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N. ROE.
ICE AND WATER BOAT.
APPLICATION FILED FEB. 26, 1907.

3 SHEETS—SHEET 1.

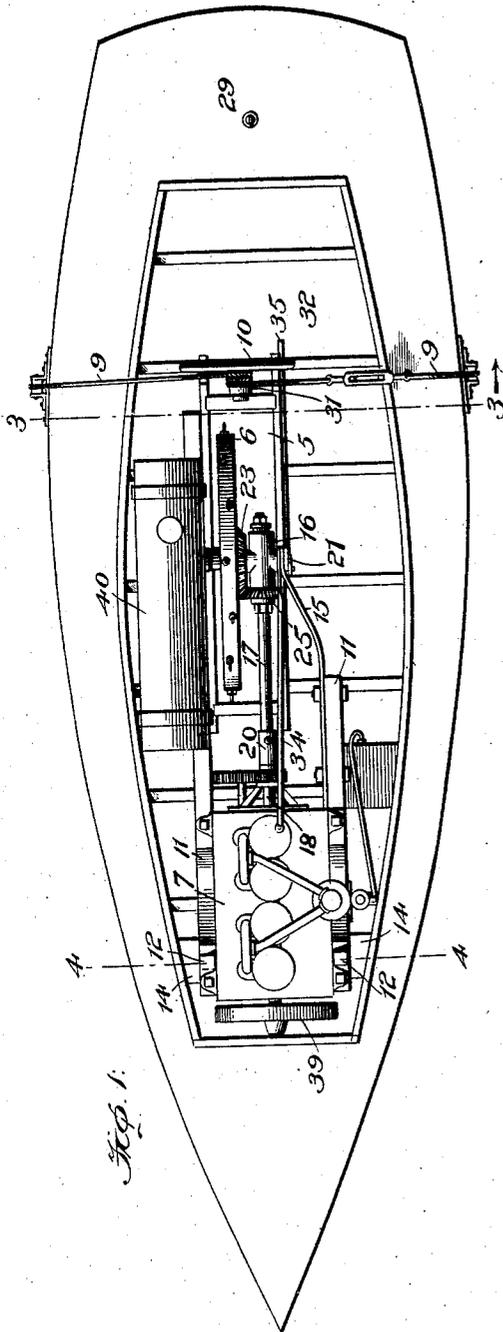
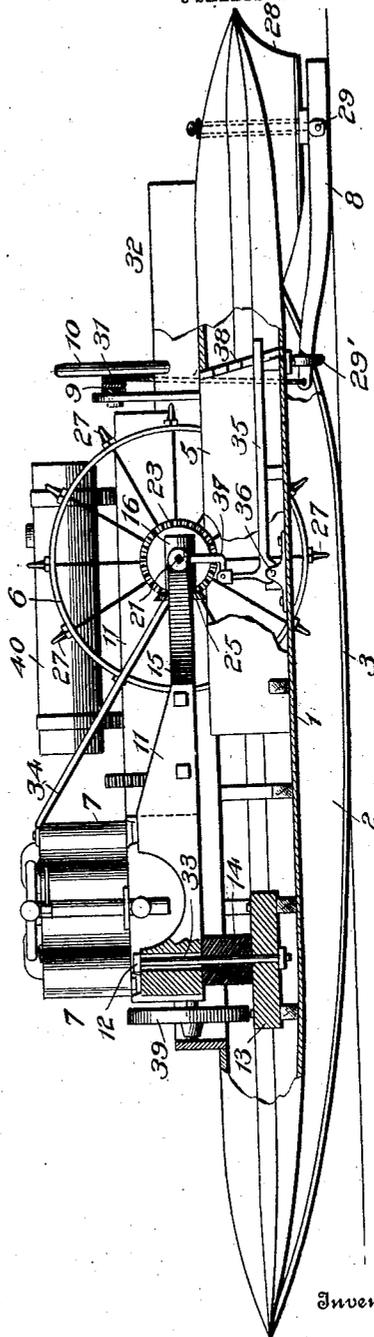


Fig. 1.

Fig. 2.



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3 SHEETS—SHEET 2.

FIG. 3.

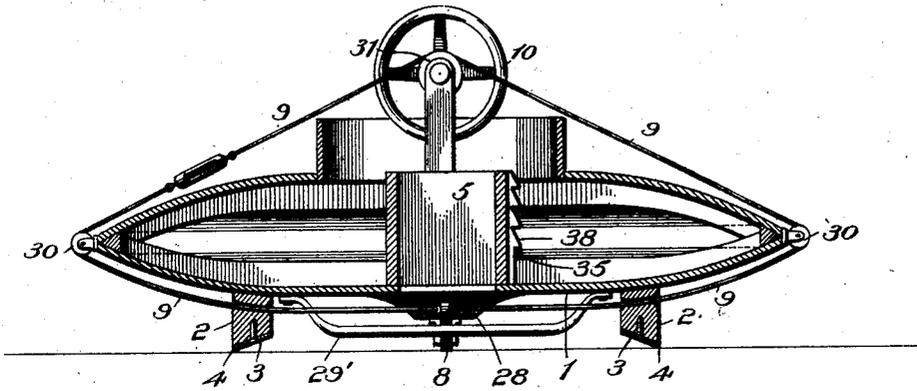
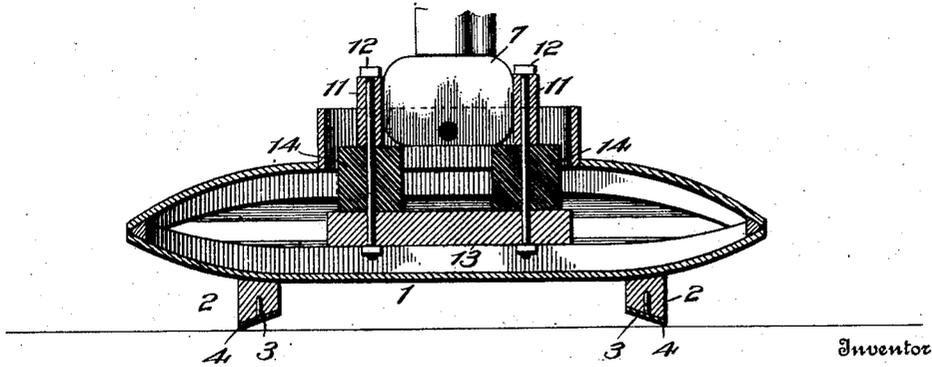


FIG. 4.



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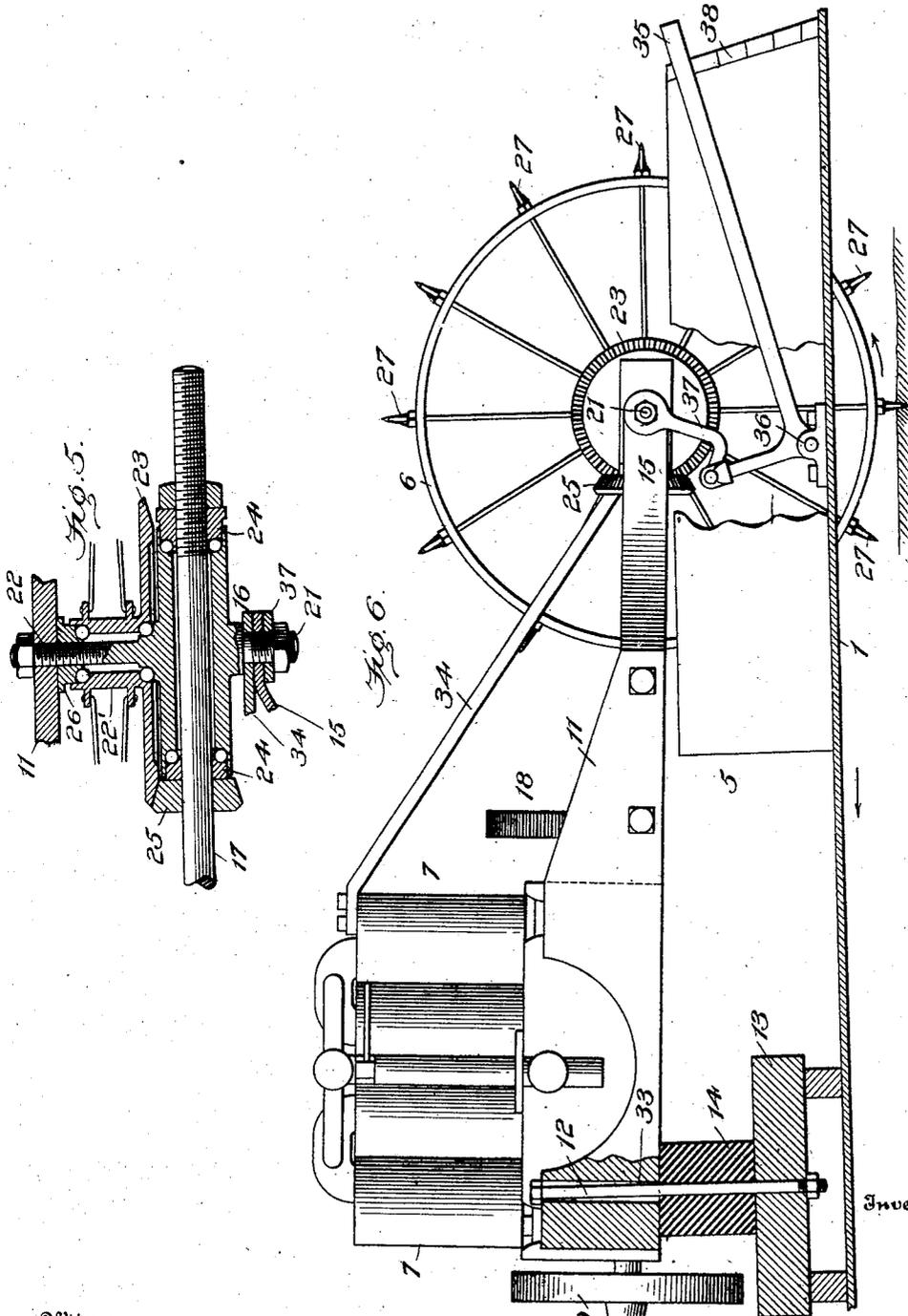
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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ICE AND WATER BOAT.

No. 859,693.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, NATHANIEL ROE, a citizen of the United States, residing at Patchogue, in the county of Suffolk and State of New York, have invented certain new and useful Improvements in Ice and Water Boats; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

I have produced a motor propelled ice yacht or scooter adapted to skim over ice and plunge into and across water spaces and air-holes with scarcely diminished speed. As an ice motor yacht it is safety controlled under high speed and affords a lively recreation to pleasure seekers and in the event of it plunging into the water in soft ice or open water leads, it would float the same as a boat and could be gotten out by means of ice hooks used to lift its runners on the ice.

A feature of my invention is the mounting of the propeller carrying beam-frame so that it will have a sort of yielding pivotal action at that end of the beams on which the motor is carried and which gives the advantage of placing the propeller in and out of action and of adjusting the depth of the engagement of the teeth of the wheel in the surface of the ice without disturbing the motor or its mounting supports and for this purpose the motor is carried at one end and the propeller wheel at the other end of their carrying beam-frame.

The accompanying drawings illustrate my motor propelled ice yacht or scooter and, in connection therewith I will set out in the appended claims, the parts and combinations of parts which constitute my invention.

In these drawings Figure 1 represents in top view my motor propelled ice yacht. Fig. 2 is a longitudinal sectional elevation the section being taken to expose the mounting of the motor and the toothed propelling wheel, the latter being lifted in inoperative position in its relation to the surface of the ice. Fig. 3 is a vertical transverse section enlarged taken on the line 3—3 of Fig. 1, looking to the rear, showing the steering cable and its connected rudder. Fig. 4 is a vertical transverse section enlarged taken on the line 4—4 of Fig. 1, showing the cushioned mounting of the beams which carry the motor. Fig. 5 shows in horizontal section the power transmitting and mounting hub device for the toothed propelling wheel. Fig. 6 shows enlarged the longitudinal beam-frame and its cushioned mounting and on which the motor and the toothed propelling wheel are mounted, the latter being in the position it occupies when in engagement with the ice for propelling the boat.

As illustrated the boat has the form of an ordinary sail boat, but it may be of the scooter type, or of any

desired form and construction adapted for ice travel, and therefore with a flat bottom 1, curving upward at the sides and at the ends and having runners 2, 2 lying parallel to the center and extending from the front to near the rear thereof. I prefer that the runners be shod with a flat steel bottom or facing 3, 3, and inclined upward toward the center forming thereby an edge 4, having the action of a skate iron so as to keep the boat in a direct course—that is, prevent giving sidewise or swaying and cause the boat to make proper turns under the action of the rudder by the cutting action of the angle edges of the runner irons into the ice in which ever direction the boat may be turned.

Near the middle of the boat is framed a well or trunk 5, open at the bottom to receive a toothed propelling wheel 6, and near the bow is mounted a motor 7, for propelling the toothed-wheel; while at the stern a rudder-bar 8, is arranged to form a sort of center keel to the boat and which is controlled in its lateral movements by a cable 9, and an auto-steering wheel 10, mounted in rear of the driving-wheel.

The motor may be of any suitable construction, that shown being of the gasolene type bolted upon timbers, or beams 11, at each side of the motor, the latter and the beams constituting the motor structure as an entirety. Each beam of this motor structure is secured by a nutted bolt 12, to a transverse bed-sill 13, suitably fastened to ribs on the bottom of the boat, the beams however, being seated upon cushions 14, preferably of rubber through which the bolts 12, pass and providing thereby a yielding mounting for the beam-frame for a purpose which I will presently state.

Both the side beams are extended rearward as a means of which to mount the propelling wheel shaft or hub arms a metallic arm 15, for this purpose, being secured to the end of one of said beams and bent inward and on the end of which the driving wheel hub shaft or arms is mounted so that it will rotate to engage the ice within the well or trunk. The mounting of the toothed driving wheel, I prefer to construct of a tubular hub device 16, which forms a bearing support for said wheel and for a shaft 17, which is driven from the well known motor shaft and transmits the power to said wheel. This power transmitting shaft is mounted in the tubular hub 16, having shaft arms 21—22 about mediately of its length at right angles and which form bearings, one of which 21, is mounted in the end of the beam arm 15, the other arm 22, screw-threaded and forming a bearing for a sleeved-hub 22', on the end of which next the tubular hub is fixed a bevel wheel 23, the driving wheel 6, being fixed on the outer end of said sleeved hub 22'. The power transmitting shaft 17, passes through and has bearings in a conical collar 24, fitted on ball-bearings at each end of the tubular-

hub. A bevel pinion 25, on the power transmitting shaft engages the bevel-wheel 23, on the sleeve-hub on which the boat driving-wheel is fixed. This tubular sleeve is mounted on ball bearings and its bevel gear is maintained in engagement with the pinion by a screw collar 26, on the arm 22, of the tubular hub; while the screw-collar 24, on the screw threaded end of the power transmitting shaft maintains the engagement of the pinion 25, with the bevel-gear. This power transmitting hub device forms a long bearing for the power transmitting shaft which always maintains its operative relation to the motor-power transmitting gear and which is maintained in firm working relation with provision for adjusting such relation to compensate for wear.

The driving-wheel which I prefer is spoked and firmly fastened on the sleeve of the bevel wheel 23, and the rim of the wheel is about two inches wide and studded with chisel pointed studs 27, screwed into the rim about four inches apart and flattened so as to give a better grip on the ice, and arranged in staggered relation which has the effect of cutting a wide path forming a sort of groove in the ice and thereby give a better engagement with the ice and necessarily increasing the propelling force on the boat.

The stern of the boat has a keel-base 28, to which the rudder-bar 8, is pivotally connected by a swivel post 29, passing up through the keel-base and suspended by a suitable collar or button at the surface of the boat and permitting the stern keel-base of the boat to rest upon the rudder at its pivotal connection with the rudder swivel post. From its pivotal connection the rudder-bar extends forward and through a loop or bow 29', formed by a bent rod fixed transversely on the bottom of the boat about at the rear end of the well for the purpose of supporting the free end of the rudder.

The cable extends beneath the boat and up at each side passing over a small sheave 30, mounted at each edge of the boat and thence over a drum 31, mounted centrally at the rear end of the well casing and operated by the auto hand-wheel 10, to wind and unwind the cable as it may be desired to steer the boat to the right or to the left and for this purpose a seat 32, is provided for the steerman. By this arrangement of the rudder the stern of the boat is supported by its base-keel centrally upon the rudder so that it forms a continuation of the side runners on which the boat is balanced. It will be noted that in moving the cable connected end of the rudder it is for that purpose curved upward from the straight bar which rests and slides upon the ice and preferably extends a short distance in the rear of its pivotally connected swivel post, there being a washer on which the rudder has its swiveling steering movements against the base-keel, thereby rendering it comparatively easy to operate the rudder and to cause the boat to quickly yield to its steering function and which is very greatly facilitated by reason of the long contact of the rudder upon the ice under the weight of the boats stern. I prefer to extend the cable connected end of the rudder between the rear ends of the runners as shown in which case the cable will pass through openings in the runners, but obviously the cable may be connected to the rudder in rear of the runners and the cable passed under their rear upward curved ends.

I have stated that the motor and driving wheel bearing beams are mounted to have a sort of pivotal function upon their fastening bolts 12, and referring to Figs. 2 and 6, it will be seen that the cushion supports of the beams and the enlarged or oblong holes 33, therein through which the fastening bolts pass, will allow the propelling or driving wheel carrying end of the beam to be raised and lowered for setting its teeth down upon and into engagement with the ice as shown in Fig. 6, or raising the wheel so that its teeth will be above the ice as shown in Fig. 1. The important matter in effecting these adjustments of the propelling-wheel is, that they do not interfere with the mounting of the motor, or its driving connections with the propelling wheel, because the rubber cushions will yield or be compressed when the wheel is lowered and the enlarged holes 33, in the beams through which the fastening rods pass, will allow the beams to be tilted up or down upon the cushions carrying the motor with them in such movements. The cushions also prevent jarring on rough ice. The power transmitting-hub in which the toothed propelling wheel is mounted, is braced laterally by the arm 15, of one of the motor supporting beams, while the power transmitting-hub is braced vertically by a brace 34, connecting the arm of said hub with the top of the motor structure.

It is important also to note that by mounting the motor supporting beams some distance in advance of the center of gravity of the motor, will cause the propelling wheel to have a tendency to drop and to have greater pressure upon it and a more certain engagement of its chisel teeth with the ice and in this the weight of the motor is a factor in giving increased traction power to the toothed wheel.

For raising and lowering the propelling-wheel I provide a lever 35, pivoted to a bracket 36, on the bottom of the boat, and having a pivotal link connection 37, with the wheel bearing-arm, the lever extending back and adapted to engage a vertical toothed-rack 38, so that the handle of the lever will be in reach of the occupant at the steering-wheel, so that when he wishes to stop the boat he depresses the lever which raises the wheel and when he raises the lever the wheel is lowered into engagement with the ice. It will also be noted that this adjustment of the propelling wheel can be made while the motor is operating it.

It is important that the rudder should not run in the groove made by the propelling wheel and to provide for this the wheel is mounted at one side of the longitudinal center of the boat as seen in Fig. 1, so that the rudder will run clear of the groove in the ice cut by the chisel studs of the wheel, otherwise this groove would badly interfere with the steering function of the rudder.

39 is the balance wheel of the motor and 40, is the tank for containing gasoline.

Obviously the yacht may be used for commercial purposes; and for fresh water ice the runners may be made of steel, but for salt water ice they may be made of brass, and they may be formed with a cutting edge at the inner side or at the outer side and in any suitable way.

While I have shown and described the preferred embodiment of my invention it will be evident to those

skilled in the art, that changes in the form and details of construction may be varied without departing from my invention.

In Fig. 1 will be seen the projecting end 18, of the 5 motor-crank shaft and its coupling 20, with the power transmitting shaft.

I claim:

1. In a vehicle of the character described, a body 10 mounted upon runners, a beam-frame, nutted bolts at one end thereof securing it to the body, a toothed propelling wheel mounted at the other end of said beam frame, a motor mounted on the bolted end thereof, means for transmitting the power of said motor to propel said wheel, and means for raising and lowering the propelling wheel carrying beam frame without disturbing the motor power 15 transmitting connections.

2. In a vehicle of the character described, a body 20 mounted upon runners, a pair of cushions seated on said body, a beam-frame supported and secured at one end on said cushions, a toothed propelling wheel mounted for rotation upon the other end of said beam-frame and adapted to engage the ice, a motor supported on the cushioned end of said beam-frame, a power transmitting shaft, connect- 25 ing said motor and wheel whereby the power of said shaft is transmitted for rotating the propelling wheel, and means under the control of the operator for raising and lowering the propelling wheel carrying beam.

3. In an ice yacht, a pair of runners having their run- 30 ning faces provided with edges for engaging the ice and preventing the swaying of the yacht, a rudder-bar mounted on a swiveling post and extending forward therefrom between the runners, a cable connected to the inner end of the rudder, means for winding the cable to operate the rudder, and a power driven toothed wheel adapted to en- 35 gage the ice.

4. In an ice yacht, a pair of runners having their run- 40 ning faces forming angle edges for engaging the ice and preventing the swaying of the yacht, a rudder-bar mounted on a swiveling post and extending therefrom between the runners, a cable connected to the inner end of the rudder, means for winding the cable to operate the rudder, a bar or loop transversely fixed to the bottom of the yacht for supporting the cable connected end of the rudder, and a power driven toothed wheel adapted to engage the ice.

45 5. In a vehicle of the character described, a body mounted upon runners, a beam-frame, nutted bolts at one end thereof securing it to the body, a toothed propelling wheel mounted at the other end of said beam-frame, means 50 for raising and lowering the wheel, and mechanism for driving the wheel consisting of a motor mounted on the bolted end of said beam-frame, a motor shaft, a power transmitting shaft connected therewith, a tubular hub supporting the power transmitting shaft and having arms which form a bearing support for said hub on the beam- 55 frame one of said hub arms having a bevel-gear and on which the propelling wheel is mounted, and a bevel pinion on the power transmitting shaft engaging the bevel wheel on the hub arm of the propelling wheel.

6. In an ice yacht, a body mounted upon runners, a beam-

frame, a pair of fixed cushions upon which one end of said 60 beam-frame is mounted, a pair of bolts whereby said beam-frame is fixed upon said cushions, a toothed propelling wheel mounted upon the other end of said beam-frame, means for raising and lowering the wheel carrying end of 65 said beam-frame, a power transmitting motor mounted upon said beam-frame in such relation to the fastening bolts thereof as to cause the weight of said motor to be in advance of said fastening bolts and to maintain a constant downward pressure upon the propelling wheel, and means for transmitting the power of said motor to propel said 70 wheel.

7. In an ice yacht, a body mounted upon runners, a beam-frame, nutted bolts at one end thereof securing it to 75 said body, a toothed propelling wheel mounted at the other end of said beam-frame, a motor rigidly mounted on the bolted end of said beam-frame, means for transmitting the power of said motor to propel the wheel, means for raising and lowering that end of the beam-frame on which the propelling wheel is mounted, and means for rigidly connect- 80 ing the said wheel carrying end of the beam-frame with the motor, whereby the beam-frame, the motor, the propelling wheel and the connections for operating it are adapted for adjustment as an entity.

8. In an ice yacht, a body mounted upon runners and 85 having a keel-base at the stern, a rudder-bar, a swivel post pivotally connected to the latter, passing through the keel-base and suspended in the body so that the keel base rests freely upon the rudder bar which extends from the post forward between the runners, a cable connecting the free 90 end of the rudder-bar, and a hand wheel the turning of which moves the cable connected end of the rudder-bar to the right or to the left, a toothed propeller wheel mounted in the body in advance of the rudder-bar, and means for operating said wheel.

9. In an ice yacht, a body mounted upon runners, a 95 beam-frame, a toothed propelling-wheel mounted upon one end of said beam-frame, a mounting for the other end of the beam-frame consisting of a base-sill, a pair of cushions fixed thereon, and a pair of bolts each connecting the base, a cushion and a beam of the frame, the holes in the latter 100 through which the bolts pass being oblong, whereby to allow the wheel-carrying end of said beam-frame to be raised and lowered, means for operating said wheel, and means for steering.

10. In an ice yacht, a body mounted upon runners, a 105 rudder-bar pivotally mounted and extending longitudinally forward centrally between the runners, and forming a support for the stern, steering means connected to the forward end of the rudder, a toothed propelling wheel mounted in advance of the rudder and at one side of the longitudinal 110 center of the body, and means for operating said toothed wheel, whereby the rudder is prevented from running into the groove formed in the ice by the wheel.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses. 115

NATHANIEL ROE.

Witnesses:

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