W. M. STANBROUGH.

ICE BOAT.

APPLICATION FILED DEC. 17, 1910.

1,006,310.

Patented Oct. 17, 1911.

7 SHEETS—SHEET 1.

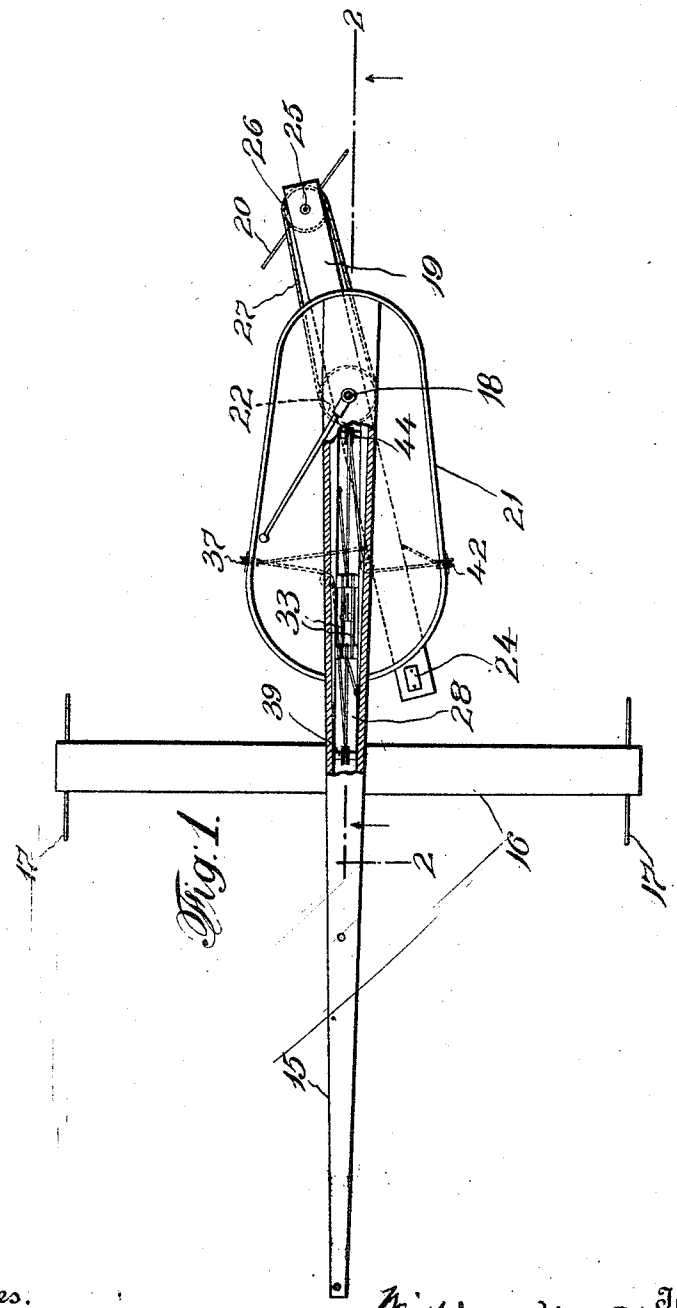

Fig. 1.

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Gustav Ganglinger.

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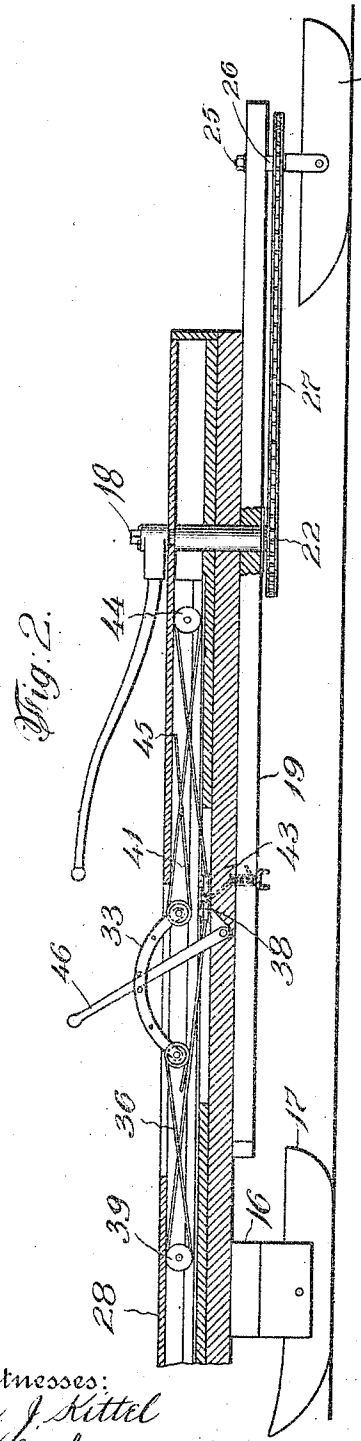

Fig. 2.

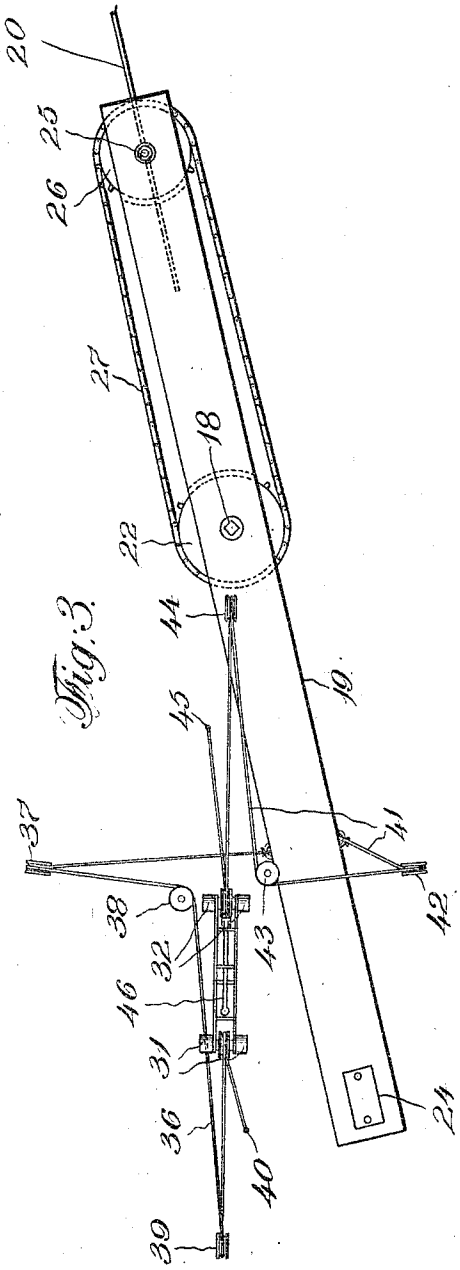

Fig. 3.

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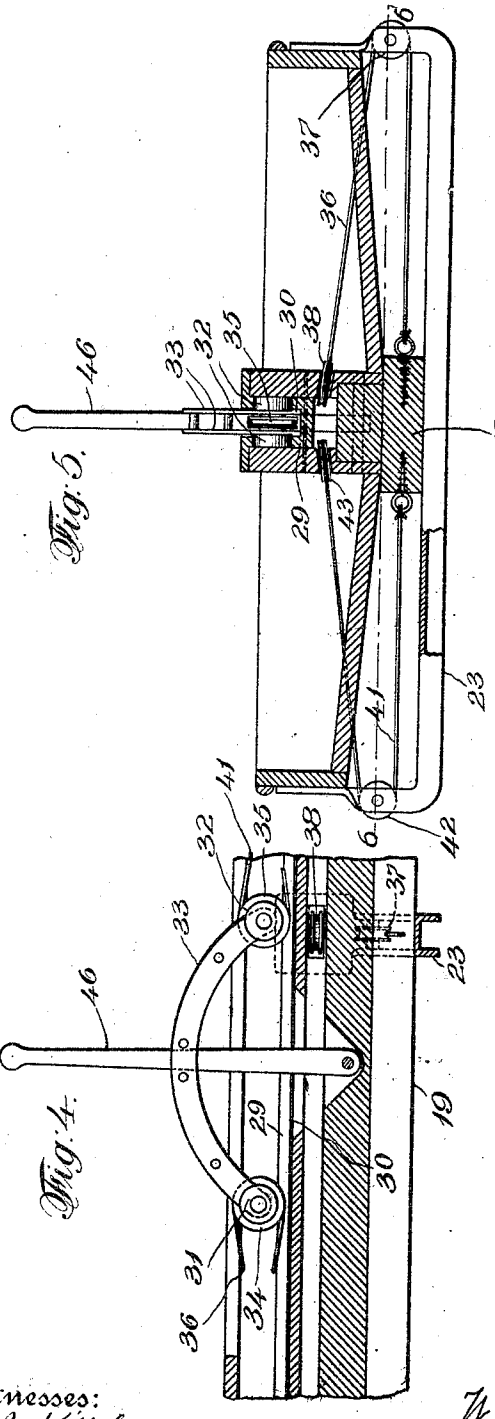

Fig. 5.

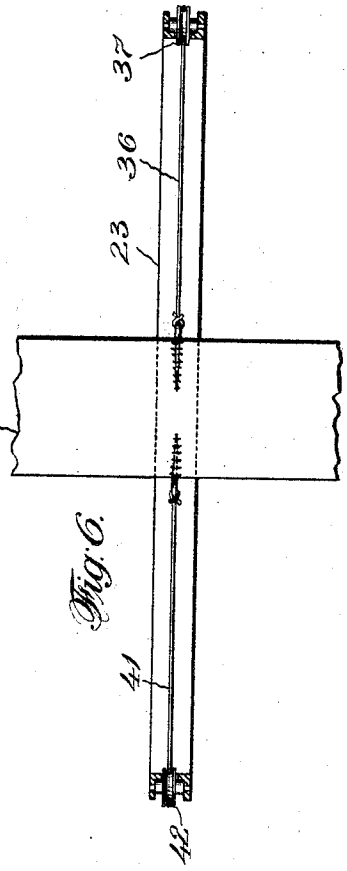

Fig. 6.

Fig. 4.

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Fig: 7.

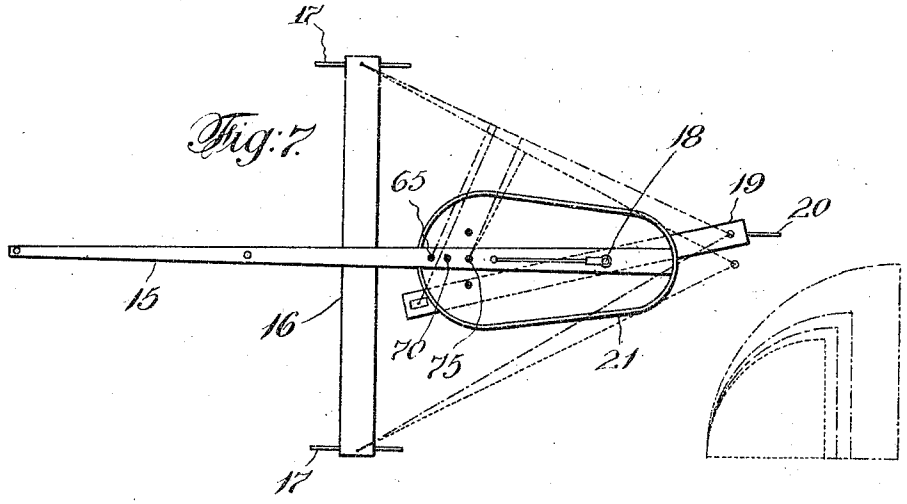
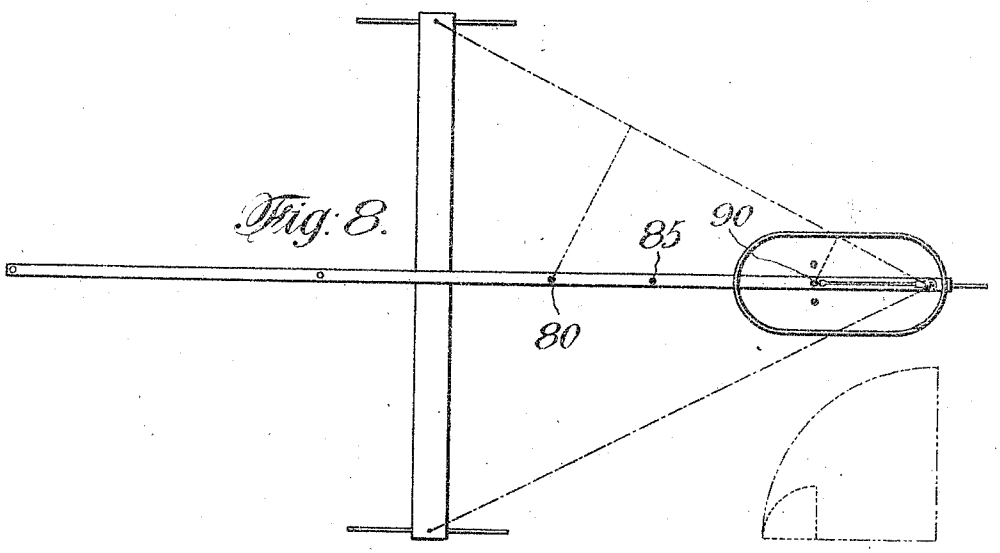


Fig: 8.



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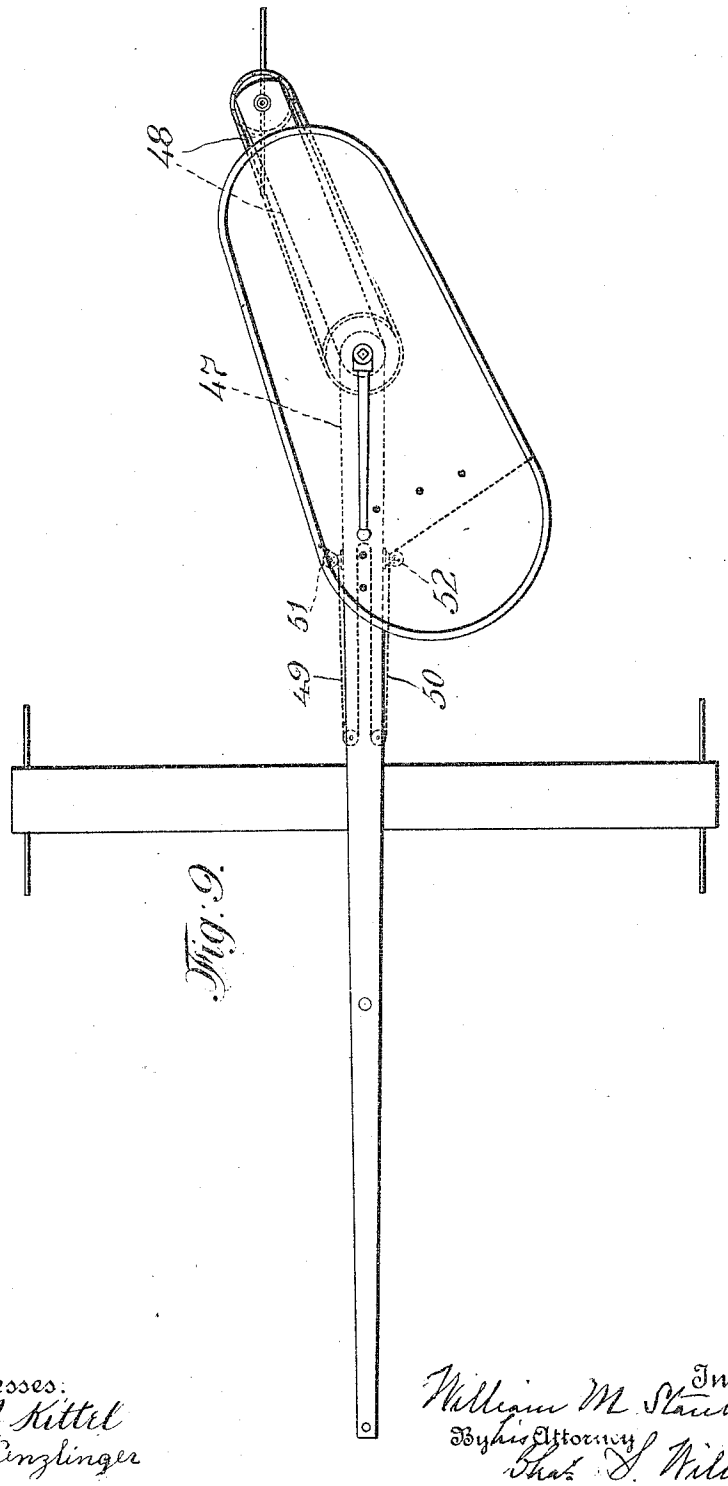

Fig. 9.

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7 SHEETS—SHEET 6.

Fig. 10.

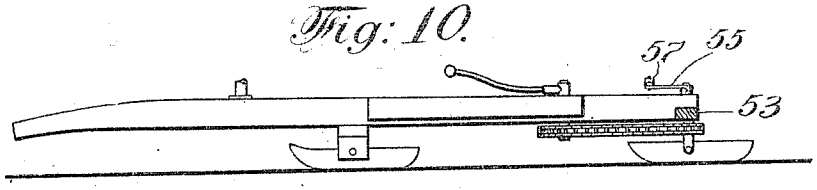


Fig. 11.

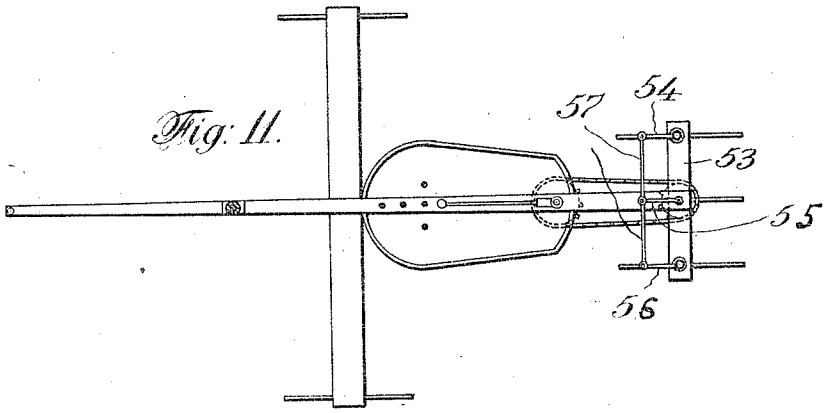


Fig. 12.

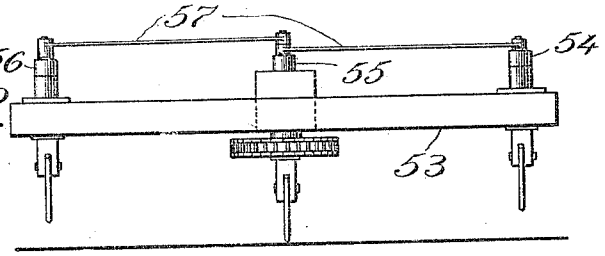
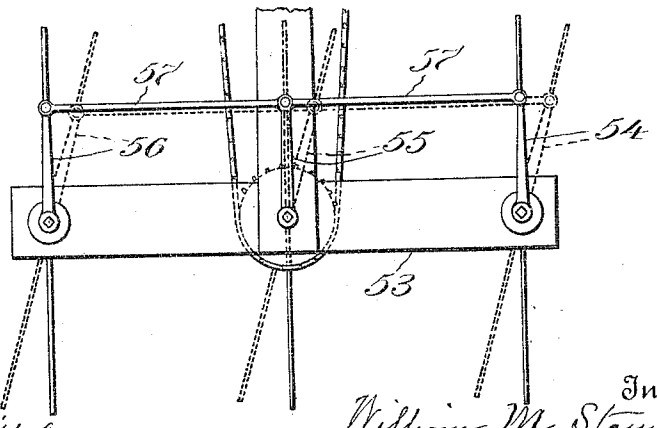


Fig. 13.



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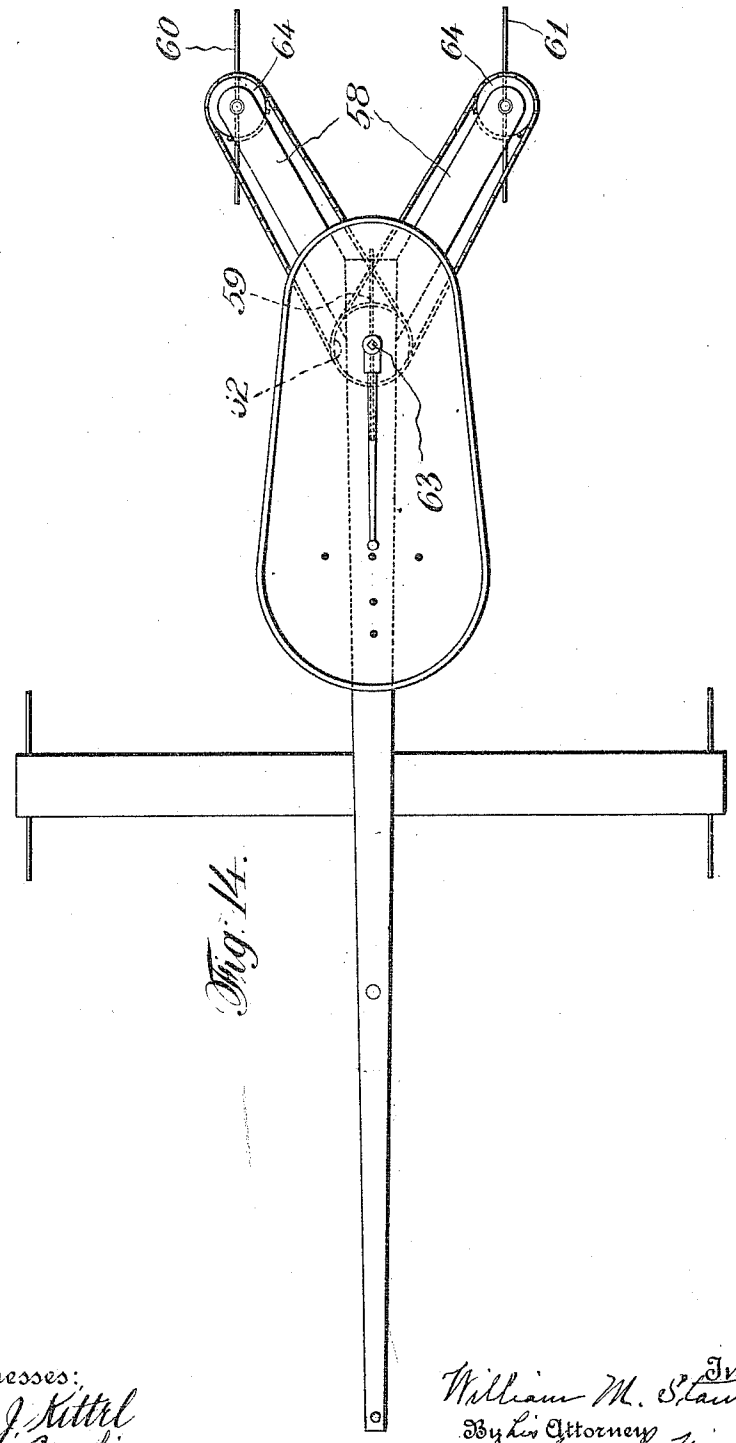

Fig. 14.

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UNITED STATES PATENT OFFICE.

WILLIAM M. STANBROUGH, OF NEWBURGH, NEW YORK.

ICE-BOAT.

1,006,310. Specification of Letters Patent. **Patented Oct. 17, 1911.**

Application filed December 17, 1910. Serial No. 597,873.

To all whom it may concern:

Be it known that I, WILLIAM M. STANBROUGH, a citizen of the United States, residing at Newburgh, in the county of Orange and State of New York, have invented a new and useful Ice-Boat, of which the following is a specification.

My invention relates to an improvement in sail propelled ice-boats in which a member is attached to the back-bone or keel of the ice-boat and to the rudder-runner thereof whereby the lines of support of the ice-boat may be shifted from an isosceles triangle to a scalene triangle, and the objects of my invention are: (1) to provide an ice-boat of greater stability under wind pressure and of greater sail carrying ability than the ordinary type of ice-boat, (2) an ice-boat of smaller proportions and less weight than one of the usual type, but capable of carrying the sail area of the larger boat with equal or greater speed and greater safety and pleasure of operation, (3) an ice-boat in which the centers of gravity may be shifted to windward or leeward of the back-bone or keel at the will of the operator, (4) an ice-boat in which the center of gravity of load is utilized as ballast to a greater extent than in a boat of the usual type, (5) an ice-boat in which the centers of gravity of boat and of boat and load are brought together or approximate so that the boat will turn in a small radius, (6) an ice-boat in which the centers of gravity are so placed that in changing the course in rounding a lee stake the momentum is absorbed as thrust by the lee runner instead of becoming drag on the rudder-runner, as in the usual type of boat, (7), an ice-boat in which the centers of gravity fall together so constructed that the weight of the load gives stability enough that inertia is overcome in a forward direction before the boat lifts (windward runner) from the ice, (8) an ice-boat in which the lee or forward portion of the sail has a tendency to carry the forward end of the back-bone or keel to leeward and the rear end thereof to windward, while the weather or after portion of the sail, the main-sheet thereof being fastened to a hinged or movable portion of the rear end of the back bone or keel, tends to hold the rear end of the back-bone or keel to leeward, thus causing the centers of gravity of boat and load to move to windward of the line of stress, (9) an ice-boat in which the cock-pit containing the load, that is, the crew or operator, is attached to a hinged portion of the back-bone or keel so that the part of the cock-pit containing the load may be shifted to windward of the line of the fixed portion of the back-bone or keel, the load thus acting as shifting ballast, (10) an ice-boat having a member for shifting the lines of support of the ice-boat provided at its fore end with a ballast weight, (11) an ice-boat in which the centers of gravity can be shifted to windward or leeward of the line of the mast and rudder-runner, (12) an ice-boat in which the centers of gravity of boat and load automatically shift to windward of the line of the mast and rudder-runner, (13) an ice-boat in which when the windward runner is raised from the ice by wind pressure, the center of gravity proceeds to windward of the line of the mast and rudder support, I attain these objects by the device illustrated in the accompanying drawings in which—

Figure 1, is a plan view of my ice-boat, partly in section. Fig. 2, is an enlarged longitudinal section on the line 2—2 of Fig. 1. Fig. 3, is a diagrammatic plan view of Fig. 2, with parts removed. Fig. 4, is an enlarged detail section of the carriage for operating the shifter, in neutral position. Fig. 5, is a cross section of Fig. 4. Fig. 6, is a sectional plan view on the line 6—6 of Fig. 5. Fig. 7, is a diagrammatic plan view of my ice-boat. Fig. 8, is a diagrammatic plan view of an ice-boat of the usual type. Fig. 9, is a plan view of a modification of my ice-boat. Fig. 10, is a side elevation of another modification of my ice-boat. Fig. 11, is a top plan view of Fig. 10. Fig. 12, is a rear elevation of the shifter, rudder-runners and their connections of the modification of my ice-boat shown in Figs. 10 and 11. Fig. 13, is a plan view of Fig. 12. Fig. 14, is a top plan view of another modification of my ice-boat.

Similar numerals refer to similar parts throughout the several views.

My ice-boat comprises a back-bone, 15, a runner plank, 16, runners, 17, a tiller post, 18, a shifting member, 19, a rudder-runner, 20, and a cock-pit or box for the crew, 21.

The back-bone, 15, is of the form commonly used in ice-boats with the usual means for stepping the mast and attaching the rigging. The runner plank, 16, is rigidly attached at its middle at right angles

to the back-bone, 15, and is such as is customary in ice-boats, and is provided at each of its ends with a runner, 17, of the form and manner of attachment to the runner plank in common use.

The tiller-post, 18, is attached to the back-bone, 15, passing through the back-bone and held in place by such means as will permit the turning of the tiller post on its axis, a suitable tiller, wheel or other means being provided for turning the tiller post. The tiller post, 18, has rigidly attached to it on the under side of the back-bone, 15, a sprocket wheel, 22, the tiller-post being extended downward to allow of such attachment, the sprocket wheel, 22, turning with the tiller-post, 18.

The shifting member, 19, is a plank of substantially the width of the back-bone, 15, and of suitable thickness to stand the strain, and lies, when in normal position, along the under side of the back-bone, 15, and parallel therewith. The shifting member 19, has a hole cut in its central line through which the tiller-post, 18, passes so that the shifting member, 19, swings or pivots on the tiller post, 18, the longer portion of the shifting member extending forward of the tiller post and the shorter portion extending aft thereof, the shifting member, 19, being supported in its position under the back-bone, 15, by resting or bearing on the upper surface of the sprocket wheel, 22, attached to the tiller-post before mentioned. To prevent the forward end of the shifting member from tilting downward, a bracket, 23, passing under the shifting member and attached to the sides of the cock-pit, 21, is provided, the bracket, 23, also limiting the distance of the lateral swing of the shifting member at its forward end. The shifting member, 19, may be provided at its forward end with a ballast weight, 24, the weight being so attached to the shifting member as not to interfere with its passage from side to side under the back-bone, 15, its purpose being to afford additional stability to my ice-boat.

The rudder-runner, 20, is of the form commonly used in ice-boats and is attached to a post, 25, by means of ears and a pin or such means as will cause the rudder-runner to turn radially in response to the turning of the post, 25, and also afford the rudder runner a rocker movement in riding over rough or hummocky spots of ice. The post, 25, extends upward passing through the after end of the shifting member, 19, and held in place in the shifting member by any suitable means that will permit the post, 25, to turn on its axis. A sprocket-wheel, 26, is rigidly attached to the post, 25, between the rudder-runner, 20, and the under side of the shifting member, 19, so as to turn with the post, 25. A sprocket-chain, 27, engaging the sprocket-wheel, 22, on the tiller-post, 18, and also engaging the sprocket wheel, 26, connects the sprocket-wheels, 18 and 26, and causes correspondent movement of the rudder-runner, 20, to right or left as the tiller on the tiller-post, 18, is moved to right or left. Any desired movement of the rudder-runner at an angle relative to the movement at any angle of the tiller on the tiller-post may be obtained by arranging the relative diameters of the sprocket-wheels accordingly. But I do not restrict myself to the use of sprocket-wheels and chain, as I can use any means that will effect correspondent movement of the tiller-post, 18, and the rudder-runner, 20, such as drums and a cable or a shaft and beveled gears.

The lines of support of an ice-boat are the lines forming the isosceles triangle from the point of contact of each runner, 17, with the ice to the point of contact of the rudder runner, 20, with the ice, an ice-boat when standing still or sailing in a light wind thus having two lines of support, or three points of contact with the ice, Figs. 7 and 8, but having only one line of support, of two points of contact with the ice, in a wind strong enough to lift the windward runner off the ice, that is, the line from the point of contact of the lee runner with the ice to the point of contact of the rudder-runner with the ice, which line also becomes the line of stress. When the windward runner lifts from the ice through wind pressure, the isosceles triangle which may be termed a triangle of ice-contact support, becomes an isosceles triangle of part weight support and part ice-contact support, that is, the weight of the boat and load, the word load here meaning the weight of the crew of the ice-boat, contained within this triangle forming the weight support, and the line of contact between the lee runner and the rudder-runner forming the line of ice-contact support. If means be provided by which the rudder runner is shifted to leeward so that the lines of support become a scalene triangle instead of an isosceles triangle the effect of the weight support in holding the boat down and preventing capsize becomes much greater, due to the longer arc of leverage through which the centers of gravity must be lifted before reaching the point of capsize, the effect being that substantially all the weight of boat and load is utilized as ballast, the ballast weight, 24, also contributing to this result. In Figs. 7 and 8, in which my ice-boat and one of the usual type are shown, my ice-boat representing a boat of twenty-four foot back-bone, and the old form of boat one of thirty foot back-bone, the dotted lines show the length of the lines of leverage of the respective boats to the lines of ice-support, and the portions

of circles adjacent to each boat indicate the arcs through which the respective boats must lift the centers of gravity before reaching the perpendicular or point of capsize. It will thus be seen that a shorter back-bone and runner-plank can be used, for example a 24 foot back-bone and a 12 foot runner-plank in my construction being equal to a 30 foot back-bone and a 16 foot runner-plank of the usual construction. This shifting of the lines of support of an ice-boat from an isosceles triangle to a scalene triangle, I attain by means of a shifting member, with a rudder-runner attached thereto, and this device and the principle therein involved I claim as new and original in the construction of a sail propelled ice-boat. While the shifting member primarily is intended to increase the stability of the ice-boat, it may be used to lessen the stability when desired. Thus in sailing in a light wind, the rudder-runner, 20, may be shifted to windward instead of to leeward, and the crew moved to the lee side of the cock-pit and the ballast weight, 24, also shifting to leeward, the object being to lift the windward runner off the ice so that the boat sails on one line of support or two points of contact with the ice in a light wind instead of upon two lines of support or three points of contact with the ice, thus reducing friction and acquiring greater speed in a light wind.

The cock-pit, 21, is preferably circular at each of its ends, the forward end being wider than the after end, but I do not restrict myself to any particular form of cock-pit. The cock-pit 21, is placed well forward relative to the back-bone, 15, the object being to bring the centers of gravity of the boat and of the boat and load together or approximate, the word load meaning the weight confined within the limits of the cock-pit, that is, the weight of the crew. By placing the cock-pit, 21, forward, I have found the center of gravity of my boat falls substantially on the point, 65, the center of gravity of the boat and load substantially on the point, 70, and the center of gravity of the load substantially on the point, 75, Fig. 7, so that the weight bears more directly on the runner-plank and runners, the momentum being absorbed as thrust on the lee runner, when changing the course as before stated, instead of as in the case of the common type of ice-boat having the cock-pit on the after end of the back-bone in which case I have found these centers of gravity to fall substantially on the points 80, 85, and 90, Fig. 8, the momentum becoming drag on the rudder-runner. The cock-pit, 21, may be attached along the sides of the back-bone, 15, its bottom extending below the lower line of the back-bone, or on top of the back-bone, or attached in any manner to the back-bone that will not interfere with the action of the shifting member, 19, and its attachments. But I do not restrict myself to a cock-pit placed forward, as the usual type of cock-pit placed aft may be used on my ice-boat, but in such case the weight support of the load is not so effective in maintaining the stability of the ice-boat as where it is placed forward.

If the main-sheet of the mainsail be attached to the extreme after end of the shifting member, 19, this end of the shifting member and the rudder-runner attached to it will shift to leeward automatically in response to the pull of the mainsail to leeward when the boat is put about, and remain in a leeward position because of the continuous strain of the mainsail to leeward. But as it is desirable that the shifting member, 19, should be under the control of the crew or helmsman, I provide such means by cutting a box, 28, longitudinally in the back bone, 15, or the box, 28, may be made by building up that portion of the back-bone, 15, in box form, provided sufficient stiffness of the back-bone is secured. Within the box, 28, a slideway, 29, having a groove, 30, is arranged, which slideway may be made of hard wood or metal as preferred, upon which a wheeled carriage operates, to the ends of which cables fastened to either side of the shifting member, 19, are attached. The wheeled carriage comprises two sets of pair-wheels, a forward set, 31, and an after set, 32, which travel on the slideway, 29, these wheels turning on shafts supported at the ends of a double arc, 33. A fore sheave-wheel, 34, is placed between the forward pair wheels, 31, and an after sheave-wheel, 35, is placed between the after pair wheels, 32, turning on the same shaft as the respective pair wheels. A fore cable, 36, is attached by suitable means to the right hand side of the shifting-member, 19, passing thence up and around a right hand pulley-wheel, 37, on the bracket, 23, thence through the cockpit to and around a pulley-wheel, 38, from aft forward, thence to the under side of a pulley wheel, 39, in the forward end of the box, thence over and aft to the under side of the fore sheave wheel, 34, and thence over and forward to a point, 40, on the left hand side of the box where it is made fast. An aft cable, 41, is attached by suitable means to the left hand side of the shifting member, 19, passing thence up and around a left hand pulley wheel, 42, on the bracket, 23, thence through the cock-pit to and around a pulley wheel, 43, from forward aft, thence to the under side of a pulley wheel, 44, in the after end of the box, thence over and forward to the under side of the aft sheave wheel, 35, and thence over and aft to a point 45, on the right hand side of the box where it is made fast. An

operating lever, 46, pivoted at its bottom in a recess in the back-bone, 15, and extending upward between the two portions of the double arc, 33, is arranged by engagement with pins on the inner sides of the arc, 33, to draw forward or pull aft the carriage and thus through the action of the cables attached to the carriage and to the shifting member to move the shifting member in the direction and to the extent desired by the operator and with it the rudder-runner. A suitable covering board with opening for the operating lever, 46, is placed over the box of the back-bone, 15. But I do not restrict myself to the above described carriage and cables to shift the member, 19, as I can use any means which will give the desired pivotal movement to the shifting member and be convenient and controllable by the crew or helmsman.

The modification of my ice-boat, Fig. 9, is in its main features constructed similar to my ice-boat hereinbefore described, except that instead of a shifting member of the form, 19, the back-bone, 15, is cut into two portions, the forward portion, 47 being rigid with the runner-plank and the aft portion, 48, hinged to the forward portion at a point in the back-bone, 15, substantially where the tiller-post, 18, passes, through the back-bone, 15, and the shifting member, 19, is pivoted in my ice-boat first herein described, the intention being that the rudder-runner, 20, should be attached to this hinged portion, 48, which having the ability to swing to right or left of the line of the rigid part, 47, of the back-bone, 15, thus takes the place of the shifting-member 19. The construction also differs from my first described boat in that the cock-pit, 21, is fixedly attached to the upper side of the hinged part, 48, of the back-bone and swings therewith, the forward end of the cock-pit being arranged to pass over or clear the upper side of the rigid portion, 47, of the back bone in swinging from side to side. A bracket, 23, similar to the bracket of my first described boat, fastened to each side of the cock-pit and passing under the rigid portion, 47, of the back-bone is provided to hold the cock-pit down on the rigid back-bone and to limit the lateral swing of the cock-pit at its forward end. Sprocket-wheels and chain can be used to connect the tiller-post and the post of the rudder-runner, to provide correspondent movement of the tiller-post and the rudder-runner as in the case of my first described boat. When it is borne in mind that in sailing an ice-boat the helmsman and crew lie down in the cock-pit facing forward, with the tiller extending over the shoulder of the helmsman, the effect of this arrangement of cock-pit is that the weight of the helmsman or crew is shifted to windward of the line of the rigid back-bone and affords a long line of ballast leverage and actually provides shifting ballast for an ice-boat. Instead of the cable and carriage means hereinbefore described, cables 49 and 50, and pulley wheels 51 and 52 means of shifting with the purchase on the rigid portion of the back-bone and attachment to the forward sides of the cock-pit may be used to move the hinged portion of the back-bone to right or left as desired. Instead of attaching the cock-pit to a hinged portion of the back-bone, the floor of the cock-pit can be made of sufficient strength and the cock-pit itself pivoted on the rigid part of the backbone by means of the tiller-post passing through the floor and the post of the rudder-runner can be extended up through the rear end of the cock-pit, thus making the cock-pit itself in effect a shifting member for the rudder-runner, and such construction I claim as my invention.

In the modification of my ice-boat, Figs. 10 and 11, I provide a shifting means comprising a supporting member, 53, rigidly attached at its middle to the under side of the extreme after end of the back-bone, 15, at right angles thereto, and having a rudder-runner pivoted at the middle of the supporting member in the line of the back-bone, the post of this rudder-runner extending upward through the back-bone, and a rudder-runner pivoted at each end of the supporting member equi-distance from the middle rudder-runner, that is, a shifting means provided with three rudder-runners. The rudder-runners are in form and means of attachment to the supporting member, 53, similar to the rudder-runner, 20, first described herein, but the bottom or shoe of the middle rudder-runner is extended downward to a lower plane than the plane of the bottoms or shoes of the side rudder-runners, Fig. 12, the intention being that when the ice-boat is standing still or sailing in a light wind the middle rudder-runner only will be in contact with the ice and the lines of support will form an isosceles triangle, but when the boat lifts under wind pressure the middle rudder-runner will leave the ice and the outside lee rudder-runner will come into contact with the ice, thus automatically shifting the lines of support to a scalene triangle, the load affording long ballast leverage and great stability, and an ice-boat adapted to use for pleasure sailing by a woman or child. Means of steering and control is had by the use of the sprocket-wheels and the sprocket-chain device before described operating on the tiller-post and the post of the middle rudder-runner. To provide correspondent movement of the middle rudder-runner and the outer rudder-runners, and in accord with the movement of the sprocket-wheels, a forward extending shaft, 54, is rigidly attached to the post of

the right-hand outer rudder-runner, a similar shaft, 55, to the middle rudder-runner and a similar shaft, 56, to the left-hand outer rudder-runner, these shafts, being connected at their forward ends by link bars, 57. If the cock-pit is placed farther aft on the back-bone the sprocket-wheels and chain may de discarded and a tiller used, formed by the extension forward of the shaft, 55, or by attaching a tiller to the forward end of the shaft, 55.

In the modification of my ice-boat shown in Fig. 14, another form of shifting means therefor is used, comprising an inverted V-shaped or forked extension of two diverging planks with the point or apex forward fixedly attached to the rear end of the back-bone, 15, a middle rudder-runner, 59, being attached to and turning with a tiller-post extending upward through the back-bone and the cock-pit at the forward point of the V-shaped extension and an outer rudder-runner, 60 and 61, pivoted at each of the rear ends of the V-shaped extension. As in the case of my last described boat, the forward or middle rudder-runner, 59, extends downward to a lower plane than the plane of the outer rudder-runners, 60 and 61, the intention being that when the ice-boat is standing still or sailing in a light wind the middle rudder-runner, 59, only will be in contact with the ice and the lines of support will form an isosceles triangle, but when the boat lifts under wind pressure the middle rudder-runner will leave the ice and the lee rudder-runner, 60 or 61, as the case may be, will come in contact with the ice, thus automatically shifting the lines of support to a scalene triangle. A boat of this construction has great stability and can carry a large sail area with resultant great speed, due to the long line of leverage through which the centers of gravity must be lifted before the boat capsizes. This construction provides particularly convenient means of entrance to the cock-pit, that is over the aft or rear end thereof, clear of all attachments. Correspondent movement of the middle rudder-runner, 59, and the side rudder-runners, 60 and 61, is had by means of a double-sprocket-wheel, 62, rigidly attached to the tiller-post, 63, which is also the post of the middle rudder-runner, 59, and turning therewith, and a single-sprocket-wheel, 64, attached to the post of each of the side rudder-runners, 60 and 61, and turning therewith, connection between the double sprocket-wheel, 62, and the single sprocket-wheel, 64, being had by means of a sprocket-chain for each of said sprocket-wheels, 64. But I do not restrict myself to the sprocket-wheel and chain arrangement, as drums and cables can be used, or shafts and bevel gears, or shafts and link bars, substantially similar in arrangement to those hereinbefore described, can be used.

As the sail propelling means my ice-boats are not restricted to any particular rig of sails, as either jib and mainsail, latteen, or mainsail only, or cat-rig, may be used, provided the arrangement of the sails is such as to afford proper sail balance.

Having fully described my invention what I claim and desire to protect by Letters Patent is:—

1. A sail propelled ice-boat comprising, with means of attachment for the several parts, a back-bone, a runner-plank, runners providing forward support, a rudder-runner in the line of the back-bone providing aft support when the boat is on a horizontal plane, means for shifting the aft support to right or left of the line of the back-bone thereby shifting the lines of support of the ice-boat from an isosceles triangle to a scalene triangle, a cock-pit, and means of steering and control; substantially as set forth.

2. A sail propelled ice-boat comprising, with means of attachment for the several parts, a back-bone, a runner plank, runners providing forward support, a cock-pit rigid in the line of the back-bone, a rudder-runner in the line of the back-bone providing aft support when the boat is on a horizontal plane, a shifting member attached to the back-bone and extending forward and aft in the line thereof and adapted to shift the aft support to right or left of the line of the back-bone thereby shifting the lines of support of the ice-boat from an isosceles triangle to a scalene triangle, and means of steering and control; substantially as set forth.

3. A sail propelled ice-boat comprising a back-bone, a runner-plank attached to the back-bone, a runner attached to each end of the runner-plank, a cock-pit attached to the back-bone and rigid in the line thereof, a shifting member attached to the back-bone on the under side thereof and extending forward and aft of the point of its attachment to the back-bone, a rudder-runner attached to the after end of the shifting member and shifting therewith, a tiller-post attached to the back-bone, means connecting the tiller-post and the rudder-runner and providing correspondent movement of the tiller post and the rudder-runner, and means controlling said correspondent movement; substantially as set forth.

4. A sail propelled ice-boat comprising a back-bone, a runner-plank attached to the back-bone, a runner attached to each end of the runner-plank, a cock-pit attached to the back-bone and rigid in the line thereof, a shifting member attached to the back-bone on the under side thereof and extending forward and aft of the point of its attachment

to the back-bone, means operating the shifting member and controlling the direction and distance of the shift thereof, a rudder-runner attached to the after end of the shifting member and shifting therewith, a tiller-post attached to the back-bone, means connecting the tiller-post and the rudder-runner and providing correspondent movement of the tiller-post and the rudder-runner, and means controlling said correspondent movement; substantially as set forth.

5. A sail propelled ice-boat comprising a back-bone, a runner-plank attached to the back-bone, a runner attached to each end of the runner-plank, a cock-pit attached to the back-bone and rigid in the line thereof wherein the centers of gravity of the boat and of the boat and load approximate, a shifting member attached to the back-bone on the under side thereof and extending forward and aft of the point of its attachment to the back-bone, a ballast weight attached to the forward end of the shifting member, means operating the shifting member and controlling the direction and distance of the shift thereof, a rudder-runner attached to the after end of the shifting member and shifting therewith, a tiller-post attached to the back-bone, means connecting the tiller-post and the rudder-runner and providing correspondent movement of the tiller-post and the rudder-runner, and means controlling said correspondent movement; substantially as set forth.

6. In an ice-boat of the character described having a back-bone and means of forward support, the combination of a rudder-runner in the line of the back-bone providing aft support when the boat is on a horizontal plane, and means for shifting the aft support to right or left of the line of the back-bone thereby shifting the lines of support of the ice-boat from an isosceles triangle to a scalene triangle; substantially as set forth.

7. In an ice-boat of the character described having means of forward support, the combination of a back-bone, a shifting member attached to the back-bone on the under side thereof and extending forward and aft of the point of its attachment to the back-bone, and a rudder-runner attached to the after end of the shifting member and shifting therewith; substantially as set forth.

8. In an ice-boat of the character described having means of forward support, the combination of a back-bone, a shifting member attached to the back-bone on the under side thereof and extending forward and aft of the point of its attachment to the back-bone, a rudder-runner attached to the after end of the shifting member and shifting therewith, and means operating the shifting member and controlling the direction and distance of the shift thereof; substantially as set forth.

9. In an ice-boat of the character described having means of forward support, the combination of a back-bone, a shifting member attached to the back-bone on the under side thereof and extending forward and aft of the point of its attachment to the back-bone, a ballast weight attached to the forward end of the shifting member, and a rudder-runner attached to the after end of the shifting member and shifting therewith; substantially as set forth.

10. In an ice-boat of the character described having a back-bone and means providing forward support and means providing aft support in the line of the back-bone when the boat is on a horizontal plane, a means for shifting the aft support to right or left of the line of the back-bone thereby shifting the lines of support of the ice-boat from an isosceles triangle to a scalene triangle, substantially as set forth.

WM. M. STANBROUGH.

Witnesses:
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HARRY L. WELLS.