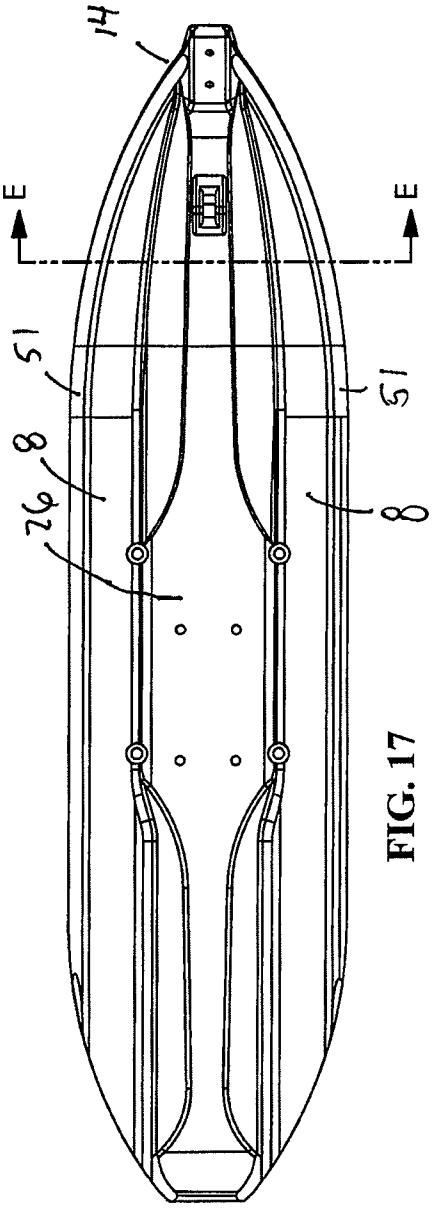

FIG. 17

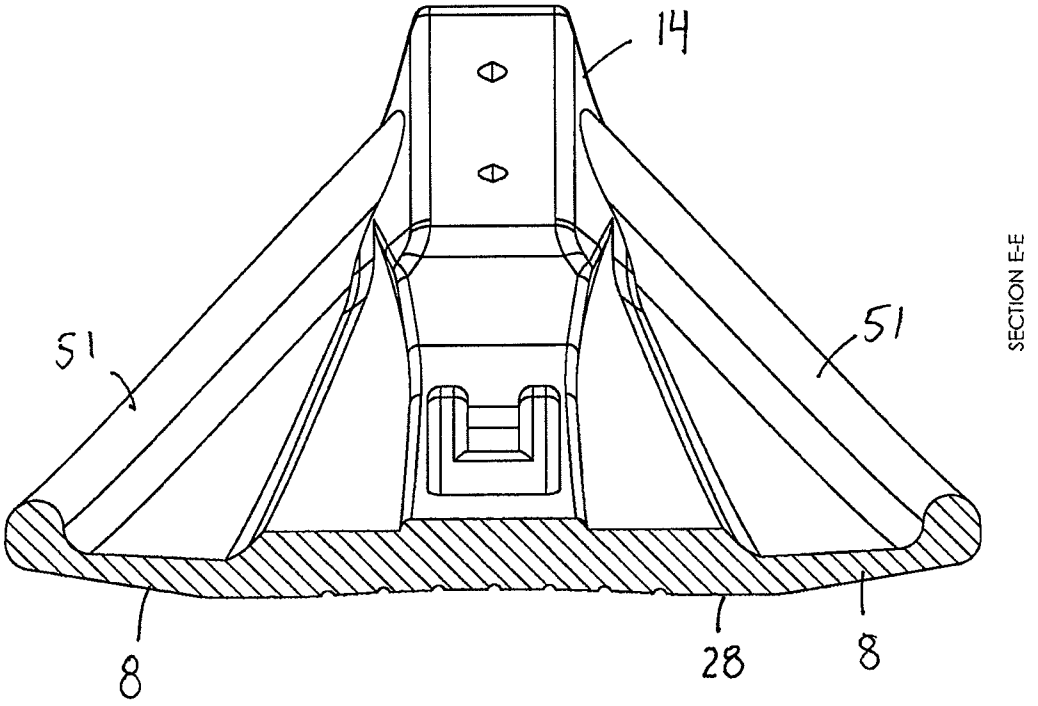

FIG. 18

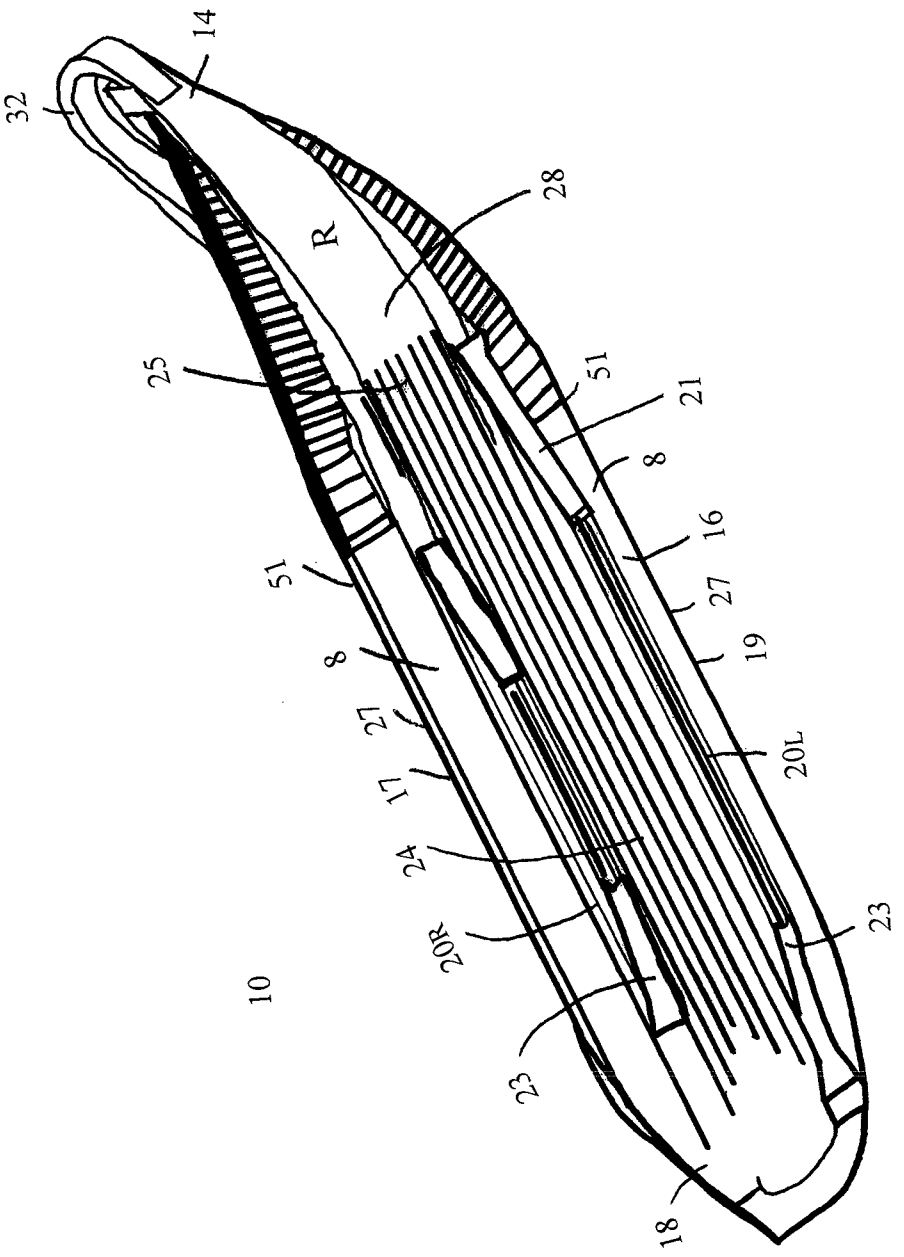

FIG. 19

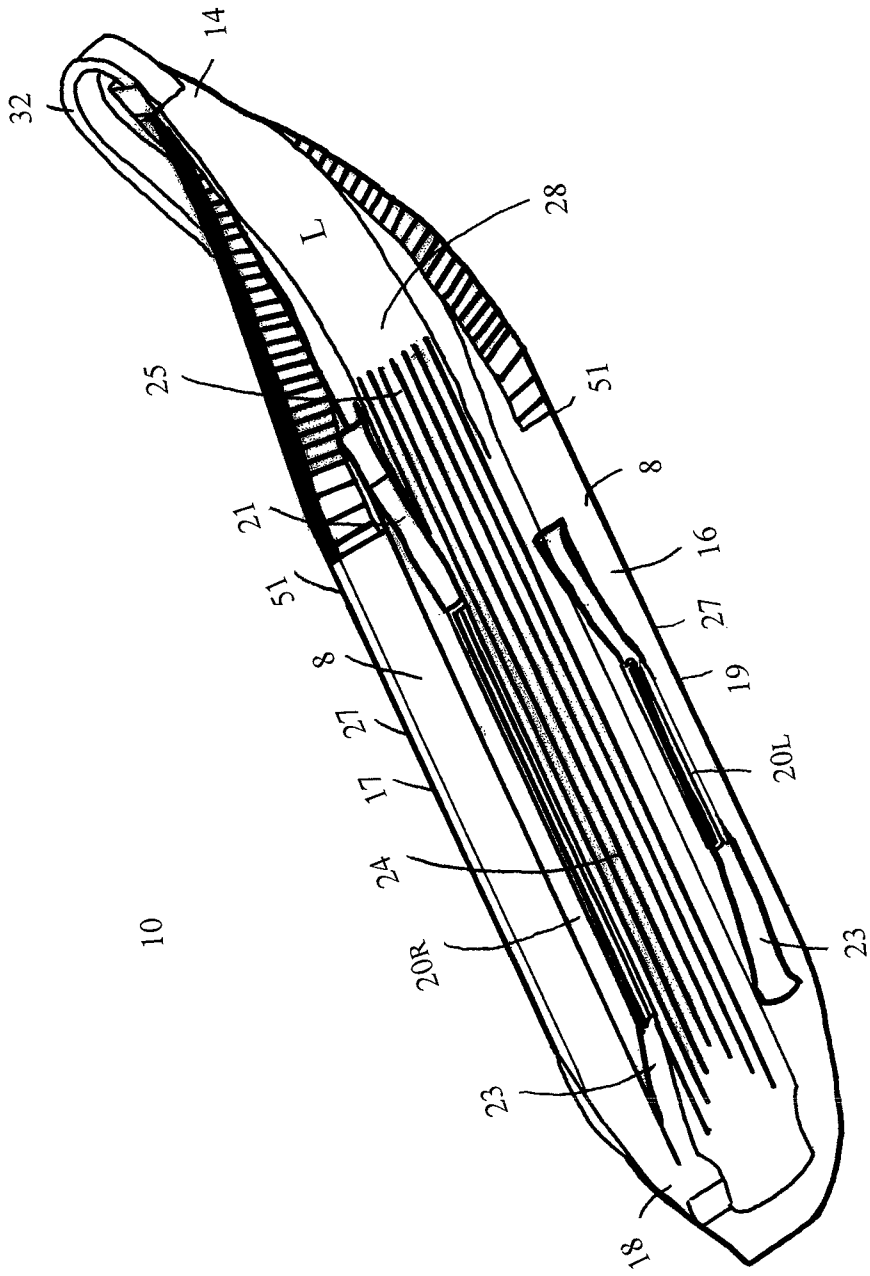

FIG. 20

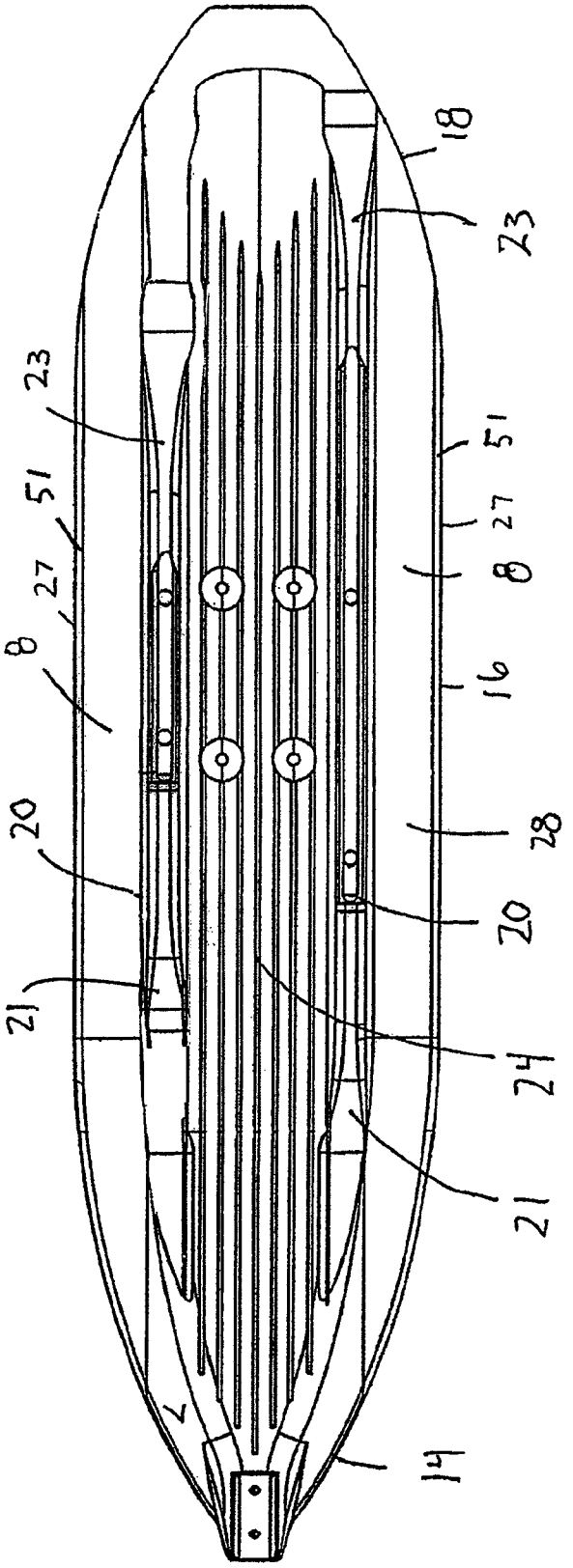

FIG. 21

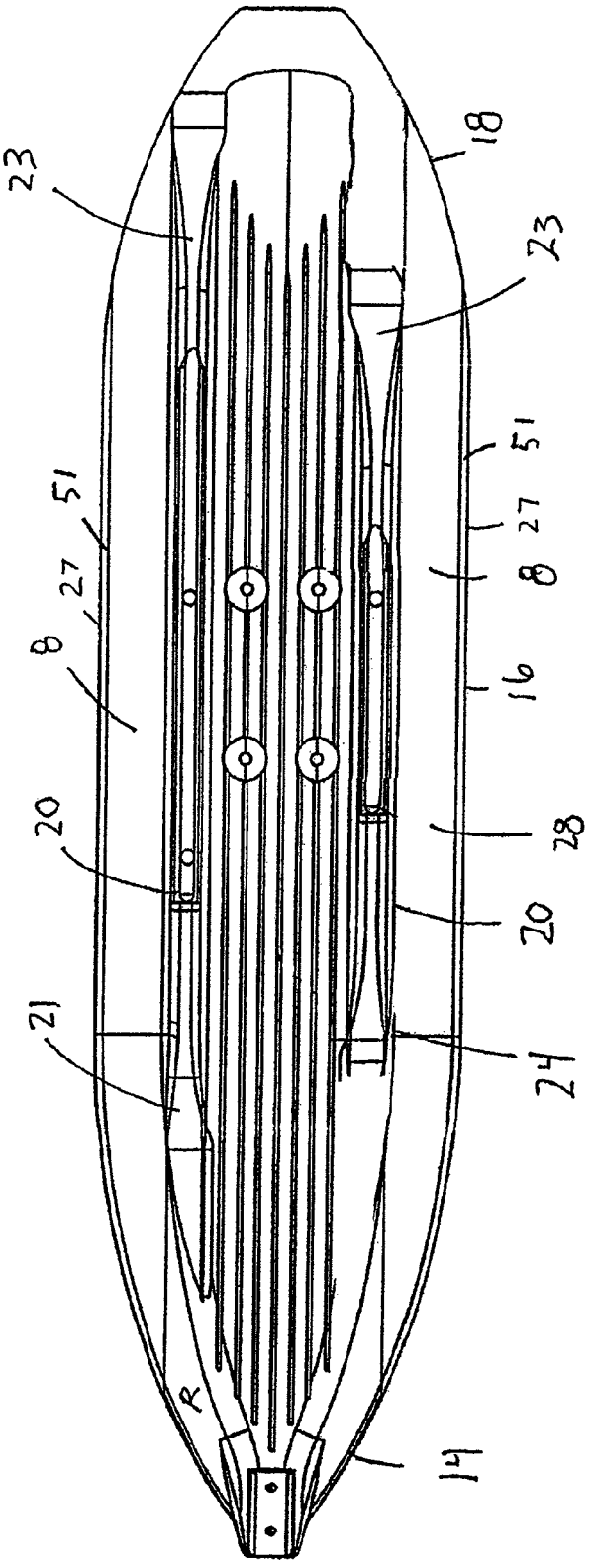

FIG. 22

SNOW MACHINE SKI

RELATED APPLICATIONS

This application is continuation in part of U.S. Ser. No. 12/727,204, which was a continuation of U.S. Ser. No. 11/687,416, filed Mar. 16, 2007, which claims priority from U.S. Provisional Application Nos. 60/783,458 filed on Mar. 17, 2006, and 60/846,983 filed on Sep. 25, 2006, each application being hereby incorporated by reference in its entirety.

FIELD OF THE INVENTION

The present invention relates to snow skis. More particularly, the invention relates to snowmobile skis providing for increased deep powder flotation and enhanced steering response and machine maneuverability.

BACKGROUND OF THE INVENTION

As snowmobiles have improved, it is recognized that the ability of the skis to provide flotation, properly control the snowmobile, and maintain an intended direction of travel have lagged behind. Conventional skis also exhibit shortcomings in the area of flotation in deep powder snow. Typically, in such snow conditions, a high rate of speed can keep the snowmobile ski planing upon the surface. However, on steep slopes or particularly deep snow the ability of the ski to continue planing can be limited

Thus, as technological barriers are being overcome, certain limitations of current snow machines have come glaringly to light. To fully utilize current technological benefits, snowmobiles must be provided with increased flotation ability, steering ability, and tracking capability. Until these needs are met, much terrain will remain impassible or at least dangerous to the operators of snow machines.

BRIEF SUMMARY OF THE INVENTION

The present invention is directed to a snow ski capable of providing enhanced machine operation across a variety of snow surfaces. In one example, a snowmobile ski embodies aspects of the present invention and is provided with a pair of lateral wings and a central channel for increasing the flow of snow under the ski during operation. The increased flow of snow enhances flotation of the ski, particularly in deep powder conditions. The channel may be formed between two keels, one disposed to either side of a gliding surface of the ski. The pair of lateral wings may be combined as an integrated ski or be separable, replaceable components which may be selectively attached to an existing ski. These wings significantly improve the handling characteristics and capability of the snow machine, particularly in deep snow. Ski embodiments having asymmetric keels can also provide improve performance characteristics of the snowmobile. In one embodiment, keels have substantially different lengths, with a shorter keel being positioned at an outer edge of the snowmobile.

The foregoing has outlined rather broadly the features and technical advantages of the present invention in order that the detailed description of the invention that follows may be better understood. Additional features and advantages of the invention will be described hereinafter which form the subject of the claims of the invention. It should be appreciated by those skilled in the art that the conception and specific embodiment disclosed may be readily utilized as a basis for modifying or designing other structures for carrying out the same purposes of the present invention. It should also be realized by those skilled in the art that such equivalent constructions do not depart from the spirit and scope of the invention as set forth in the appended claims. The novel features which are believed to be characteristic of the invention, both as to its organization and method of operation, together with further objects and advantages will be better understood from the following description when considered in connection with the accompanying figures. It is to be expressly understood, however, that each of the figures is provided for the purpose of illustration and description only and is not intended as a definition of the limits of the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

For a more complete understanding of the present invention, reference is now made to the following descriptions taken in conjunction with the accompanying drawing, in which:

FIGS. **1-4** are perspective views illustrating an embodiment of the present invention in which a ski is provided with a contoured gliding surface including a channel and a pair of longitudinal powder wings.

FIGS. **5-6** are side elevation views of the ski of FIG. **1**.

FIGS. **7-8** are top plan views of the ski of FIG. **1**.

FIG. **9** is a front elevation view of the SKI of FIG. **1**.

FIG. **10** is a back elevation view of the SKI of FIG. **1**.

FIG. **11** is a bottom plan view of the SKI of FIG. **1**.

FIG. **12** is a top plan view of the SKI of FIG. **1**.

FIG. **13** is a cross-sectional detail of the ski of FIG. **12** taken around line A-A of FIG. **12**.

FIG. **14** is a cross-sectional detail of the ski of FIG. **12** taken around line B-B of FIG. **12**.

FIG. **15** is a cross-sectional detail of the ski of FIG. **12** taken around line C-C of FIG. **12**.

FIG. **16** is a cross-sectional detail of the ski of FIG. **12** taken around line D-D of FIG. **12**.

FIG. **17** is a top plan view of the SKI of FIG. **1**.

FIG. **18** is a cross-sectional detail of the ski of FIG. **17** taken around line E-E of FIG. **17**.

FIGS. **19-22** illustrate a second embodiment of a snowmobile ski.

DETAILED DESCRIPTION OF THE INVENTION

The present invention may be embodied as a snowmobile ski to improve the ski's ability to float on top of deep powder snow, track straight across a variety of terrain, maneuver effectively on steep hills, and turn sharply in different snow conditions, particularly light and deep snow. Other aspects of a snow machine ski are disclosed in Applicant's U.S. Pat. Nos. 5,360,220, 5,836,954 and 6,276,699, each of which are hereby incorporated by reference into this document.

FIGS. **1** through **18** show aspects of snow machine ski **10** in accordance with the present invention. As illustrated in FIG. **1**, snow machine ski **10** has a body **12** functionally divided into an upturned tip **14**, a tail **18**, and an intervening base portion **16**. Body **12** of snow machine ski **10** extends in a longitudinal direction **15***a* from tip **14** through tail **18** and has a width extending in a lateral direction **15***b* between a first edge **17** and a second edge **19**. Body **12** also has a depth in a vertical direction **15***c*. Ski **10** in FIG. **1** further includes a pair of longitudinally extending wing sections, or "wings" **8**. In the illustrated embodiment, ski **10** is generally symmetric about longitudinal plane. For example, keels **20** are equidistant from a centerline of channel **24**. In alternative embodi-

ments, keels **20** may be located at different distances relative to edges **17**, **19**. A gliding surface **28** is generally defined as the ski surface in contact with snow during machine operation, e.g., portions of tip **14**, tail **18**, base portion **16**, wings **18** and keels **20**. The relatively thick base portion **16** provides stiffness to the ski that aids in maintaining flotation and steering ability, while the comparatively thinner tip **14** and tail **18** impart flexibility to ski **10**. Flexibility allows tip **14** to bend, aiding the ski to "climb" out of and remain on the surface of deep snow. The flexibility of tip **14** and tail **18** also affords a shock absorption capability to ski **10**.

In the illustrated embodiments, wings **8** are substantially thinner than other portions of the body **12**. As illustrated, wings **8** are integrated into a single piece molded part. In other embodiments of the invention, wings **8** may be separable parts capable of being removed or replaced after wear or damage. Wings **8** are shown with an upwardly extending, generally planar underside which provides for better ski floatation in deep powder as compared to a ski without wings **8**. In other embodiments of ski **10**, wings **8** extend generally horizontally (no upward extension). Wings **8** extend along ski **10** substantially from tip **14** to tail **18**. As shown, for example at FIG. **11**, wings **8** include a pair of parallel edges **27** having lengths, L1, substantially equal to the lengths of the keels **20**, L2. The keels **20** are substantially parallel to the pair of parallel edges **27** across generally the entire length of ski **10**.

Wings **8** of snow machine ski **10** are preferably homogeneously molded from a material with a relatively low coefficient of friction on snow and ice. A material with a low modulus of elasticity relative to that of metal is also desired. In one embodiment the material is a polymer or plastic. In one preferred embodiment, body **12** is compression molded from a durable thermoplastic material such as TIVAR-brand UHMW. Forming snow machine ski **10** from plastic also reduces the weight and increases the flexibility of the snow machine ski **10**.

Wings **8** may preferably be between 1.0 to 6 inches in width (as measured from an edge of keel **20** to ski edge **50**). In preferred embodiments of the invention, wings **8** have a width which is approximately 50% of the width of channel **24**. In one ski embodiment wings **8** are approximately 3 inches in width. Embodiments of ski **10** of the present invention are preferably between 8 to 14 inches in width (measured through the portion of ski **10** containing the parallel edges **27**), and more particularly between approximately 10-12 inches in width. In a preferred embodiment, ski **8** has a width of approximately 10 inches. As used herein, the length of the ski **10** and the length of the wings **8** are measured in the longitudinal direction of the ski. The width of the ski **10** and width of the wings **8** are measured in a transverse direction.

Wing **8** thickness may range from about 0.05 inch to about 0.75 inch. Wing **8** thickness may vary as a function of lateral position from keel **20**. As shown in FIGS. **13-16**, local wing **8** thickness decreases with an increase in the distance to keel **20**, thereby defining a generally tapering form across laterally extending portions of wing **8**. In one embodiment of ski **10**, a portion of wing **8** has a thickness of approximately ⅛th inch. In a preferred embodiment, wings **8** are substantially thinner than other portions of ski **10** and, as a result, are generally more flexible than other portions of ski **8**. During cornering of the snow machine, wings **8** may deflect to provide keels **20** with enhanced access to snow.

In the illustrated embodiment, wings **8** are provided with longitudinal ribs **51**. In one embodiment, rib **51** approximates a 0.5 in. solid rod extending along an outer edge of wing **8**. In other embodiments, rib **51** can be defined with non-circular cross sections, for example, rectangular or oval shapes. Rib **51**, in the illustrated embodiment, is positioned away from the underside of wing **8** surface. In other words, portions of rib **51** would not typically engage snow during straight travel use. In cornering conditions, portions of rib **51** engage snow and tend to prevent the wing **8** edge from burying itself in the snow surface. A portion **52** of rib **51** may be generally vertical and function to provide additional resistance to side slippage in a turn and provide additional structural rigidity to wing **8**. In order to improve ski **10** handling characteristics, at least a portion of rib **51** is substantially thicker than portions of wing **8**. Wings **8** extend substantially an entire length of said ski from a front tip to a rear edge, and with said pair of wings further defined by a pair of generally parallel edges extending generally parallel to said pair of keels.

A top surface **26** of snow machine ski **10** has provided thereon a means for connecting to the steering mechanism of a snow machine. In the depicted embodiment, a mounting bracket **30** is provided for connecting to a steering spindle of a snowmobile. A loop **32** may be provided to act as a bumper for protecting the front of the ski from impacts, while also providing a gripping handle for the operator. Loop **32** is preferably dynamically mounted at one or both ends, providing flexibility and shock absorption to tip **14**.

In the depicted embodiment, loop **32** is fixedly attached to tip **14** of ski **10** with bolts **13**. Loop **32** bends up and back, transitioning through a first apertured sliding brace **36**, and through a second apertured sliding brace **34**. A free end of loop **32** (not shown) is movable in a longitudinal direction with respect to braces **34**, **36**, allowing it to flex within braces **34**, **36**. This arrangement allows the tip **14** to flex backwards and absorb shock normally transmitted through conventional snow machine skis.

A concavity **25** is shown formed in the gliding surface of ski **10** beginning at tip **14**. In depicted embodiments, two elongated keels **20** protrude downward from edges **17**, **19** of base portion **16**. While keels **20** may extend over the length of body **12**, each of the keels **20** preferably extends longitudinally along the bottom of the base portion **16**, and is not present on tip **14** or tail **18**.

The keels **20** are shown in cross-sectional views in FIGS. **13-15**. The gliding surface **28** could be otherwise configured, but is preferably contoured in some manner. Each keel has a height, h**1**, as shown in FIGS. **13-15**. The overall height, h**2**, of the ski **10** is also shown. The ski **10** is relatively compact in cross-section and the ski height, h**2**, is less than twice the keel height, h**1**. In the illustrated embodiment, the keel height, h**1**, is approximately 60% of the overall ski height, h**2**. This relationship between keel height and overall ski height exists throughout the keel length of the ski as shown in FIGS. **13-15** to provide a compact ski **10** with improve performance characteristics.

Shown connected to bottom **43** of each of keel **20** is elongated metal wear bar **22**. Wear bars **43** are designed to make primary contact with harder surfaces, such as roadways and packed or icy snow, to prevent wear. Wear bars **43** are also designed to focus the weight of the snow machine on a smaller surface area, acting as runners and guides for improved steering control.

Channel **24** is shown defined by portions of the gliding surface, e.g., concavity **25** and inner walls of keels **20**. Channel **24** extends in the longitudinal direction **15***a* along the gliding surface **28** of ski **10**, toward tail **18**, where ski **10** is depicted as being substantially flat. Consequently, channel **24** is shallow at the tip **14**, and increases in depth **13***a* as it transitions to base portion **16**. In the illustrated embodiment, channel **24** maintains a substantially consistent depth and thickness across a portion of base **16**. The keels are preferably

about one inch in depth and of a thickness of approximately one half inch In the depicted embodiment the forward tip of each of the keels **20** wedges outward laterally, narrowing in a lateral direction **15***b*, as keel **20** progresses longitudinally from a forward apex **21** rearward. Keels **20** may each also wedge inward at the rear toward a rear apex **23**.

The wedging action of keels **20**, together with concavity **25** helps to gather and funnel snow into the front of channel **24**, providing lift to the snow machine during operation. The wedging at the rear of keels **20** allows the snow to freely exit from the rear of the channel **24**.

In the depicted embodiment, keels **20** are shown wedging downwards from the forward apex **21** rearward. Keels **20** wedge upward again as the keels progress toward rear apex **23**. This vertical wedging helps to provide less friction, allow the ski **10** to overcome obstacles, and further increasing flotation of the ski **10**.

When ski **10** is moving relative to the snow, a high volume of snow is funneled under ski **10** by concavity **25** and/or keel wedges and captured within channel **24** or engaged by wings **8** to provide additional lift. Snow flowing into channel **24** also provides lift to tip **14**, providing additional flotation to the ski **10**. Thus, ski **10** provides a resistance to snow in the vertical direction **15***c*, while providing a minimum of resistance to the flow of snow in the longitudinal direction **15***a*. The upturned tip **14** of ski **10** provides a transitional contact surface to snow when the ski is sunken within the snow to provide a maximum resistance, causing the ski to climb up out of the snow, and also directing the flow of snow through channel **24**.

In order to provide a high surface area for higher vertical resistance and increased planing, snow machine ski **10** may be wider than conventional skis. In a preferred embodiment, body **12** is about 10 inches in width. The top surface **26** of the snow machine ski **10** may be flat, which keeps ski **10** light and renders relatively thin tip **14** and tail **18** more flexible. In other embodiments, top surface **26** may be ribbed or otherwise configured to reduce weight. The base portion **16** preferably does not substantially flex, and is relatively deep to provide strength and reinforcement. The keels **20** also lend structural rigidity to base portion **16**. In order to further keep weight to a minimum, while imparting strength, body **12** is shown being of a substantially constant width between keels **20**.

To accommodate these considerations while sacrificing only a minimal increase in resistance to the flow of snow, the top of channel **24**, as depicted in FIGS. **13-15**, may be substantially flat across the center **38** and radiused at corners **40**. Thus, the channel **24** may approximate the shape of a half cylinder, for instance, further increasing hydraulic diameter and decreasing resistance to the longitudinal passage of snow past the snow machine ski **10**.

To overcome some of the problems of pushing and darting, a series of longitudinal grooves **44** are formed in the gliding surface. Grooves **44** increase the lateral surface area for gripping the snow when snow machine ski **10** is turned relative to the facing of the snow machine. Nevertheless, the unobtrusive narrow width and shallow nature of the grooves **44** allow the gliding surface to be relatively smooth, allowing for low longitudinal friction.

A series of lands **46** are formed between grooves **44**. The lands **46** are preferably much wider than grooves **44**, forming the majority of the gliding surface. It is preferred that the lands **44** provide a flat contact surface at the tip thereof In this manner, the gliding surface has a continuous contour, broken only by grooves **44**.

The grooved/ribbed gliding surface of ski **10** also increases the shear force available to hold the snow machine ski **10** in the desired lateral position. Moreover, keels **20** tend to capture and pack into the grooves the snow in turns using the skis **10** momentum. Of course, it will be apparent to one skilled in the art that grooves **44** may be configured in other, selected dimensions, cross-sectional shapes, and configurations to balance competing consideration discussed herein. For instance, deepening grooves **44** tends to increase the responsiveness of snow machine skis **10** to a change in course, as does increasing the width and number of the grooves **44** and steepening the sides of grooves **44**. Nevertheless, increasing the responsiveness of snow machine skis **10** in this manner can be dangerous to an inexperienced operator or one who is not informed of the increased handling capability of ski **10**.

In operation of the snow machine, especially at high speeds in deep powder snow, the skis may function effectively upon principles of fluid dynamics, providing floatation (e.g., by tips **14**, channels **24**, and wings **8**) and ruddering (e.g., by keels **20**) in deep or loose snow. Skis **10** may also effectively function upon principles of mechanical dynamics and solid mechanics of snow when snow machine skis **10** are turned, slowed, etc., in wet or packed conditions, thus trapping and packing the snow within channel **24** while allowing wings **8** to easily deflect upwardly and providing addition operative access to keels **20**, and causing the snow machine to turn sharply, responsive to a direction set by the operator.

The embodiment of ski **10** having wings **8** and ruddering keels **20**, in accord with the present invention, can be used with snow machine skis other than those described in detail herein. Ski **10** of the present invention can also be used on all types of powered snow machines, including dual tracked "snow cat" snow machines and singe ski powered snow machines. As discussed, ski **10** provides snow machines so equipped with better tracking, control, and flotation over a broader range of speeds, snow conditions, and operating conditions over prior art snow machine skis. Furthermore, due to the reduction in pushing and darting, the snow machine ski of the present invention also provides a better ability to traverse hills, allowing an operator to maneuver effectively on hills in any direction without being limited to going only straight up and straight down. This better control, tracking, "side hilling" and flotation allows access to locations that were previously inaccessible to vehicles in winter.

FIGS. **19-22** illustrate another embodiment of the invention wherein the keels **20** have substantially different lengths. The asymmetric keels **20** of this ski embodiment yield improvements in snowmobile handling across a variety of terrain. FIG. **19** depicts a ski **100** for use on a right hand side of the snowmobile (from a seated operator's perspective). The shorter keel **20**R is positioned at an outer edge of the snowmobile with the longer keel **20**L being positioned closer to a longitudinal centerline of the snowmobile. FIG. **20** depicts a ski **10** for use on the left hand side of the snowmobile and is generally a mirror image of the ski **10** of FIG. **19**. The shorter keel **20**L on the left handed ski **10** of FIG. **20** is positioned toward an outer edge (left) of the snowmobile. Thus a snowmobile utilizing the pair of skis **100** of FIGS. **19** and **20** would have the pair of longer keels **20** being positioned toward the snowmobile's centerline and the pair of shorter keels **20** being positioned at the outer edges of the snowmobile. The positioning of the shorter keels **20** toward the outer edges of the snowmobile is counterintuitive. At least one reference teaches a longer keel being positioned toward the outer edge of the snowmobile with the short keel being positioned toward a machine centerline.

FIGS. **21** and **22** depict plan views of a pair of asymmetric skis **102** suitable for use on a snowmobile. The length of a wear bar of the shorter keel **20** is approximately 50% of the wear bar length of the longer keel **20**. Each of the keels **20** is

centered along the mounting plate apertures. FIG. **21** depicts a left-handed ski, while FIG. **22** depicts a right-handed ski (from the perspective of a seated operator). The cross-sectional characteristics of the skis of FIGS. **19-22** are similar to the cross-sections of FIGS. **13-15**, i.e., the overall ski height, h**2**, is less than twice the keel height, h**1** through the keel section of the ski **102**. Improved snowmobile handing characteristics are provided with the pair of relatively compact skis **102** with asymmetric keels **20**.

Although the present invention and its advantages have been described in detail, it should be understood that various changes, substitutions and alterations can be made herein without departing from the spirit and scope of the invention as defined by the appended claims. Moreover, the scope of the present application is not intended to be limited to the particular embodiments of the process, machine, manufacture, composition of matter, means, methods and steps described in the specification. As one of ordinary skill in the art will readily appreciate from the disclosure of the present invention, processes, machines, manufacture, compositions of matter, means, methods, or steps, presently existing or later to be developed that perform substantially the same function or achieve substantially the same result as the corresponding embodiments described herein may be utilized according to the present invention. Accordingly, the appended claims are intended to include within their scope such processes, machines, manufacture, compositions of matter, means, methods, or steps.

What is claimed is:

1. A snow ski comprising:

a base having a top adapted to be connected to a snow machine and a gliding surface disposed at the bottom thereof for traveling over snow, the gliding surface extending in a longitudinal direction positionable to correspond to a desired direction of travel;

a pair of keels integral to and extending downwardly from the base, said keels and a portion of said base therebetween defining a snow channel, with one of the pair of keels being shorter than the other one of the pair of keels, with said shorter one of the pair of keels being outboard from said other one of the pair of keels; a pair of wear bars extending along the bottom of the pair of keels, with an outboard wear bar being shorter than an inboard wear bar; and

a pair of wings, one extending laterally from one of said pair of keels, and the other extending laterally from the other of said pair of keels, with a thickness of said pair of wings being smaller than a thickness of the ski within the snow channel, and a pair of ribs defined at outermost edges of said wings, said ribs being substantially thicker than other portions of said pair of wings.

2. The ski of claim **1** wherein the pair of wings are upwardly tilted away from the pair of keels.

3. The ski of claim **2** wherein the pair of wings have tapering cross sections, with end portions of the pair of wings being thinner than other portions of the pair of wings.

4. The ski of claim **1** wherein each of said pair of ribs approximate a rod of material having a diameter of approximately 0.5 inch.

5. The ski of claim **1** wherein said pair of ribs extend from a front portion of the ski substantially the entire length of the ski.

6. The ski of claim **1** wherein a bottom surface of the pair of wings is generally planar and the pair of ribs extend in an upward direction away from the lowermost edge of the pair of keels.

7. The ski of claim **1** wherein each of said pair of keels includes a portion extending forward of a mounting bracket and another portion extending rearward of the mounting bracket.

8. The ski of claim **7** wherein a first one of the pair of wear bars is approximately twice a length of a second one of the pair of wear bars.

9. A snow ski comprising:

a base having a top adapted to be connected to a snow machine and a gliding surface disposed at the bottom thereof for traveling over snow, the gliding surface extending in a longitudinal direction positionable to correspond to a desired direction of travel;

a pair of keels extending downwardly from the base, with one of the pair of keels being shorter than the other one of the pair of keels, with said shorter one of the pair of keels being outboard from said other one of the pair of keels said pair of keels defining portions of a snow channel, with a concave portion of the base directing snow into the snow channel;

a pair of wings extending throughout a length of said ski, with one of the pair of wings extending laterally from one of said pair of keels, and the other extending laterally from the other of said pair of keels, and

a pair of ribs defined at outermost edges of said ski and extending along the pair of wings upwardly away from the pair of keels, said ribs having a thickness which is greater than a thickness of the pair of wings.

10. The ski of claim **9** wherein the pair of wings have a thickness which is substantially smaller than a thickness of the ski between the pair of keels.

11. The ski of claim **9** wherein the first wear bar is approximately twice a length of the second wear bar.

12. A snow ski comprising:

a gliding surface disposed at a ski bottom and extending in a longitudinal direction positionable to correspond to a desired direction of travel and extending in a lateral direction;

a pair of downwardly extending keels, said pair of keels and said gliding surface defining portions of a snow channel, with a portion of the ski directing snow into the snow channel;

a pair of wear bars attached to bottom portions of the pair of keels; and

a pair of wings extending alongside the pair of keels, said wings being thinner than a portion of the ski between the pair of keels, and wherein each of said pair of wings extends along a length of said ski from a front tip to a tail, and with said pair of wings further defined by a pair of ribs extending along the pair of wings at outermost edges of said ski wherein an outboard one of the pair of keels and one of the pair of wear bars are shorter than the other one of the pair of keels and other one of the pair of wear bars.

13. The ski of claim **12** wherein the pair of ribs extend upwardly away from the pair of keels, with each of said pair of ribs having a thickness which is greater than a thickness of the pair of wings.

14. The ski of claim **13** wherein the ribs have a generally circular cross section.

15. The ski of claim **12** wherein the pair of keels are positioned directly underneath a mounting bracket affixed to the top of the ski, and each of the pair of keels is centered relative to the mounting bracket.

16. The ski of claim **12** wherein a width of one of the pair of wings is approximately 50% of a width of the ski between the pair of keels, as measured in the lateral direction.

17. A pair of snow skis comprising:

a first ski comprising:

a gliding surface disposed at a ski bottom and extending in a longitudinal direction positionable to correspond to a desired direction of travel and extending in a lateral direction;

a pair of downwardly extending keels, said pair of keels and said gliding surface defining portions of a snow channel, with a portion of the ski directing snow into the snow channel; and

a pair of wings extending alongside the pair of keels, said wings being thinner than a portion of the ski between the pair of keels, and wherein each of said pair of wings extends along a length of said ski from a front tip to a tail, and with said pair of wings further defined by a pair of ribs extending along the pair of wings at outermost edges of said ski with said pair of ribs, and wherein one of the pair of keels is substantially shorter than the other, with the shorter of the pair of keels being disposed at an outer edge of a snowmobile and the longer of the pair of keels being disposed toward a longitudinal centerline of the snowmobile; and

a second ski being a mirror image of the first ski to define a pair of skis for a snowmobile, with the pair of shorter keels being positioned toward outer edges of the snowmobile and the pair of longer keels being positioned toward the longitudinal centerline of the snowmobile.

18. The ski of claim 17 wherein a first wear bar positioned in the longer keel is approximately twice a length of a second wear bar positioned in the shorter keel.

19. The ski of claim 17 wherein the pair of keels are positioned directly underneath a mounting bracket affixed to a top of the snow ski.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE

CERTIFICATE OF CORRECTION

PATENT NO. : 8,641,055 B2
APPLICATION NO. : 13/412526
DATED : February 4, 2014
INVENTOR(S) : Simmons et al.

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

In the Claims

Column 8, Claim 12, line 48, delete "from a front tip to a tail,".

Column 9, Claim 17, line 14, delete "from a front".

Column 9, Claim 17, line 15, delete "tip to a tail".

Column 9, Claim 17, line 18, delete "substantially".

Signed and Sealed this
Sixteenth Day of September, 2014

Michelle K. Lee

Michelle K. Lee
Deputy Director of the United States Patent and Trademark Office