United States Patent

Demaree et al.

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[45] **Jan. 18, 1972**

[54] ONE-PIECE PLASTIC SLED

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[52] **U.S. Cl.** **280/18**

[51] **Int. Cl.** **B62d 13/06**

[58] **Field of Search** ..... 280/12 B, 18, 19

[56] **References Cited**

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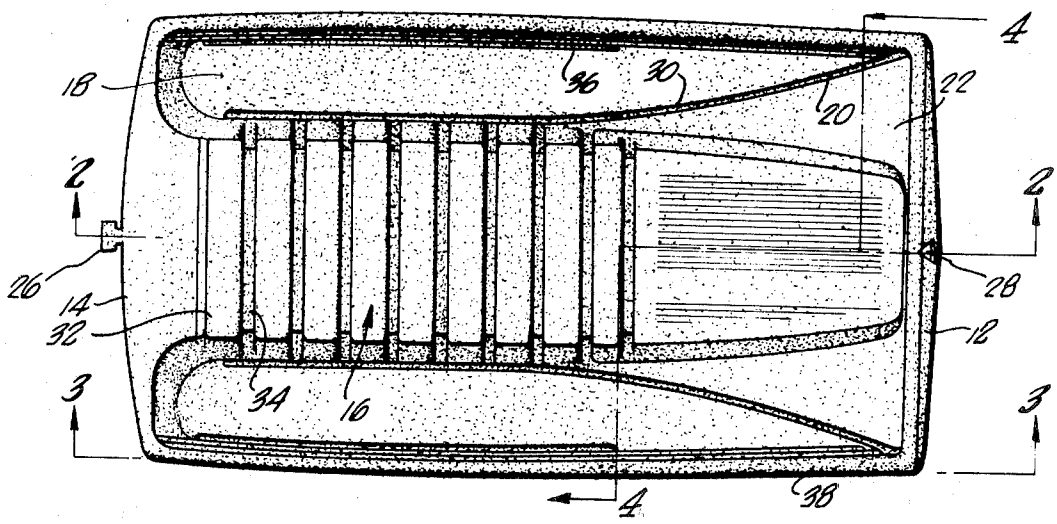
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Assistant Examiner—Winston H. Douglas
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[57] **ABSTRACT**

A snowsled molded of one piece of a plastic material wherein the runners are so designed as to accommodate various types of snow conditions. The surfaces of the runners are provided with secondary ribs so that when someone is seated upon the sled, it will cause the runners to tilt outwardly so that it will run upon this secondary runner if the snow conditions are hard. Under softer snow conditions, the runners are forced inwardly so that the sled runs upon the larger flat portions of the running surfaces thereby providing a larger running surface so that the sled stays higher up in the snow. By this tilting action together with the configuration of the runners, the sled thus presents the best running surface automatically no matter what the snow conditions are. In addition, the runners are curved so as to permit the sled to be easily maneuvered.

7 Claims, 11 Drawing Figures



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SHEET 1 OF 2

FIG. 1.

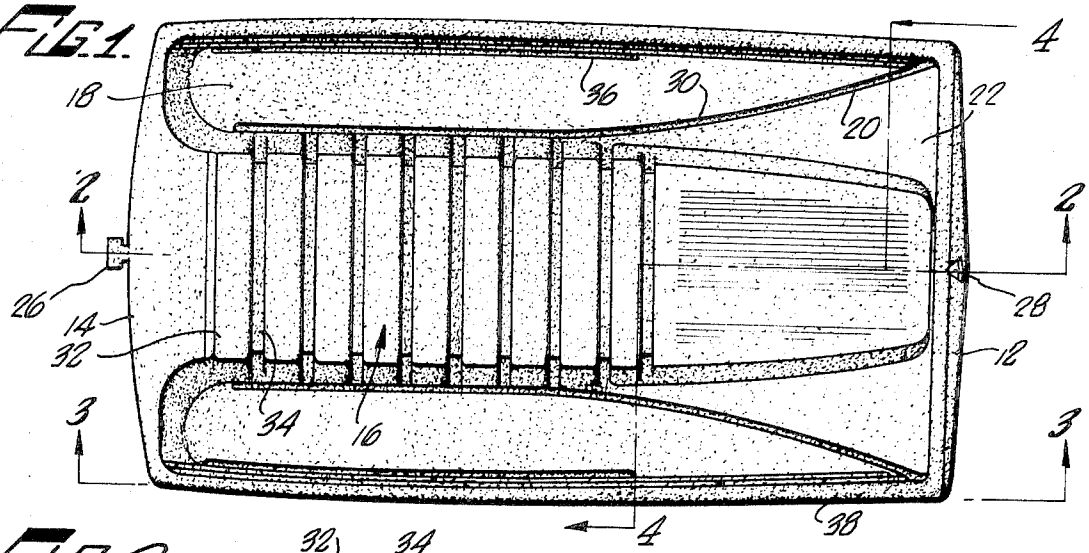


FIG. 2.

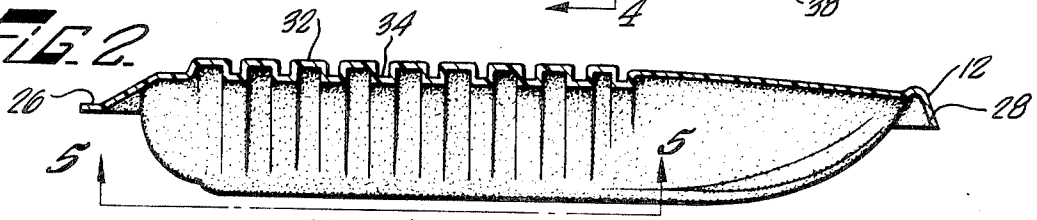
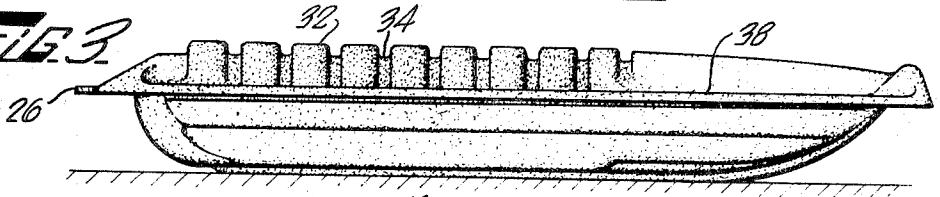


FIG. 3.



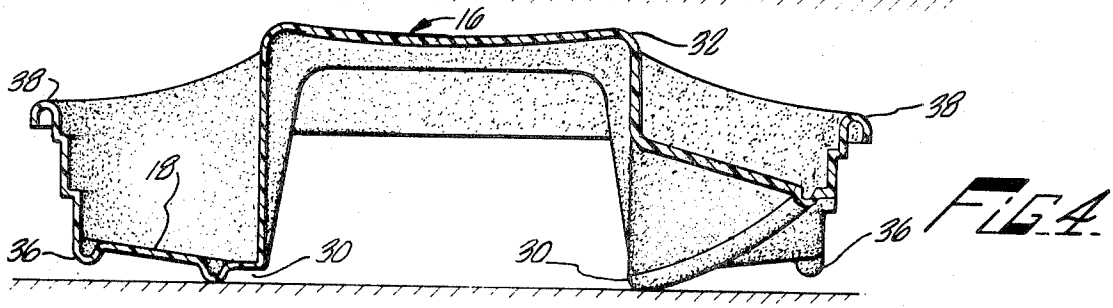


FIG. 4.

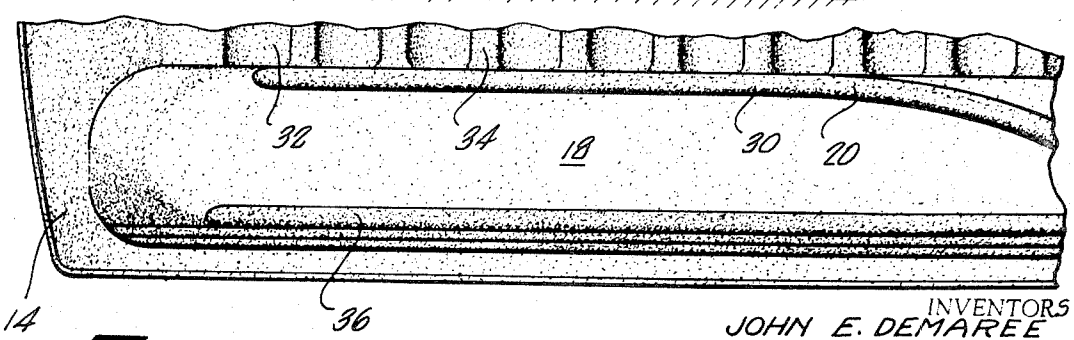


FIG. 5.

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FIG. 6

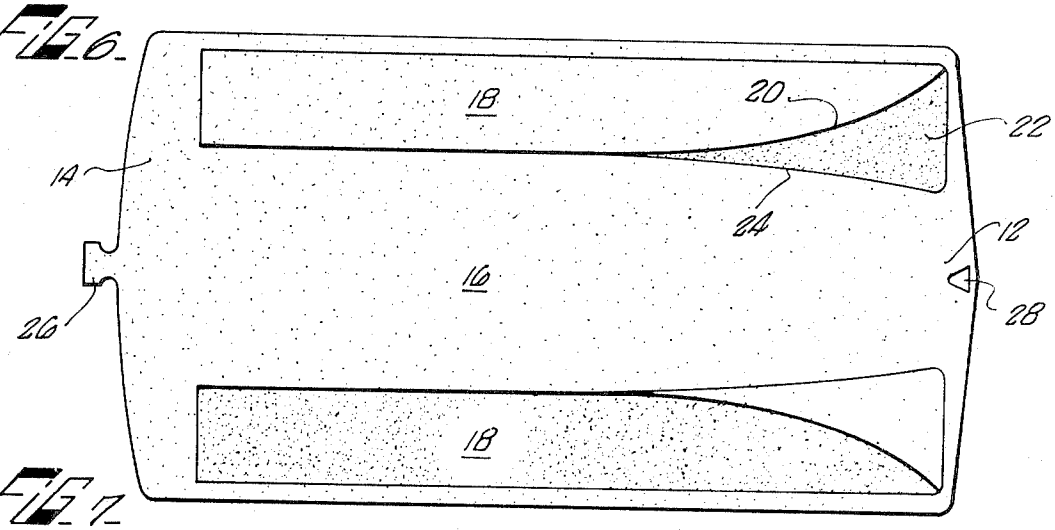
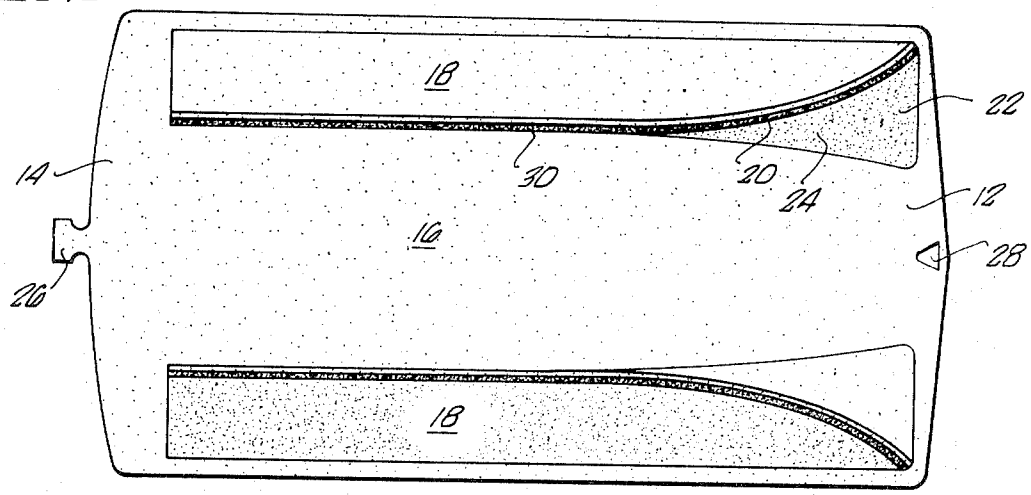


FIG. 7



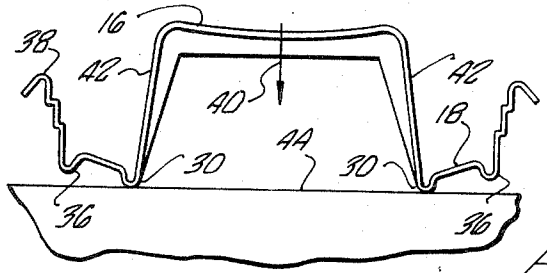
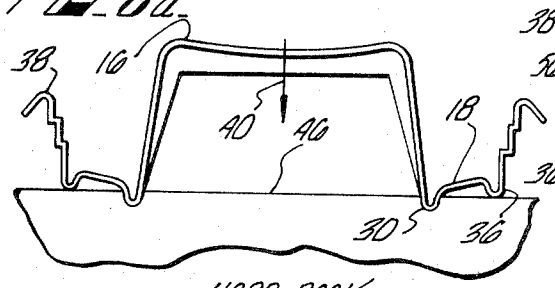


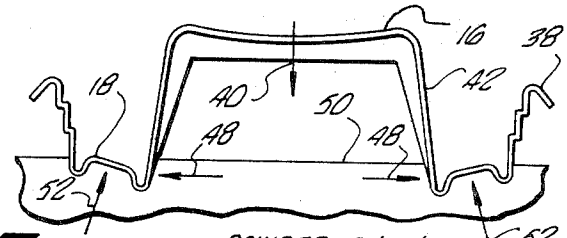
FIG. 8a

ICE



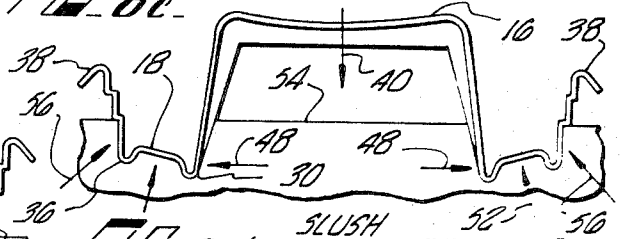
HARD PACK

FIG. 8b



POWDER SNOW

FIG. 8c



SLUSH

FIG. 8d

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ONE-PIECE PLASTIC SLED

BACKGROUND OF THE INVENTION

Snowsleds have been made for many years featuring many different kinds of designs. They have incorporated various types of runners in order to achieve the best sort of running conditions so that a sled could be made which would be both fast and maneuverable. For example, sleds have been made having a central runner and two side runners whereby after the sled is in motion, the side runners can be pivoted upwardly so that the sled runs on a central runner thereby achieving greater speed. In addition, such sleds have included means for warping the runner so that it can be steered. Many of the previous devices have turned their attention towards means for steering a sled and this has primarily involved the warping of the runners.

SUMMARY OF THE INVENTION

The advent of mouldable plastic materials has permitted the formation of a snowsled of one piece. It has also permitted the formation of a unique series of runners not otherwise easily obtainable because of the amount of workmanship involved using conventional materials. The sled formed in accordance with the present invention provides a unique runner system having both primary and secondary running surfaces whereby the sled adapts itself to the best running condition for various types of snow conditions. This is accomplished through the use of the secondary runners and the tilting action when a load is applied to the sled.

If the sled is sitting on a hard surface such as ice, its one-piece construction causes the center portion of the seat to bend downwardly causing the runners to tilt upwardly at their outermost edges. This causes the innermost secondary runner to be the only one which contacts the hard surface thereby providing the least amount of running surface for ice conditions, thereby presenting the least drag and therefore the fastest running situation. For progressively softer snow conditions such as hard pack or powder snow, the runners will sink further into the snow presenting a larger running surface thereby permitting the sled when it is in motion to plane up upon the snow presenting the most efficient running surface. The softer snow through which the sled may be going will exert a force against the tilted surface causing the runners to remain inwardly so that the major portion of the running surface will be more parallel to the surface of the snow. This enhances the efficiency of the running surface by again providing the optimum amount of running surface for the type of snow conditions encountered. An additional factor is that the formation of the runners provides a buoyant or floating action to occur in wet snow thereby further permitting the sled to ride as high up in the snow as possible for the best running conditions with the least amount of drag.

A further advantage of the invention derives from the formation of the runners having a curved edge which permits the sled to be easily maneuvered. Thus, the sled is steerable without the necessity for any apparatus such as those found in the prior art whereby it is necessary to bend or warp the runners in order to steer the sled. The present sled may be steered simply by leaning to the right or left whereupon the sled will turn to the right or left because of the curved configuration of the runners.

It is an object therefore of the present invention to provide a one-piece moulded plastic sled having improved performance characteristics.

More specifically, it is an object of the present invention to provide a sled having a unique arrangement of runners whereby the runners present the optimum amount of running surface depending upon the type of snow conditions encountered.

It is a specific object of the present invention to provide a one-piece moulded plastic sled having both primary and secondary surfaces whereby the sled readily adapts itself to varying snow conditions to provide the most efficient running surface and wherein the sled may be easily steered.

It is also an object of the present invention to provide a sled having the foregoing characteristics but which may be cheaply manufactured of a durable yet flexible plastic material such as by moulding or vacuum forming.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a plan view of the sled in its preferred embodiment.

FIG. 2 is a sectional elevation taken along line 2—2 of FIG. 1.

FIG. 3 is a side elevation of the sled taken along line 3—3 of FIG. 1.

FIG. 4 is a partial sectional end elevation taken along line 4—4 of FIG. 1.

FIG. 5 is a detailed enlargement showing the runner configuration.

FIG. 6 is a plan view showing another form of runner configuration.

FIG. 7 is a plan view showing another form of runner configuration.

FIG. 8*a*, 8*b*, 8*c* and 8*d* are a series of four end elevations demonstrating the action of the runners on differing types of snow conditions.

DESCRIPTION OF THE INVENTION

The invention in its broader aspects may be best understood from a consideration of the simplest embodiments thereof such as those shown in FIGS. 6 and 7. The sled comprises a bow portion 12 and a stern portion 14 with a centrally located raised seat area 16. On each side of the seat area 16 are the primary runners 18 which extend longitudinally along the sled from the stern to the bow. The flat surface of the runner 18 is substantially horizontally disposed when the sled is sitting on a flat surface. It will be noted that the flat surface of the runners 18 is quite wide as compared with conventional snow runners and it has been found for the purposes of this invention that the ratio between the length and width of the running surface should be approximately one to 10. The portion of the runners near the bow 12 have a curved edge 20. The remainder of the runner 18 inboard of the curved edge 20 facing the bow 12 is not horizontally disposed but rather provides a canted surface 22 as it extends upward from the horizontal surface of the runner 18 to join the uppermost portion of the seat area 16. It will also be noted that the line 20 of the runner 18 particularly in the area of this canted surface 22 is curved at 24 as it extends forward towards the bow 12.

Thus, the forward end of each runner 18 has a shape which includes a pointed bow 21 which curves downwardly from the plane of the seat area 16, the portion of the runner 18 outboard of edge 20 being substantially flat and approaching a horizontal orientation as it curves downwardly. The portion of runner 18 inboard of edge 20 curves from bow 21 following the curvature of edge 20, surface 22 extending upwardly on an angle thereby joining edge 20 to the plane of the seat 16. In this manner, each runner 18 has a prow having a curved and canted inboard surface 22 with the outboard edge substantially vertical. In addition to the foregoing features of the runners, the stern of the sled is provided with a coupling tang 26 and the bow is provided with a coupling hole 28 adapted to receive a tang 26 of another sled whereby a plurality of sleds may be temporarily affixed in tandum fashion if desired.

Turning now to the embodiments shown in FIG. 7, a secondary or ice runner 30 is provided along the inner inboard edge of the primary runner 18 and extending the entire length of that edge from the stern to the bow. Ice runner 30 extends along the curved edge 20 and terminates at the outermost corners of the runner 18. The function and operation of both the curved edge 20 and the ice runner 30 will be more clearly explained subsequently.

Referring now to the preferred embodiment of the invention disclosed in FIGS. 1 through 5, it will first be noted that the tang 26 and the coupling hole 28 may be reversed. This prevents the coupling tang 26 from being broken off should the bow of the sled be dug into a snowbank or the like. The

seating area 16 is provided with a plurality of lands 32 separated by grooves 34 to provide a reinforced corrugated seating area further enhancing the strength of the overall sled. These lands and grooves extend not only across the upper seating surface but along the sides thereof for added rigidity. The configuration of the runner 18 is again quite similar to that shown in FIGS. 6 and 7 inasmuch as it includes the curved edge 20, the canted front leading portion of the runner 22 and the ice runner 30. To this is added another secondary runner 36 which is linear in configuration and extends along the outboard edge of the runner 18 from the stern to a position approximately one-third from the end of the bow. It will also be noted that the curvature of the edge 20 commences at approximately the midpoint of the sled.

FIGS. 2 and 3 further show the configuration of the seating area including the lands 32 and grooves 34. FIGS. 1 and 3 also disclose the siderails 38 which can also be seen in FIG. 4 extending up from the bottom of the runners 18 and being folded over to provide a semirigid structure. The enlarged detail view of FIG. 5 shows perhaps more clearly the formation of the secondary runners 30 and 36 in the bottom of runner 18. FIG. 4 shows a cross-sectional view more clearly setting forth the shape of the runners and their relationship to the seating area 16.

FIG. 4 also shows the manner in which the primary and secondary runners contact a flat surface in the unloaded condition. When no one is sitting on the seat 16, ice runners 30 will naturally be in contact with a flat surface but the outboard secondary runners 36 will be at or immediately adjacent the surface.

Referring now to the sequence of drawings in FIGS. 8*a*, 8*b*, 8*c*, and 8*d*, the operation of the sled will be explained. In FIG. 8*a*, the sled is shown with a load exerted thereon, the component of which is directed in the direction of arrow 40. This causes the seat area 16 to bend slightly in the center and causes the side 42 of the sled to slide outwardly at the bottom thereby causing the surface of the runners 18 to be tilted upwardly so that the outermost runner 36 is lifted up and away from the surface 44. Thus, the ice runner 30 will be the only runner contacting the surface thereby providing the least amount of running area and therefore the least amount of friction.

In FIG. 8*b*, the snow conditions for the surface 46 are a hard pack in which the surface is somewhat softer than that for ice. In this situation, the ice runner 30 may extend partially into the surface 46 such that the outermost secondary runners 36 will come in contact with the surface 46. The load represented by the component arrow 40, again causes the seating area 16 to bow downwardly so that the surface of the runners 18 is tilted upwardly at the outer edges and the ice runner 30 has been translated outwardly away from its original position. In FIG. 8*c*, the component force 40 is again imposed and the surface areas 16 is bent downwardly in the center. Again, this causes the sides 42 to tend to extend outwardly in the direction of arrow 48. In powder snow, the surface is considerably softer than that for hard pack or ice. Here the component force translating the walls outwardly in the direction of arrow 48 is opposed by a component force indicated by arrow 52 which restricts to some extent the lateral translation of the lower edges of the walls 42. This component force 52 is imposed by the fact that the running surfaces 18 sink further into the snow and this additional component force will therefore prevent some of the tilting of the running surface 18 as previously described for other snow conditions. The result is that more of the running surface is presented for these types of snow conditions. This will give greater buoying action for the sled allowing it to ride up higher in the softer snow therefore presenting less drag and a better running situation.

Finally, in FIG. 8*d* the snow conditions here represent very soft or slushy conditions. The component force 40 is again exerted causing the lower edges of the sled to be forced outwardly again in the direction of arrows 48. Since the snow surface 54 is considerably soft in this instance, there will be a number of forces opposing lateral translation—these being represented by arrows 52 and 56 imposed upon different portions of the runners 18. In this instance, the ice runner 30 and the outermost runner 36 do not form an important part of the running surface as the primary runner 18 is here important and provides the critical running surface. In addition, the fact that the siderails 38 extend upwards from the runner 18 provides a buoyant type of running area so that there is in effect a floating action which occurs to further cause the sled to ride higher in the very soft snow conditions.

In any of the snow conditions described in FIG. 8, the curvature 20 of the runners permits an unusually high degree of maneuverability for the sled. When the weight is evenly distributed upon the sled and the sled is traveling in a linear direction, the curved edges of both of the runners will have approximately equal lateral forces exerted thereon so that the sled will maintain its linear motion. If, however, the load is shifted, say to the right, the lateral force being exerted on the left side of the sled will thereby be decreased so that the curvature of the runner on the right-hand side will cause the sled to turn to the right. This is contrary to many previous designs in which it has been necessary for the sledder to lean in the opposite direction from that in which he intended to turn in order to maneuver the sled. The fact that one may lean in the direction in which one desires to turn increases the ability to handle the sled as well as decreasing its turning radius since the adverse affects of the centrifugal force of the weight of the sledder will be decreased.

While several embodiments of the present invention have been shown and described, the common feature in all is the outwardly curved edge of the primary running surface. In addition, two of the three embodiments show the utilization of a secondary inboard ice runner further enhancing the performance characteristics of the sled. While other additions and modifications will occur to those skilled in the art, it is intended that the appended claims cover all such changes and modifications as falls within the true scope and spirit of the invention.

I claim:

1. A one-piece snowsled comprising:
   a centrally located longitudinally extending seat area;
   a pair of runners longitudinally disposed on each side of said seat area, depending support means positioning said seat area above said runners;
   said runners having a wide horizontally disposed running surface, each running surface having an inner edge which is curved gradually upwardly and outwardly near the front portion of the sled.

2. The article described in claim 1 wherein said runners further include secondary runners disposed along the innermost edge of said horizontal runners.

3. The article described in claim 1 wherein a secondary rib is disposed along the innermost edge of the runner and along said curved edge.

4. The article described in claim 3 wherein the curved edge of said runners begins at a point near the longitudinal center of the runners.

5. The article described in claim 3 further including another secondary rib disposed along the outermost edge of the horizontal running surface, said rib extending from the sternmost end of each runner a distance less than the entire runner length.

6. A sled of the type described in claim 1 wherein:
   said seat area, said depending support means and said runners are constructed of a pliable material whereby the application of a load to said seat area deforms said sled to cause the outermost edges of said runners to tilt upwardly.

7. A sled of the type described in claim 1 wherein said seat area has a plurality of transversely disposed ribs, said ribs extending at least partially down said depending support means.

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