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3,276,785

SKI SLED AND MOUNTING MEANS

Filed Dec. 30, 1964

2 Sheets-Sheet 1

FIG. 1

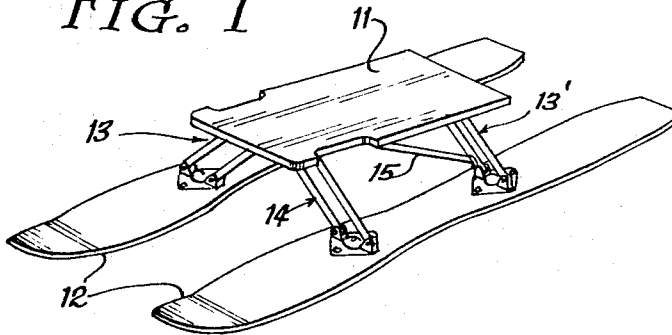


FIG. 2

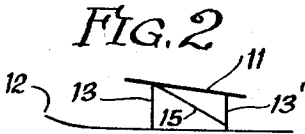


FIG. 3

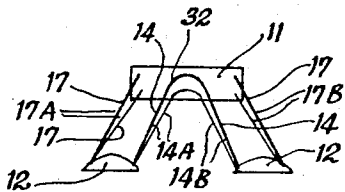
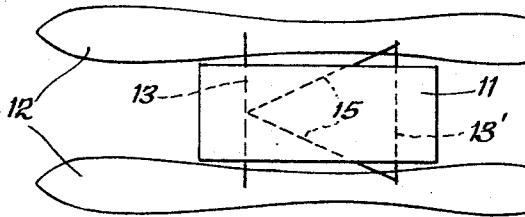


FIG. 4

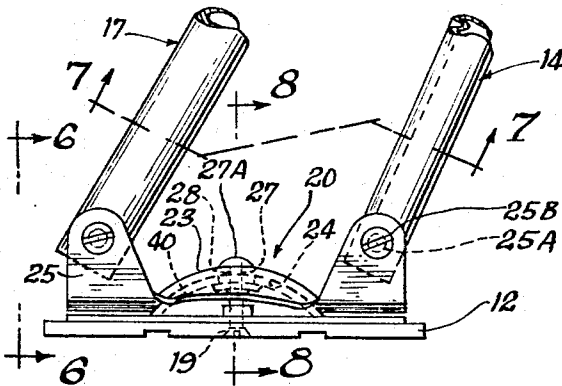
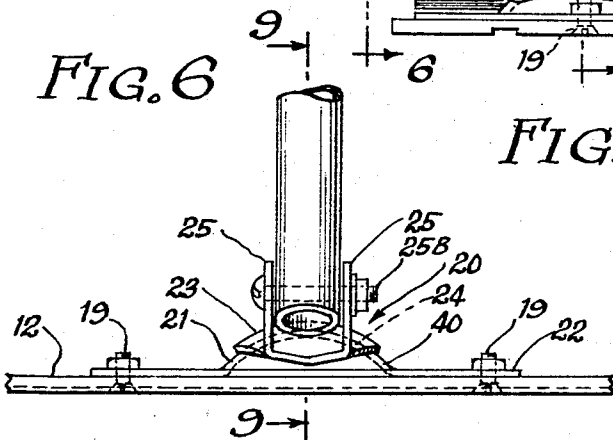


FIG. 5

FIG. 6



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FIG. 7

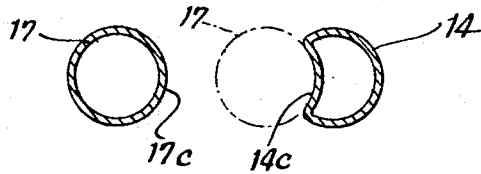


FIG. 8

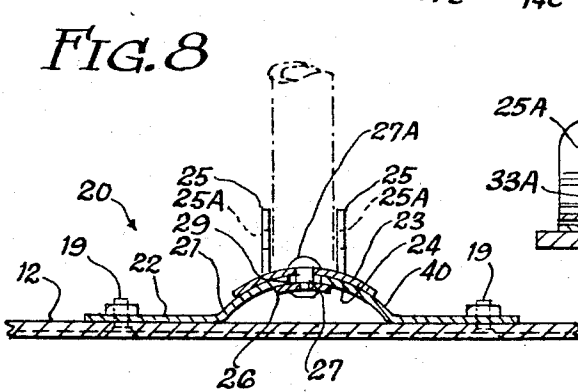


FIG. 9

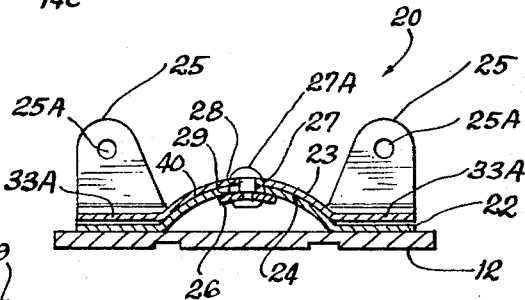


FIG. 10

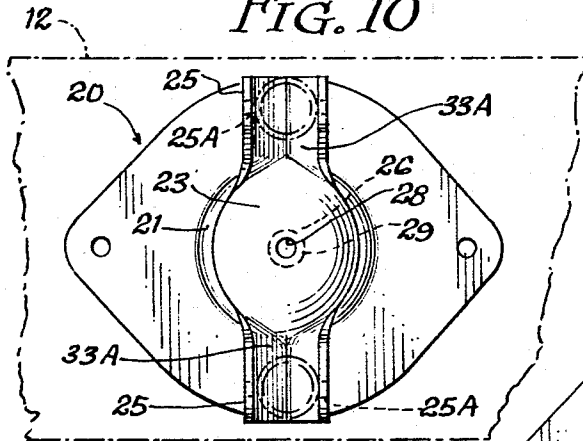


FIG. 11

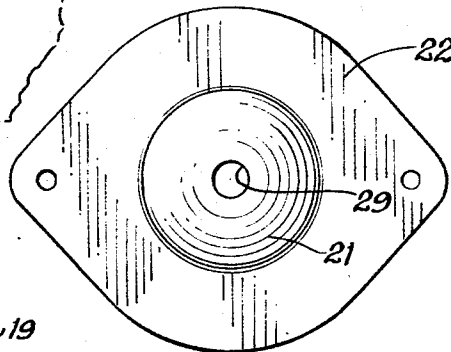
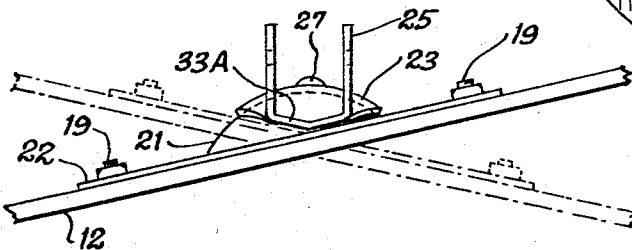


FIG. 12



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SKI SLED AND MOUNTING MEANS

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11 Claims. (Cl. 280-21)

This invention relates to a ski sled which is capable of slalom movements over the snow or other skiing surfaces but which is manageable simply by inclination of the rests supported by the skis in which one or more persons can sit, lie or otherwise be positioned.

In the copending application of Fabris, Serial No. 250,383, now Patent No. 3,190,671, entitled "Sled With Tilttable Runners Controlled by a Tilting Rider Support," description is made of a ski sled having a rest or platform centrally disposed between two spaced apart parallel skis and which is supported above the skis by a plurality of rod members that are movable relative to each other and interconnected between the platform and the skis to cause the skis to tilt about their respective longitudinal axes responsive to tilting movements of the platform.

In order to accomplish the desired tilting movements of the pairs of skis responsive to tilting movement of the platform, each of the skis are connected to the bottom side of the platform by a pair of laterally spaced-apart rods pivoted at their lower ends to laterally spaced-apart portions on the top surface of the skis and their upper ends to laterally spaced-apart portions on the bottom side of the platform with the pivot for the inner rods being preferably located along the center line of the platform. Best results are secured when the pivot points form a parallelogram so that the pivot of the platform will effect concurrent tilting movement of the skis by about a corresponding amount.

In the construction described, the ends of the rods are secured to pivots fixed on the upper surface of the skis. It has been found that such fixed pivots interfere with the desired flexibility in operation of the skis as might otherwise be effected in skiing by bending ones knees or tilting the skis in the lengthwise direction to accommodate differences in slope, differences in level and the like. Further, such rigid construction to the skis operates to transmit shock to the platform which might otherwise be absorbed by the spring action of the skis if they were free to flex.

It is desirable, from the standpoint of maneuverability and safety, as well as ease of operation that the skis remain in contact, substantially throughout their lengths, with the skiing surface. This is difficult to achieve when the surface has variations in contours such as occur on water or rough terrain. To maintain maximum contact between the skis and the underlying surface, it is important for the skis to be free to flex and thereby permit the skis approximately to follow the surface contours.

It is an object of this invention to provide a highly maneuverable ski sled of the type described which provides a unique and pleasant ride over snow or over water; which is capable of performing movements characteristic of a slalom and the like; which is simple and safe in operation; which is sturdy in construction; which can be economically manufactured of readily available materials; which can be easily managed in turning movements over the snow or other skiing surfaces merely by tilting action of the platform, and which can be enjoyed by young and old alike.

More particularly, it is an object of this invention to provide a device for mounting the skis which, in addition to withstanding the stresses occurring at the pivots, will permit the skis to follow the contours of the underlying

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surface without transmitting such effects to the body of the sled.

These and other objects and advantages of this invention will hereinafter appear and, for purposes of illustration, but not of limitation, an embodiment of the invention is shown in the accompanying drawings in which:

FIGURE 1 is a perspective elevational view of a ski sled embodying the features of this invention;

FIGURE 2 is a schematic side elevational view of the ski sled shown in FIGURE 1;

FIGURE 3 is a schematic top plan view of the ski sled shown in FIGURE 1;

FIGURE 4 is a schematic front elevational view of the ski sled shown in FIGURE 1;

FIGURE 5 is a front elevational view of a flexible ski mounting bracket embodying the features of this invention;

FIGURE 6 is a side elevational view taken along the line 6-6 of FIGURE 5;

FIGURE 7 is a sectional view taken along the line 7-7 of FIGURE 5;

FIGURE 8 is a sectional view taken along the line 8-8 of FIGURE 5;

FIGURE 9 is a sectional view taken along the line 9-9 of FIGURE 6;

FIGURE 10 is a top plan view of a ski mounting bracket embodying the features of this invention;

FIGURE 11 is a plan view of the base plate forming a part of the bracket shown in FIGURE 10; and,

FIGURE 12 is a fragmentary elevational view illustrating the flexibility in the ski mounting bracket.

Referring now to the drawings, the ski sled of this invention is formed with a seat 11 in the form of a substantially flat platform and a pair of laterally spaced-apart skis 12. The platform is supported in vertically spaced-apart relation above the pair of skis by a rod system which is effective to cause the skis to incline side-wise in one direction or the other about their longitudinal axes responsive and concurrently with corresponding tilting movement of the platform. The latter may be effected by shifting of weight or force by the operator at rest on the platform or seat 11.

For this purpose, there is provided a group 13 of rods at the forward end portion of the platform and a similar group 13' of rods at the rearward end portion of the platform. Since the two groups of rod systems are substantially the same, the description of one group 13 will suffice to describe the other group 13'. The rods in each group are substantially crosswise aligned and include a hooped rod 14 having arched central portion 32 and substantially straight end portions 31 which extend angularly downwardly and outwardly from the central portion 32. Rod 14A is pivoted at its lower end to the top surface of one ski while rod 14B is pivoted at its lower end to the top surface of the other ski, and rod 14 is pivoted at its center 32 at a point substantially aligned with the center line of the platform, and it thus defines the pivotal axis of the platform.

The other two rods 17 are spaced outwardly of the straight portions of the inner rods 14A and 14B with the rod 17A pivoted at its lower end to the ski and at its upper end to the platform but with the pivots also spaced outwardly from the pivots for rod 14A and preferably spaced outwardly by an equal amount. The other rod 17B is similarly pivoted at its lower end to the other ski and at its upper end to the platform.

It will be apparent that tilting movement of the platform will cause the rods 17A and 17B to move relative to the substantially straight portions of the inner rods 14A and 14B to effect a substantially equal corresponding tilt-

ing movement of the skis in the same direction. It will be understood that the straight portions of the rods 14 and 17 need not be parallel if it is desired to actuate the movement of the skis by comparison with the movement of the platform. It will be understood that instead of a single rod 14 having the end portions 14A and 14B, the inner rod can be formed of a pair of rods pivoted at their upper ends along the central line of the platform and with their lower ends pivoted to the respective skis as previously described.

A corresponding arrangement is effected between the rearward group of rods 13', between the skis and platform. Since it is desirable to provide a downward tilt to the platform 11, the rearward group of rods are preferably formed to shorter lengths than the forward group, as illustrated in FIGURES 2 and 4. It will be understood that the same results may be accomplished by the use of rods of equal lengths in both groups but by making use of a spacer member on the bottom side of the platform at the forward end thereof and from which the forward group of rods 13 are pivoted.

Tilting the platform to effect corresponding tilt of the skis will effect the desired steering or slalom movements of the sled somewhat in the same manner as employed in conventional skiing. By shifting the weight or tilting the platform from one side to the other, the ski sled can be made to weave its way down a slope.

It will be appreciated that the relative movements resulting from the tilt of the platform in one direction will operate to bring the adjacent pairs of inner and outer rods 14A and 17A or 14B and 17B into closer side-by-side relationship to the end that the amount of tilting movement capable of being effected will be limited by engagement between the rods. Since the degree of maneuverability depends on the maximum angle of tilt which can be effected, it is desirable that the relative lateral displacements between the pairs of rods be maximized. In order to achieve this desired end, the surface of one rod adjacent the other rod is formed with an indented or concave portion 14C which is adapted to receive the adjacent rounded surface 17C of the other rod, as shown in FIGURE 7. Thus the rods are adapted to interfit thereby correspondingly to increase the amount of lateral displacement with corresponding increase in the angularity or tilt possible to be achieved.

An important feature of this invention resides in the flexibility in the pivotal connection between the lower ends of the rods and the ski members whereby a knee action is made available for greater maneuverability of the skis substantially independently one from the other and relative to the platform whereby the skis are capable of automatic self-adjustment for accommodating differences in surface formations, surface levels and the like for a smoother and safer ride, without interfering with the tilt of the skis responsive to tilting movement of the platform, as previously described.

The desired flexibility and self-adjustment is achieved, in accordance with the practice of this invention, by means of a bracket 20 formed of a flat base portion 22 and a central raised portion 21 in the form of a spherical section which operates as a bearing surface 40 adapted slideably to support a bearing member 23 having a spherical section 24 concentric with the bearing surface 40 and which is received thereon in mating relation with means securing the bearing member 23 onto the spherical section 40 for circumferential relative movement therebetween. The base portion 22 is fixed to the top surface of the skis while the lower ends of the rods 14 and 17 are pivotally connected in the desired laterally spaced-apart relation to the bearing member 23, as illustrated in FIGURES 5 and 6.

More specifically, the bracket 20 consists of a flat base portion 22 adapted securely to be fastened to the top surface of a ski. For purposes of illustration, but not of

limitation, the base portion 22 is secured to the ski by fasteners 19 in the form of nut and bolt members. The bearing surface 40 extends upwardly curvilinearly from the base portion 22 and is provided with a central opening 29 extending therethrough at the apex or axial portion.

The bearing member 23 comprises a rigid plate which may be formed of sheet metal having a plate, horizontally disposed flange members 33A extending outwardly from the opposite edges of a central spherical section 24 which is formed to concave curvature corresponding to the bearing surface 40 and which is also provided with an opening 28 at its apex for axial alignment with the opening 29 in the bearing surface but in which the opening 28 is of smaller diameter than the opening 29 and dimensioned to enable the shank 27 of a fastening bolt or rivet 27A to extend therethrough in fitting relationship. The flange portions 33A are each provided with upstanding bracket members such as a pair of longitudinally spaced ears 25 having lengthwise aligned openings 25A for receiving a pivot pin 25B therebetween on which the lower ends of the rods 14 and 17 are mounted in laterally spaced-apart relation for rocking movement about the pin as a pivot in the crosswise direction about a longitudinal axis. For this purpose, the bearing member 23 is mounted on the bearing surface with the flanges 33A extending crosswise of the skis and with the pins 25B on the ears 25 spaced laterally by an amount corresponding to the desired space relationship between the pivoted lower ends of the rods 14 and 17.

The concave spherical section forming the bearing surface 24 of the bearing member 23 has substantially the same curvature as the spherical section of the bearing surface 40 on the base member 20 but preferably is of a depth slightly less than that of the base member so as to permit the bearing member 23 to be received in mating relationship on the bearing surface 40.

In the preferred embodiment, the mating surfaces of the bearing members are held together, as by a fastening means comprising the rivet 27A having a shank which extends through the opening 28 in the bearing member into the aligned opening 29 in the bearing surface to a bearing washer 26 seated firmly against the underside or concave surface 40. The rivet 27A has a shank 27 dimensioned to be received in fitting relationship within the opening 28 but with a clearance all around within the opening 29 to permit the bearing member 23 to slide relative to the bearing surface 40 in all directions.

It is desirable to provide for a high degree of relative movement between the spherical sections in the lengthwise direction but to limit the amount of relative movement in the crosswise direction so that the crosswise tilting movement of the platform will be translated through the rods 14 and 17 to the bearing member 23 and through the bearing member 23 to the base member 22 and the skis on which the base members are mounted while still permitting the skis freely to rock about a crosswise axis through the bearing members to give the effect of a universal joint or the type of knee action desired in skiing. For this purpose, the portions from the flanges extending laterally from the spherical section are dimensioned substantially to correspond with that of the underlying bearing surface so that the flanges 33A will be spaced but a very short distance, if any, from the underlying surface fixed to the skis. On the other hand, the portions of the bearing member longitudinal of the ski are short of the base 22 of the bracket 20 so that a substantial amount of relative movement is possible, limited either by engagement between the lower edge of the bearing member 23 and the base 22 of the bracket 20 or by the amount of space between the shank 27 of the rivet 27A within the opening 29.

The described universal mounting for the pivoted lower end portions of the laterally spaced-apart rods permits the skis independently of each other and of the platform to be flexed whereby the skis acquire the versatility of a knee

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action while giving full response to the tilting action imposed by the platform.

For purposes of reinforcing the structure and for interconnecting the rod groups 13 and 13', use is made of angle rods 15 which extend from the upper pivot of the front rod 14 to the lower end portions of the rear rod 14', as shown in FIGURE 2.

It will be understood that changes may be made in the details of construction, arrangement and operation without departing from the spirit of the invention, especially as defined in the following claims.

That which is claimed is:

1. In a ski sled having a pair of laterally spaced-apart ski members, a platform centrally disposed between the ski members, and rod members interconnecting the ski members with the platform to support the platform above the ski members and pivotally to interconnect the ski members with the platform for rocking movement of the ski members about a longitudinal axis responsive to pivotal movement of the platform, the improvement comprising means pivotally interconnecting the rod members with the skis for enabling pivotal movement of the skis relative to the platform along axes other than their longitudinal axes including a base member having a bulbous portion in the form of a curvilinear section extending upwardly from the base portion, and means for securing the base member to a ski, a bearing member in the form of a curvilinear concave portion adapted slideably to receive the bulbous portion therein in substantially mating relation, means interconnecting the base member and the bearing member to enable sliding movement of the bearing member about the bulbous portion of the base member, and means on the bearing member for pivotally mounting the rod members for rocking movement relative thereto about a longitudinal axis.

2. A ski sled as claimed in claim 1 in which said rod members include inner rods comprising a pair of separate relatively straight rods having a common pivot on the platform.

3. A ski sled as claimed in claim 1 in which the curvilinear section of the base member is substantially a spherical section with the apex extending in the direction away from the ski to provide a bearing surface.

4. A ski sled as claimed in claim 1 in which the means for securing the base member to the ski comprise flange portions extending outwardly from the base of the bulbous portion and fastening means securing the flanged portion to the upper surface of the ski.

5. A ski sled as claimed in claim 1 in which the curvilinear section of the bearing member is in the form of a substantially spherical section.

6. A ski sled as claimed in claim 1 in which the curvilinear sections of the base member and the bearing member are in the form of substantially concentric spherical sections in which the spherical section of the bearing member is dimensioned substantially to correspond with this spherical section of the base member in diametrically opposed portions extending crosswise of the skis and is dimensioned to be of lesser depth than the spherical section of the base member through the remainder to enable the bearing member to slide on the bearing surface of the

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base member and relative to the base member in directions other than said diametrically opposed portions.

7. A ski sled as claimed in claim 1 in which the means on the bearing member for pivotally mounting with rod members comprises flanges extending outwardly from diametrically opposed portions at the base of said curvilinear section and means on said flanges for pivotally mounting the rod members in laterally spaced-apart relation.

8. A ski sled as claimed in claim 7 in which the means pivotally mounting the rod members comprises spaced ears extending upwardly from the flanges and a pivot pin interconnecting the ears and the rod member.

9. A ski sled as claimed in claim 7 in which the bearing member is positioned on the base member with the flanges extending laterally crosswise of the ski with the means for pivotal attachment of the rods being spaced one from the other crosswise on the flanges by an amount to correspond with the spaced relationship between the rods.

10. A ski sled as claimed in claim 1 in which the means interconnecting the base member and the bearing member for relative sliding movement comprises aligned openings in the apex portion of the curvilinear sections on each of the members including the bearing member and the base member with the opening in one being dimensioned to have a larger diameter than the opening in the other and rod means extending through said aligned openings with abutments on the ends of the rods engaging the opposite surfaces of said members to interconnect said members.

11. In a ski sled comprising a pair of skis in laterally spaced-apart parallel relationship and a platform centrally disposed with respect to the skis, an improved platform supporting structure locating the platform above the skis and for tilting the skis about their longitudinal axes responsive to tilting movement of the platform comprising a front and back group of rods in which each group includes a hooped inner rod having straight end portions and means connecting the arched central portion thereof pivotally to the platform and means pivotally connecting the lower end portion of one straight end portion to one ski and the lower end portion of the other straight portion to the other ski, a pair of outer supporting rods pivotally connected at their lower ends to the skis and at their upper ends to the platform with the outer rods being spaced outwardly in substantially parallel relation to the straight portions of the inner hooped rod, the adjacent peripheral surface of one of the rods including the straight portion of the inner rod and the outer rods being formed with a concave section adapted to receive the peripheral portion of the other rod to enable a greater degree of relative movements between said rod members.

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