

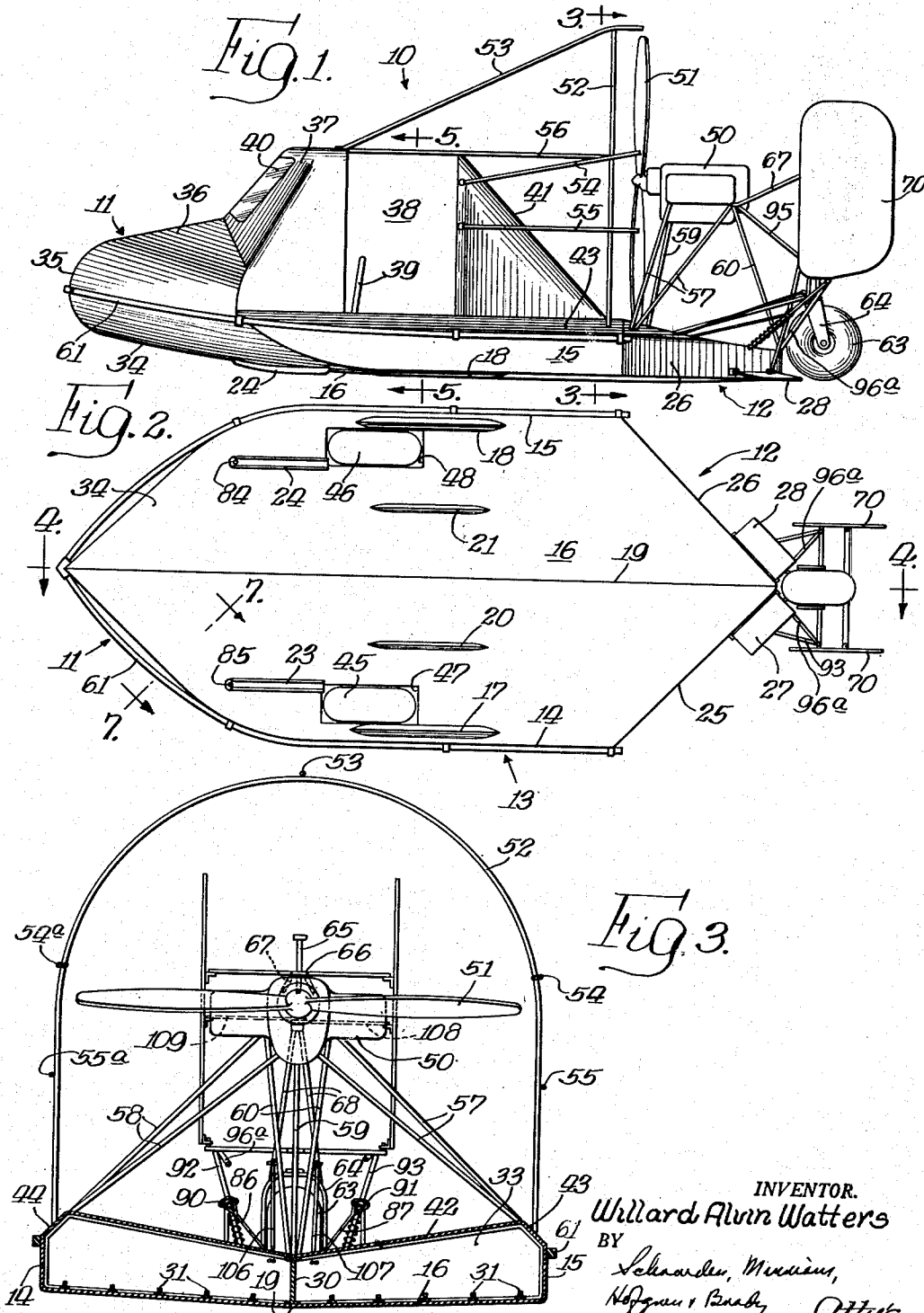
Nov. 30, 1954

W. A. WATTERS
SURFACE CRAFT

2,695,584

Filed Aug. 19, 1950

3 Sheets-Sheet 1



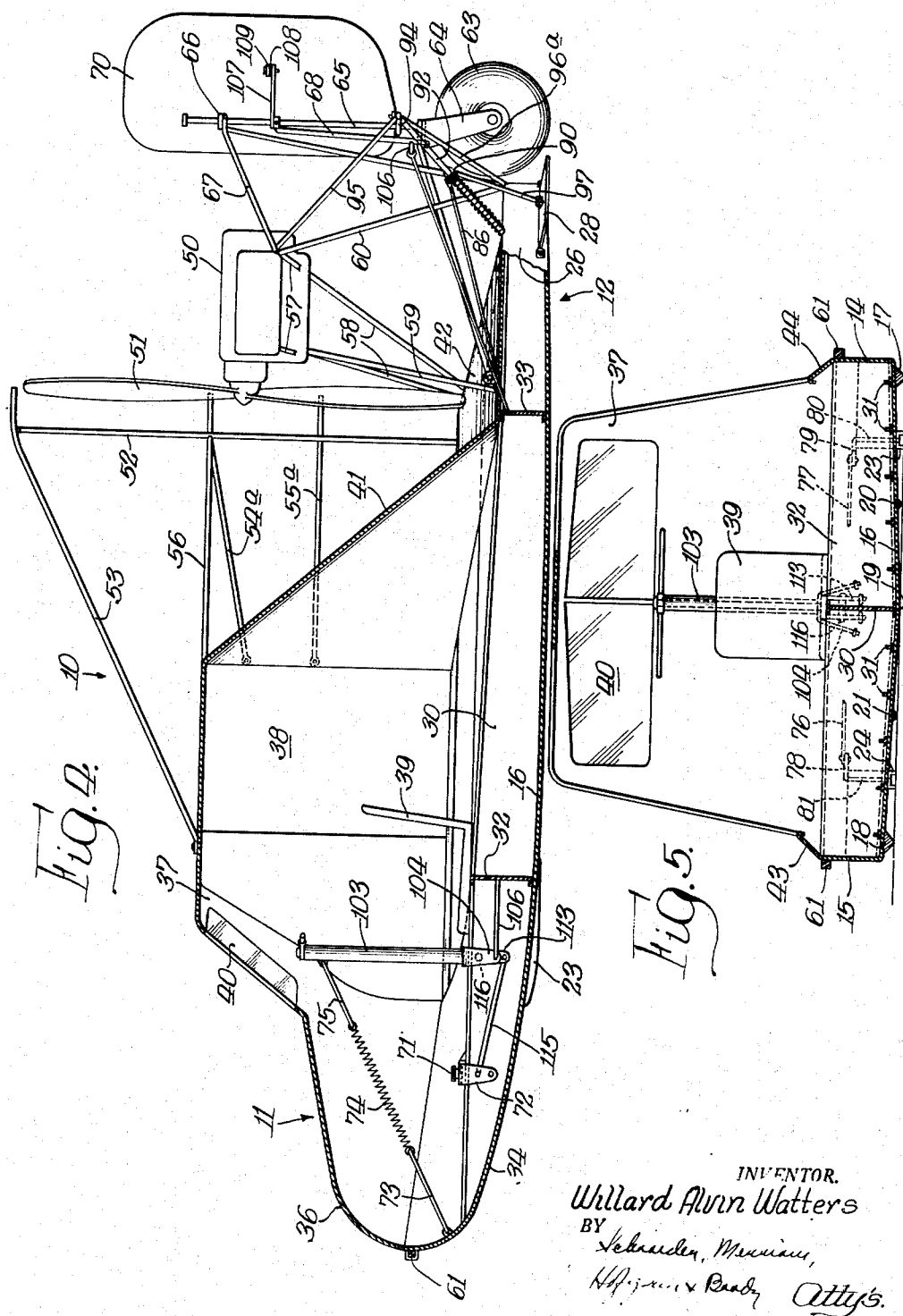
Nov. 30, 1954

W. A. WATTERS
SURFACE CRAFT

2,695,584

Filed Aug. 19, 1950

3 Sheets-Sheet 2



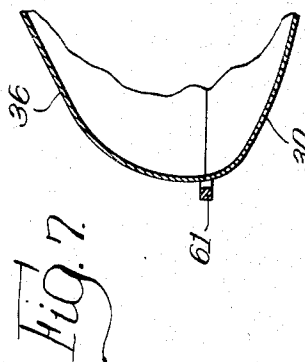
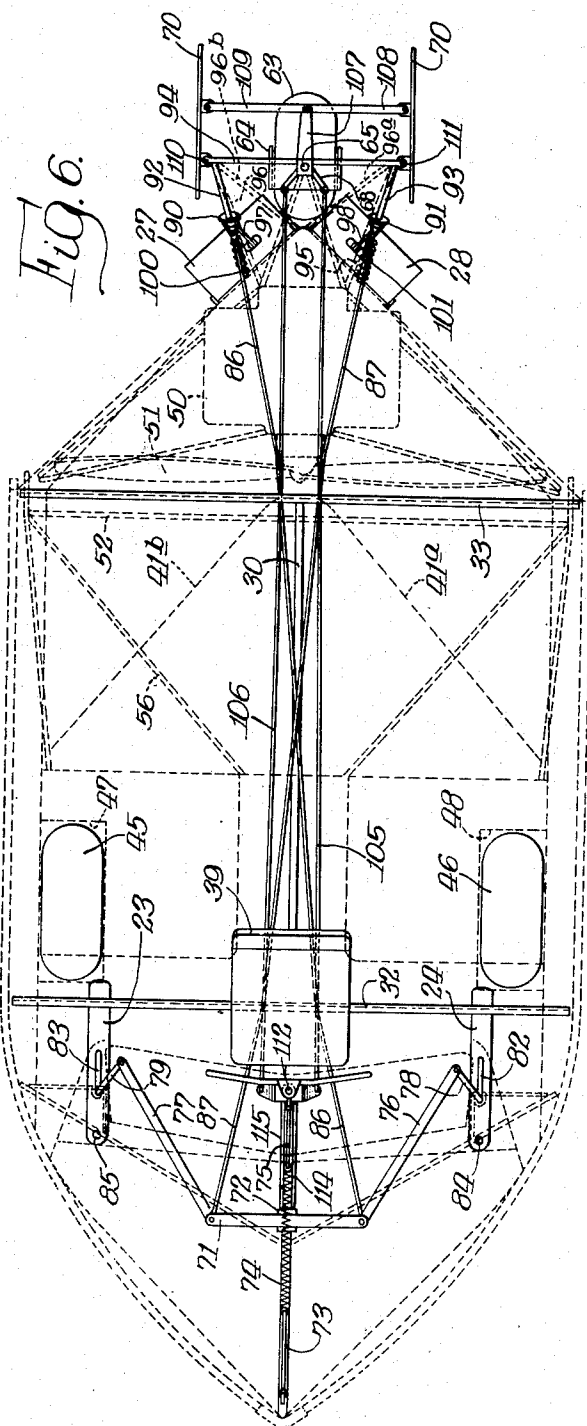
Nov. 30, 1954

W. A. WATTERS
SURFACE CRAFT

2,695,584

Filed Aug. 19, 1950

3 Sheets-Sheet 3



INVENTOR.
Willard Alvin Watters
BY *Schneider, Merriam,
Hoffman & Beatty* Attys.

1

2,695,584

SURFACE CRAFT

Willard Alvin Watters, Grand Marais, Minn.

Application August 19, 1950, Serial No. 180,459

10 Claims. (Cl. 114-43)

This invention relates to a surface craft and more particularly to a craft capable of travelling over snow, ice, land and water.

It is the principal object of this invention to produce a surface craft of new and improved design and construction.

It is a more specific object of this invention to produce a craft capable of travelling over snow, ice, land or water which is light in weight and yet is provided with a simple and rigid hull design.

It is a further object of this invention to produce a craft of the type described in the preceding paragraphs which is capable of travelling at high speed over the types of surface described with a relatively light horsepower.

A further object of the invention is to produce a novel control system to control the direction of the craft when travelling over any of the surfaces described.

Yet another object of the invention is to produce a surface craft in which many of the component parts perform dual functions, such as the provision of flap members and movable runners in the control system which function not only to change the direction of travel but also act as brakes and similarly to provide the hull with certain structural members which serve not only to stiffen and strengthen the hull but also serve as supports for the motor mount.

Other and further objects of the invention will become apparent from the following description and drawings, in which:

Fig. 1 is a side elevation of the surface craft of this invention;

Fig. 2 is a bottom plan view of the craft shown in Fig. 1;

Fig. 3 is a transverse vertical section taken along line 3-3 of Fig. 1;

Fig. 4 is a vertical longitudinal section taken along line 4-4 of Fig. 2;

Fig. 5 is a transverse vertical section taken along line 5-5 of Fig. 1;

Fig. 6 is a top plan schematic view of the control system with the outlines of the craft shown in phantom, and

Fig. 7 is a vertical section along line 7-7 of Fig. 4.

While my invention is susceptible of embodiment in many different forms, I have shown in the drawings and will herein describe in detail one specific embodiment, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

Referring now to the drawings, the craft 10 of this invention is provided with a pointed bow section 11, a pointed stern section 12 and a mid-section 13 which is substantially rectangular in shape, joined at either end to the bow and stern sections respectively and having straight parallel sides 14 and 15 extending between the ends of the bow section and the beginning of the stern section. In order to achieve maximum maneuverability for the craft, the bow, mid and stern sections of the craft are so proportioned that their sides are approximately parallel to tangents to the minimum turning circle of the craft. When the controls of the craft are held in position for the sharpest possible turn, the craft will travel in a circle, which circle is normally called the minimum turning circle, and the craft travels along the

2

circumference of such circle. When so turning, for example to the right, an arcuate portion of the bottom travels precisely along the circumference of the circle and thus the port side of the bow, mid and stern sections are close to the circle and, in the craft shown, are parallel to lines tangent to the circle at the closest point of the circle to each of the sections. Thus the port side of the bow section is parallel to a line tangent to the part of the circle closest to that side of the bow section; the port side of the mid-section is parallel to a line tangent to the part of the circle closest to the mid-section; and the port side of the stern section is parallel to a line tangent to the part of the circle closest to that side of the stern section. Thus sharp turns can be achieved without snow or water piling up against either the bow or stern sections. The bottom 16 is in the shape of a shallow V, the V being upright and is provided with a number of fixed skegs or runners. Adjacent the sides 14 and 15 is a pair of outer runners 17 and 18, and substantially midway between the outer runners and the centerline 19 of the craft is a pair of inner runners 20 and 21. As best shown in Fig. 5, the runners 17, 18, 20 and 21 are so correlated to the shape of the bottom 16 so that the bottom of those runners and the bottom of the craft along the centerline lie in a single horizontal plane. Thus with the craft travelling over ice only a minimum surface is actually resting upon the ice so that little friction is encountered. Furthermore, the weight of the craft is spread over the entire width between the outer runners. Because of this fact and because none of the runners nor the center of the craft are below any of the other runners, I reduce the danger of one runner breaking through thin ice and retarding the progress of the craft. When travelling over deep snow the entire surface of the bottom, of course, comes into contact with the snow to support the craft. Forward of the fixed runners and lying along a line substantially midway between the outer and inner fixed runners is a pair of movable runners 23 and 24. Secured to the sides 25 and 26 of the stern section is a pair of movable flaps 27 and 28 which with the movable runners form a part of the control system hereinafter to be described.

As best shown in Figs. 3, 4 and 5, the bottom structure includes a vertical keel 30 in the form of an I-beam which runs from bow to stern of the craft. Additional longitudinal strengthening is supplied by a number of stringers 31 which extend from bow to stern and through a forward transverse bulkhead 32 and an aft transverse bulkhead 33. The stern section 12 aft of the bulkhead 33 constitutes a watertight compartment which has sufficient buoyancy to keep the craft afloat should hull damage occur.

As will be noted from an inspection of Fig. 1, that portion 34 of the bottom 16 which extends under the bow section 11 curves upwardly toward the nose 35 of the craft. This curvature is in two planes, that is a fore and aft plane and a side to side plane as seen in Fig. 7. Thus the bow section has a tendency to ride up over soft snow and prevent the craft from bogging down. This riding effect is achieved not only when the craft is travelling on a straight course but also when the craft is turning inasmuch as the sides of the bow section are similarly curved upwardly. The bow section is provided with a top deck 36 which curves upwardly and rearwardly and merges with a cabin section 37. The cabin section defines a seating compartment 38 provided with a chair 39 for the operator and with windows 40 for forward view. The aft part of the cabin section is provided with a downwardly slanting rear closure 41 whose sides taper inwardly along the top deck 42 of the mid-section and meet at a point at the centerline of the craft. The sides of the rear closure are substantially parallel to the sides 25 and 26 of the stern section, and their position relative thereto may be seen in the dotted lines marked 41a and 41b in Fig. 6.

The mid-section 13 is provided with straight sides 14 and 15 as hereinbefore described which extend vertically upward from the outer edges of the bottom at mid-section and are connected to a center deck comprising inwardly inclined stepped portions 43 and 44

3 which run longitudinally along the sides of the craft and merge with the cabin along the seating compartment 38 and, aft of the cabin, with the upper deck 42.

Also located in the mid-section of the craft is a pair of retractable wheels 45 and 46 adapted to be raised manually into wells 47 and 48 formed into the bottom and extending up into the seating compartment 38. The wheels may be lowered manually whenever it is desired to use the craft for travel over land and may be retracted for travel over snow, ice or water.

Mounted on the stern section 12 is a motor 50 carrying an air propeller 51 to provide propulsion for the craft. The propeller 51 is guarded by a number of guard rods which are secured to the cabin structure and to an inverted U-shaped guard ring 52. The guard rods include an upper rod 53 secured to the top of the forward part of the cabin and to the top of the guard ring, and two pairs of side guard rods 54, 54a and 55, 55a on opposite sides of the craft which are vertically spaced along the rear closure 41 and extend from that closure to and slightly beyond the guard ring 52. A generally V-shaped guard rod assembly 56 is so arranged as to have the point of the V secured at spaced points to the after part of the cabin structure and the legs of the V extending outwardly to the guard ring.

The motor 50 is mounted above the stern section on a number of supporting rods. A V-shaped supporting rod assembly 57 has the outer ends of its legs secured to spaced points at the forward end of the motor with the apex of the V being secured to the deck 43 at the location of the after bulkhead 33 so that the weight of that part of the motor is carried through the deck and to the bulkhead. Similarly a second V-shaped supporting rod assembly 58 is provided on the opposite side of the craft and secured to the deck 44 at the location of the bulkhead 33 in a similar manner. A single vertical supporting rod 59 extends vertically downwardly from the motor and is connected to the keel member 30 through the deck portion 42. An additional V-shaped supporting rod assembly 60 is secured to the after part of the motor and extends downwardly and rearwardly therefrom with the apex of the V being located at the tail end of the stern section and connected to the keel 30 at the juncture of the stern.

By so arranging the supporting rods the motor is rigidly and firmly supported on the craft, and substantially the entire weight of the motor is transferred to the various structural members described and in no case is borne at any point by the deck alone. The guard rods and guard ring provide ample protection for the propeller when travelling through thick brush and the like, and the hull itself is provided with a bumper rail 61 which extends completely around the craft to ward off low brush and the like and assist in the travel through obstructed areas.

Mounted just aft of the stern section is a third retractable wheel 63. The wheel itself is rotatably mounted in a U-shaped bracket 64 carried by a vertical rod 65 rotatably mounted on a cross bar 66 secured to the ends of a V-shaped supporting assembly 67 which in turn is secured to the motor 50. Additional support for the bracket 64 is provided by another V-shaped supporting rod structure 68 which has the ends of its legs secured to the sides of the bracket 64 and the apex secured to the vertical rod 65. The rod 65 is slidable vertically in the cross bar 66 and may be retracted manually to the position shown in Figs. 1 and 4 when the craft is travelling over water, ice or snow and may be extended downwardly manually and locked in a position wherein the wheel extends below the bottom of the craft whenever it is desired to travel over land.

A novel control system is provided for the craft which is adapted to change the direction of travel regardless of whether the craft is travelling over ice, snow, water or land. To this end a pair of twin rudders 70 are provided on the stern section and located in the slipstream of the propeller. Rotation of the rudders about a vertical axis will, of course, turn the craft when it is travelling over water and assist in turning the craft when it is travelling over other surfaces. The flap members 27 and 28 are adapted to be rotated downwardly into contact with the surface over which the craft is travelling either individually to turn the craft or simultaneously to brake the craft. In a similar manner the movable runners 23 and 24 may be turned simultaneously in the same direction to turn the craft

or simultaneously in the opposite direction again to serve as a brake.

For the purpose of operating the controls, two control actuating members are shown. The first control actuating member comprises a rudder bar 71 pivotally mounted in a bracket 72 pivotally mounted on the keel in the bow section. A bracket 73 is connected to the bow of the craft and to the spring 74 which is connected to a second bracket 75 secured to the central control column to urge the control column toward counterclockwise movement. A pair of connecting rods 76 and 77 have one end pivotally secured to the rudder bar 71 and the other end pivotally secured to lever arms 78 and 79 respectively. The lever arms are provided with a horizontal portion attached to the rods 76 and 77 with vertical portions 80 and 81 which extend downwardly through the bottom and second horizontal portions 82 and 83 located beneath the bottom and slidably secured in seats in the movable runners aft of the pivot points 84 and 85 about which the runners rotate. Thus by foot pressure on the rudder bar 71, for example on the portion to the right of the bracket 72, the runners 23 and 24 are caused to rotate in a clockwise direction to turn the craft to the right while pressure on the left-hand portion of the rudder bar causes the runners to rotate in an anti-clockwise movement and thus cause turning movement to the left. Should the rudder bar be moved forwardly without being rotated by pivoting the bracket 72, both runners will be caused to move, but in opposite directions and the runners will assume a toeing-out position which serves to brake the craft.

The flap members 27 and 28 are also secured to the rudder bar by means of the flexible connections 86 and 87 which extend rearwardly and are connected to brackets 90 and 91 respectively, slidably mounted on rods 92 and 93. The rods 92 and 93 have their lower ends secured to the sides of the stern section and extend rearwardly and upwardly therefrom with their outer ends being secured to a second cross bar 94 fixed to the motor mount by means of the supporting rods 95 and 96 and to the stern of the rods 96a and 96b. Pivotally secured to the brackets 90 and 91 is a pair of actuating rods 97 and 98. The actuating rods extend downwardly from the bracket and are pivotally secured to the flaps 27 and 28, respectively.

From the foregoing it can be seen that rotation of the rudder bar in a counter-clockwise direction (as shown in Fig. 6) serves through the medium of the control cable 87 to slide the bracket 91 downwardly on the rod 93 and thus to depress the flap member 28. Rotation of the rudder bar in this direction has no effect on the flap member 27 which remains in its normal horizontal position. It is clear that rotation of the rudder bar in the opposite direction serves to depress the flap member 27, the flap member 28 remaining in its normal horizontal position. In order to insure the return of the flap members to their normal position, compression springs 100 and 101 surround the rods 93 and 92, respectively, and have one end bearing against the brackets 90-91 and the other end bearing against the deck at the lower ends of the rods.

A second controlling member in the form of a control column 103 is also located in the seating compartment 38 and is provided at its lower end with an inverted U-shaped bracket 104 to which flexible control cables 105 and 106 are secured. The opposite ends of the control cables are secured to the bracket 64 which carries the after wheel. Rotation of the control column 103 about a vertical axis serves through the medium of the cables 105 and 106 to rotate the bracket 64 and hence the supporting rod 65 to which it is secured. Firmly secured to the supporting rod 65 is an arm 107 which is pivotally secured at its outer end to a pair of arms 108 and 109 which in turn are secured to the twin rudder assembly 70. Thus rotation of the rod 65 serves through the medium of the control arm 107 and the arms 108 and 109 to rotate the rudders in the same direction as the wheel. The rudders themselves are rotatably mounted at 110 and 111 to the cross arm 94.

The control column 103 is hollow and surrounds a shaft 112 which is provided at its lower end with a U-shaped bracket 113 straddling the keel and pivotally mounted thereto for pivoting fore and aft. The control column itself can, of course, be rotated about the shaft 112 as its axis. As best shown in Fig. 4, the lower

ends of the U-shaped member 113 are secured by means of rods 114 and 115 to the bracket 72. Thus rotation of the control column 103 about the pivot point 116 of the shaft 112 serves through the medium of the rods 114 and 115 to pivot the bracket 72 and hence to move the rudder bar 71 forwardly without rotating it. This rearward rocking of the control column 103 serves to brake the craft inasmuch as the movement imparted to the rudder bar serves to rotate the rudders 23 and 24 in opposite directions while simultaneously depressing both of the flaps 27 and 28.

It has been found that the craft of this invention is extremely maneuverable and can turn about a very short radius. The particular curve of the bow section greatly facilitates turning of the craft in soft snow. The general fore and aft upward curvature serves, of course, to permit the craft to travel in a straight line over snow and to, in effect, ride up on the snow in the manner of a ski or toboggan. In addition, however, the fact that the sides of the bow section are also curved upwardly and outwardly from the centerline of the craft serves to assist the craft in riding up over the snow even though it is turning. When travelling over land or water, rotation of the control column 103 about its vertical axis serves to rotate both the stern wheel 63 and the twin rudders. When turning over ice or snow, the rudder bar serves not only to turn the runners but also to depress one of the flaps at the stern section which has the effect of skidding the stern section around in the direction desired. It should be obvious, however, that turning on any surface, both the rudder bar and control column may be rotated in the desired direction of turn to call into play the entire control system to increase the maneuverability of the craft.

I. claim:

1. A control system for a craft capable of travelling over snow, ice, land and water having a hull, a V-shaped stern and a flat bottom and having a motor driven air propeller for propulsion of the craft, comprising a rudder member mounted in the slipstream of the propeller for rotation about a vertical axis, a flap member mounted along one side of the stern for pivotal movement about a substantially horizontal axis intersecting the centerline of the craft at an acute angle, a second flap member mounted along the other side of the stern for pivotal movement about a substantially horizontal axis intersecting the centerline at an acute angle, a pair of spaced parallel runner members rotatably mounted on the bottom adjacent the forward end of the craft and positioned at opposite sides of the centerline, a control member mounted for rotation about each of two axes perpendicular to each other and connected to said members, said control member being adapted when rotated about one of its axes to rotate the rudder member and when rotated about its other axis to rotate the runner members in opposite directions to a toeing-out position and simultaneously to rotate the flap members downwardly, and a second rotatably mounted control member connected to the flap members and to the runner members and adapted when rotated to rotate the runner members in the same direction, and simultaneously to depress only the flap member on the side toward which the fore-to-aft line of the runner members is inclined.

2. A control system for a craft capable of travelling over snow, ice, land and water having a hull, a bottom and a motor driven air propeller for propulsion of the craft comprising a rudder member mounted in the slipstream of the propeller for rotation about a vertical axis, a flap member mounted on the stern on one side of the centerline of the craft for pivotal movement about a substantially horizontal axis intersecting said centerline at an acute angle, a second flap member mounted on the stern on the other side of said centerline for pivotal movement about a substantially horizontal axis intersecting the centerline at an acute angle, a pair of spaced parallel runner members rotatably mounted on the bottom adjacent the forward end of the craft and positioned on opposite sides of the centerline, a moveable control member connected to said members, said control member being adapted when moved in one direction to rotate the rudder member and when moved in another direction to rotate the runner members in opposite directions to a nonparallel position and simultaneously to rotate the flap members downwardly, and a second movably mounted control member connected to the flap members

and to the runner members and adapted to rotate the runner members in the same direction, and simultaneously to depress only the flap member on the side toward which the fore-to-aft line of the runner members is inclined.

3. In a control system for a craft capable of travelling over snow, ice, land and water having a hull, a bottom, and a motor driven air propeller for propulsion of the craft, in combination a rudder member mounted in the slipstream of the propeller for rotation about a vertical axis, a flap member mounted on the stern on one side of the centerline of the craft for pivotal movement about a substantially horizontal axis intersecting said centerline at an acute angle, a second flap member mounted on the stern on the other side of said centerline for pivotal movement about a substantially horizontal axis intersecting the centerline at an acute angle, each of the flap members having a surface extending a substantial distance parallel to its pivotal axis, a pair of spaced parallel runner members rotatably mounted on the bottom adjacent the forward end of the craft and positioned on opposite sides of the centerline, a control device mounted for rotation about each of two axes perpendicular to each other and connected to all of said members, said control device being adapted when rotated about one of its axes to rotate the rudder member and when rotated about its other axis to rotate the runner members in opposite directions to a nonparallel position and simultaneously to rotate the flap members downwardly to bring said surfaces into contact with the surface over which the craft is traveling.

4. In a control system for a craft capable of travelling over snow, ice, land and water having a hull, a bottom, and a motor driven air propeller for propulsion of the craft, in combination, a flap member mounted on the stern on one side of the centerline of the craft for pivotal movement about a substantially horizontal axis intersecting said centerline at an acute angle, a second flap member mounted on the stern on the other side of said centerline at an acute angle, a pair of spaced parallel runner members rotatably mounted on the bottom adjacent the forward end of the craft and positioned on opposite sides of the centerline, each of the flap members having a surface extending a substantial distance parallel to its pivotal axis, a rotatably mounted control member connected to the flap members and to the runner members and adapted when rotated to rotate the runner members in the same direction, and simultaneously to depress only the flap member on the side toward which the fore-to-aft line of the runner members is inclined to bring the surface of the depressed flap member into contact with the surface over which the craft is traveling.

5. A control system for a craft capable of travelling over snow, ice, land and water having a hull, a V-shaped stern and a flat bottom and having a motor driven air propeller for propulsion of the craft comprising a rudder member mounted in the slipstream of the propeller for rotation about a vertical axis, a flap member mounted on the stern on one side of the centerline of the craft for pivotal movement about a substantially horizontal axis intersecting said centerline at an acute angle, a second flap member mounted on the stern on the other side of said centerline for pivotal movement about a substantially horizontal axis intersecting the centerline at an acute angle, a pair of spaced parallel runner members rotatably mounted on the bottom adjacent the forward end of the craft and positioned on opposite sides of the centerline, a manually operable control column mounted for rotation about a substantially vertical axis and movable fore and aft, said control column being connected to said members and adapted when rotated to rotate the rudder member and when moved in a fore-to-aft direction to rotate the runner members in opposite directions to a toeing-out position and simultaneously to rotate the flap members downwardly, and a rotatably mounted rudder bar connected to the flap members and to the runner members and adapted when rotated to rotate the runner members in the same direction, and simultaneously to depress only the flap member on the side toward which the fore-to-aft line of the runner members is inclined.

6. A craft capable of travelling over snow, ice, land and water comprising a pointed stern section, a pointed bow section, a substantially rectangular mid-section in-

intermediate and secured to the bow and stern sections, a bottom having a keel and extending under said sections and being in the shape of a shallow V and inclining upwardly under the bow section, a fixed runner adjacent and parallel to each of said edges of the bottom and extending below the bottom, a pair of spaced controllable runners rotatably mounted on the bottom substantially at the juncture of the mid-section to the bow section, said keel and said fixed and controllable runners lying in a single plane, a pair of controllable flaps on the sides of the stern section with each flap being pivotally mounted about an axis parallel to the side to which it is secured and having a surface extending a substantial distance parallel to its pivotal axis, each flap being movable to a position in which at least a portion of said surface of the flap extends below the bottom, a deck over the bow section, curved sides extending downwardly from said deck to the bottom thereunder, a center deck extending along each side of the mid-section parallel to the side edges of the bottom thereunder, vertical sides joining the center deck and said edges of the bottom, a deck over the stern section, straight sides along the edges of the bottom under the stern section and extending vertically upwards therefrom to the last named deck, an air propeller mounted on the stern section, and means for rotating the runners and for moving the flaps to control the craft.

7. A craft capable of travelling over snow, ice, land and water comprising a hull having a substantially rectangular mid-section, a pointed bow section and a pointed stern section, a flap member mounted along one side of the stern for pivotal movement about a substantially horizontal axis intersecting the centerline of the craft at an acute angle, a second flap member mounted along the other side of the stern for pivotal movement about a substantially horizontal axis intersecting the centerline at an acute angle, a pair of spaced parallel runner members rotatably mounted on the bottom of the craft adjacent the forward end thereof and positioned on opposite sides of the centerline, means for rotating said runners in the same direction and simultaneously to depress only the flap member on the side toward which the fore to aft line of the runner members is inclined to turn the craft, the sides on the port side of the craft being parallel to lines tangent to the closest portion of the minimum turning circle when the craft is making a minimum turn to the right and the sides on the starboard side of the craft being parallel to lines tangent to the closest portion of the minimum turning circle when the craft is making a minimum turn to the left.

8. A craft capable of travelling over snow, ice, land and water comprising a pointed bow section, a pointed stern section, a substantially rectangular mid-section intermediate and secured to the bow and stern sections, a bottom having a keel and extending under said sections and being in the shape of a shallow V and inclining upwardly under the bow section, a deck over the bow section, curved sides extending downwardly from said deck to the bottom thereunder, a center deck extending along each side of the mid-section parallel to the side edges of the bottom thereunder, vertical sides joining the center deck and said edges of the bottom, a deck over the stern section, straight sides along the edges of the bottom under the stern section and a motor driven air propeller mounted on the stern section, a rudder member mounted in the slip-stream of the propeller for rotation about a vertical axis, a flap member mounted on the stern on one side of the centerline of the craft for pivotal movement about

a substantially horizontal axis intersecting said centerline at an acute angle, a second flap member mounted on the stern on the other side of said centerline for pivotal movement about a substantially horizontal axis intersecting the centerline at an acute angle, a pair of spaced parallel runner members rotatably mounted on the bottom adjacent the forward end of the craft and positioned on opposite sides of the centerline, a movable control device connected to all of said members, said control device being adapted when moved in one direction to rotate the rudder member and when moved in another direction to rotate the runner members in opposite directions to a nonparallel position and simultaneously to rotate the flap members downwardly, and a second movably mounted control device connected to the flap members and to the runner members and adapted to rotate the runner members in the same direction, and simultaneously to depress only the flap member on the side toward which the fore-to-aft line of the runner members is inclined.

9. A craft as claimed in claim 8 in which the sides on the port side of the craft are parallel to lines tangent to the closest portion of the minimum turning circle when the craft is making a minimum turn to the right and the sides on the starboard side of the craft are parallel to lines tangent to the closest portion of the minimum turning circle when the craft is making a minimum turn to the left.

10. A craft capable of travelling over snow, ice, land and water comprising a pointed bow section, a pointed stern section, a substantially rectangular mid-section intermediate and secured to the bow and stern sections, a bottom having a keel and extending under said sections and being in the shape of a shallow V and inclining upwardly under the bow section, a runner adjacent and parallel to each of said side edges of the bottom with the keel and the runners lying in a single plane, a deck over the bow section, curved sides extending downwardly from said deck to the bottom thereunder, an inwardly inclined step portion extending along each side of the mid-section parallel to the side edges of the bottom thereunder, vertical sides joining the step portions and said edges of the bottom, a deck over the stern section, straight sides along the edges of the bottom under the stern section and extending vertically upwards therefrom, a pair of wells adjacent the forward end of the bottom, a pair of wheels on the craft with each wheel being retractable into a different one of the wells, a third wheel mounted on the stern section and an air propeller mounted on the stern section.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,048,337	Offenburger	Dec. 24, 1912
1,450,197	Zwickey	Apr. 3, 1923
1,710,869	Farrell	Apr. 30, 1929
1,716,230	Ingram	June 4, 1929
1,816,118	Knight	July 28, 1931
1,928,552	Band	Sept. 26, 1933
2,054,011	Isherwood	Sept. 8, 1936
2,165,633	Hunt	July 11, 1939
2,259,804	Davis et al.	Oct. 21, 1941
2,276,310	James	Mar. 17, 1942

FOREIGN PATENTS

Number	Country	Date
1,364	Great Britain	of 1881