July 15, 1941. C. W. ALLEN 2,248,930

BOAT PROPELLING MECHANISM

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Fig. 1.

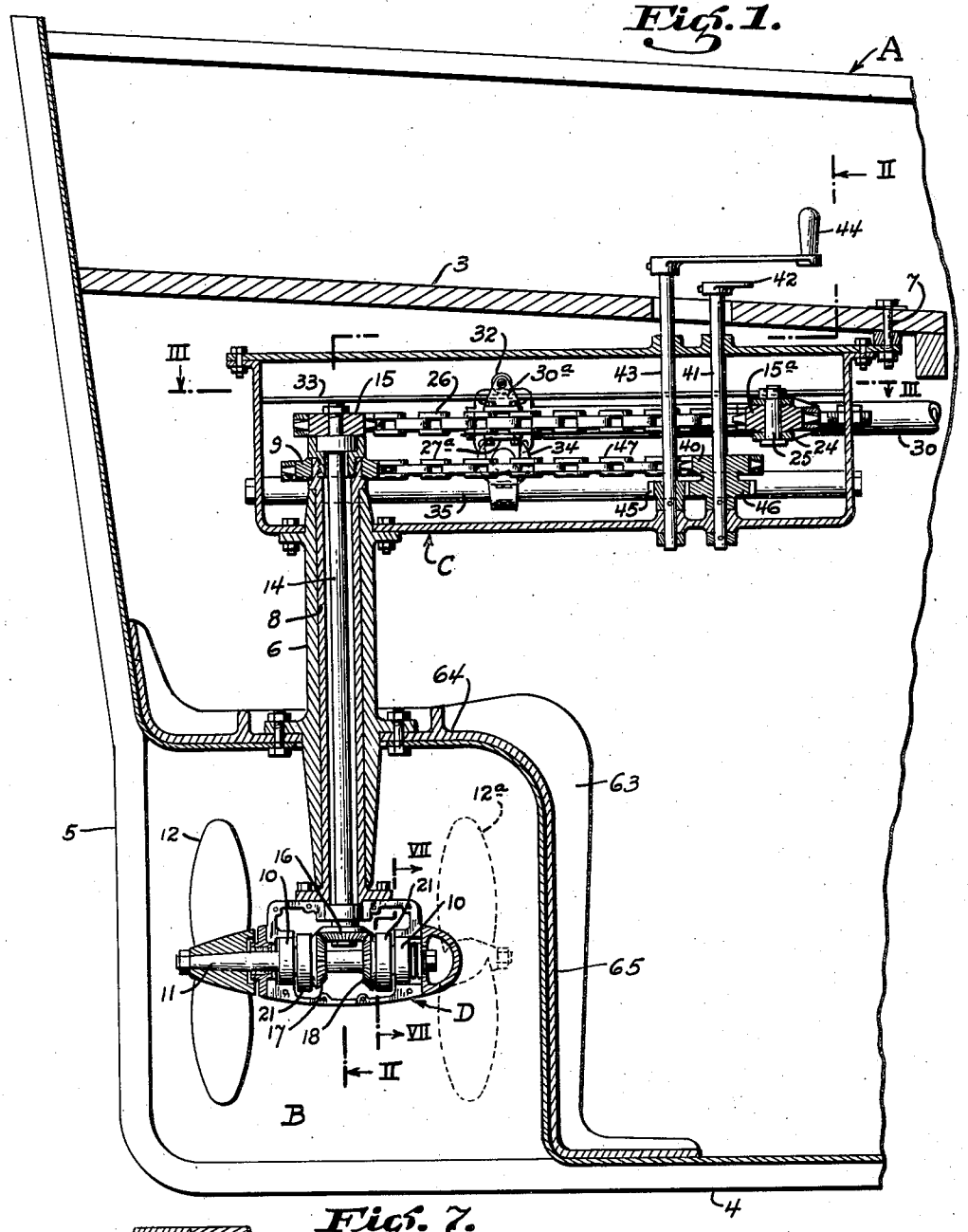
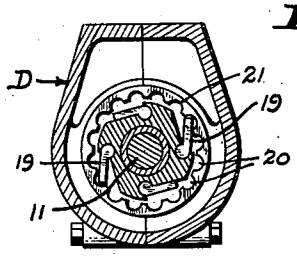


Fig. 7.



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Fig. 2.

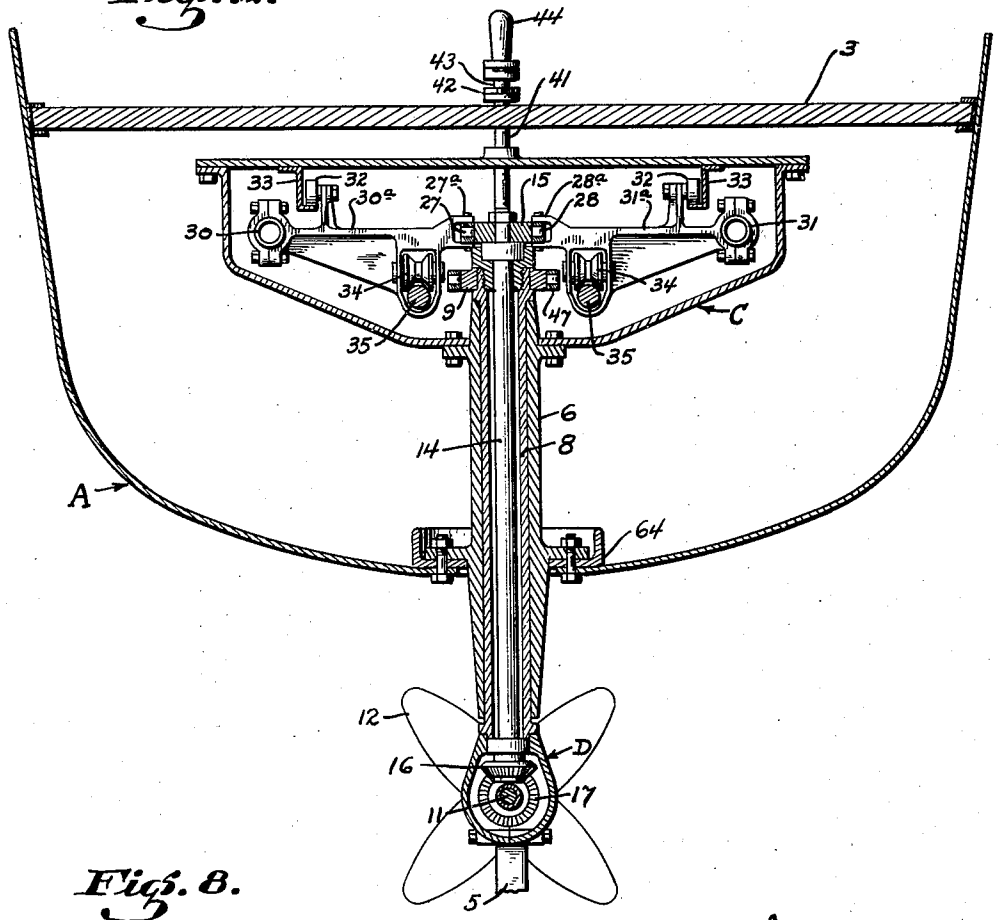
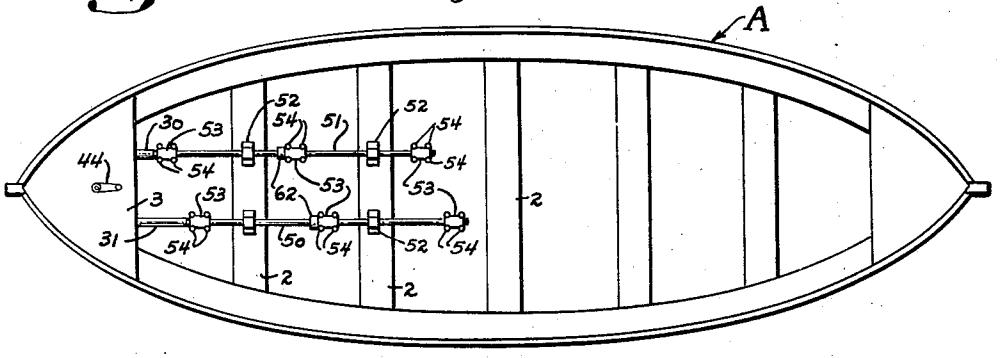


Fig. 8.



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BOAT PROPELLING MECHANISM

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Fig. 3.

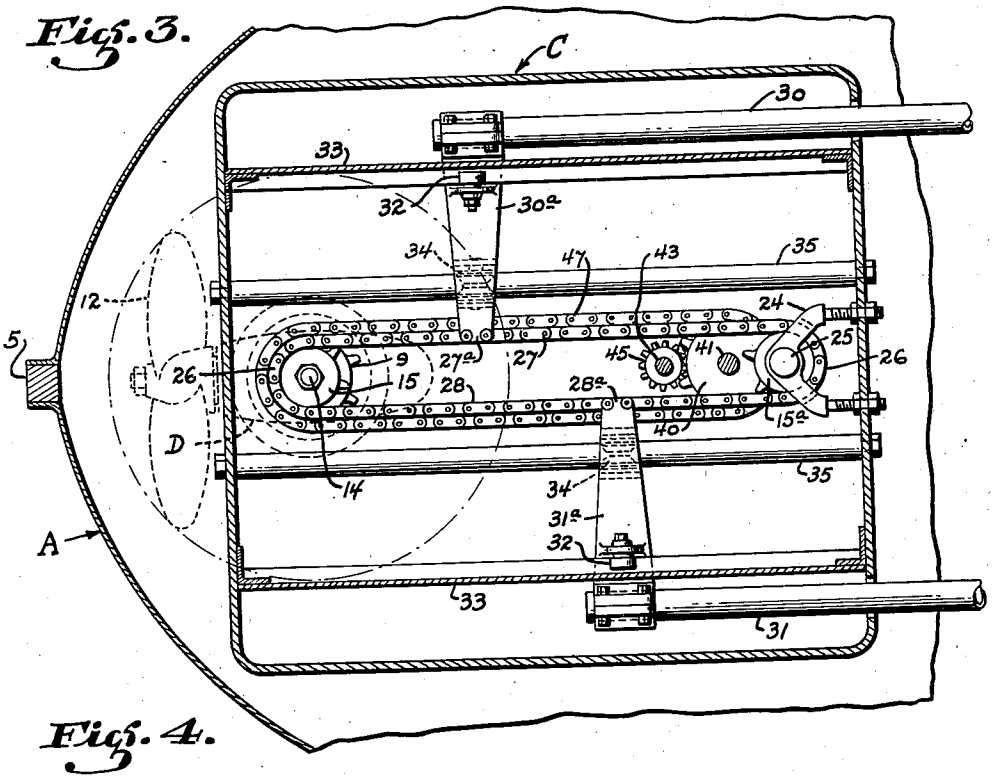


Fig. 4.

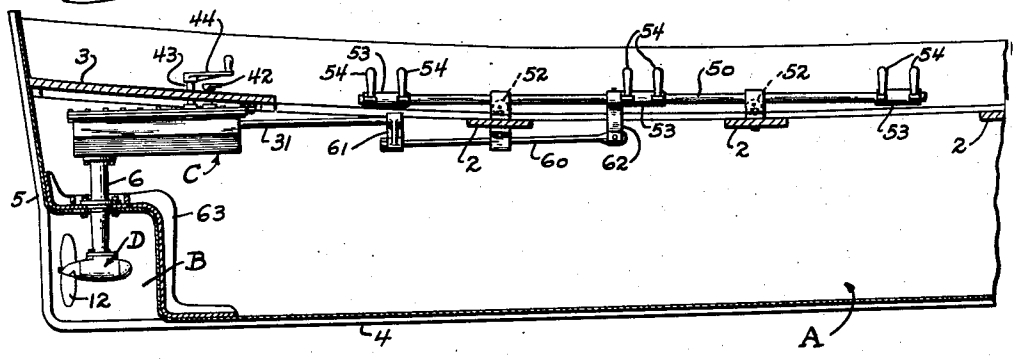


Fig. 5.

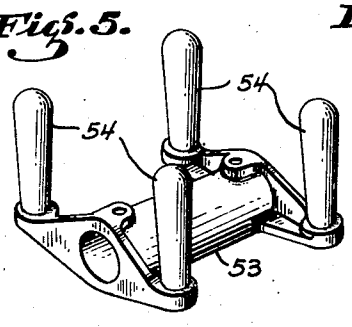
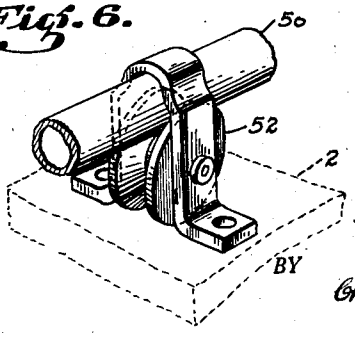


Fig. 6.



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BOAT PROPELLING MECHANISM

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Fig. 9.

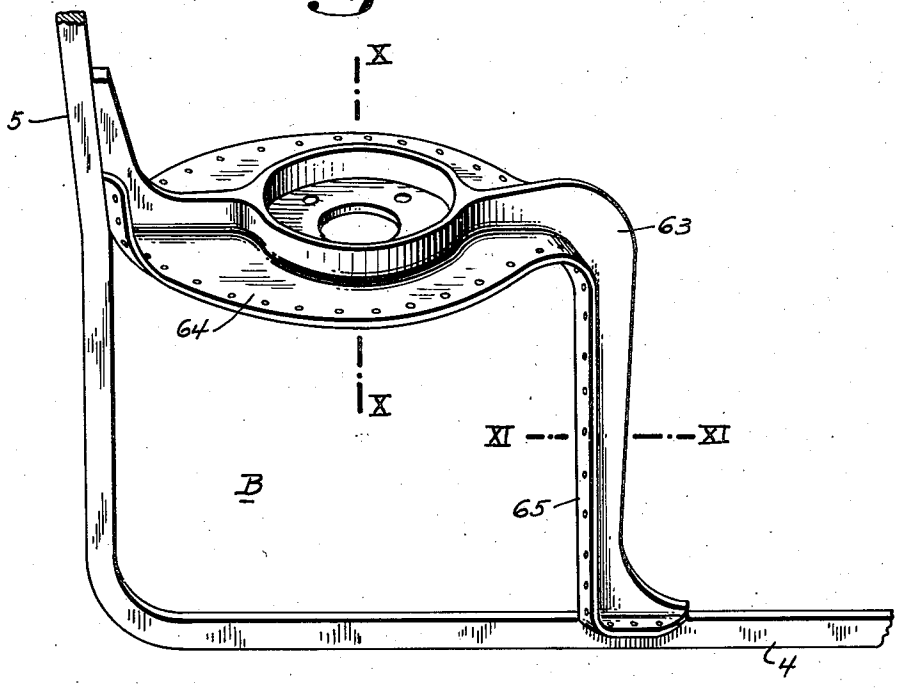


Fig. 10.

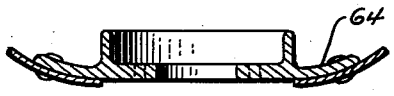
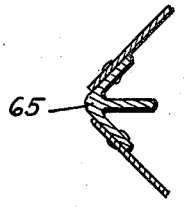


Fig. 11.



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UNITED STATES PATENT OFFICE

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BOAT PROPELLING MECHANISM

Clarence W. Allen, San Francisco, Calif.

Application April 11, 1938, Serial No. 201,337

11 Claims. (Cl. 115—24)

This invention relates to a boat propelling mechanism, and particularly to a mechanism of this character which may be employed not only as a propelling mechanism but also to steer and reverse the boat.

The object of the present invention is generally to improve and simplify the construction and operation of boat propelling mechanisms; to provide a propelling mechanism whereby the boat may be propelled, steered and reversed; to provide a propelling mechanism in which the propeller proper is mounted in a recess formed in the stern of the boat and, in combination therewith, steering means whereby the propeller may be swung completely around and in a circle, for steering and reversing purposes; to provide means in combination with the steering mechanism whereby the direction in which the boat is being propelled is visually indicated at all times; and further, to provide a drive for the propeller comprising a pair of manually reciprocated rods, an endless chain, to opposite sides of which the rods are connected, a sprocket gear driven by the chain, a drive shaft alternately driven in opposite directions by the sprocket and chain, and in conjunction therewith, means whereby continuous rotation in one direction is transmitted to the propeller shaft from the drive shaft.

The boat propelling mechanism is shown by way of illustration in the accompanying drawings, in which—

Fig. 1 is an enlarged side elevation in section of the stern end of the boat and the propelling mechanism mounted therein;

Fig. 2 is a cross-section taken on line II—II of Fig. 1;

Fig. 3 is a horizontal section taken on line III—III of Fig. 1;

Fig. 4 is a longitudinal section of a life boat showing the middle and rear portion of the same, said view also showing the propelling mechanism in side elevation;

Fig. 5 is a perspective view of the hand grips whereby the propelling rods are grasped and reciprocated;

Fig. 6 is a perspective view of one of the guide rollers;

Fig. 7 is a cross-section of one of the pawl clutches taken on line VII—VII of Fig. 1;

Fig. 8 is a plan view of the boat;

Fig. 9 is a perspective view showing the reinforcing member interposed between the keel and the sternpost of the boat;

Fig. 10 is a cross-section taken on line X—X of Fig. 9; and

Fig. 11 is a cross-section taken on line XI—XI of Fig. 9.

Referring to the drawings in detail, and particularly to Figs. 1 and 4, A indicates in general a life boat, 2 the seats or thwarts extending crosswise thereof, and 3 the stern seat or deck. The boat may be planked or built from metal, but in either instance is shaped to form a propeller recess B, which is guarded by extending the keel 4 rearwardly under the recess and then upwardly to form the sternpost 5 of the boat or to reinforce the same. Disposed under the stern seat or deck 3 is a housing C, and forming a support for one end thereof is a bearing sleeve 6. The opposite end of the housing may be secured in any suitable manner, but is here shown as secured or supported by bolts 7.

Extended through the bearing sleeve 6 is a steering column 8 in the upper end of which is secured a sprocket gear 9. The outer end of the steering column is flanged to receive and secure a torpedo-shaped housing D in which are formed bearings 10—10 to receive and support a propeller shaft 11 which is extended at one end to receive a propeller 12.

Extending through the steering column is a drive shaft 14. Secured on the upper end thereof is a sprocket gear 15, and secured on the lower end of the shaft is a bevel gear 16 which intermeshes with a pair of bevel gears 17 and 18 which are loosely mounted on the propeller shaft. Each of the gears 17 and 18 is provided with hubs, and mounted on each hub are a plurality of pawls 19 (see Fig. 7) which engage teeth 20 formed on the inner face of a flange 21, said flange being secured to a hub which in turn is secured to the propeller shaft 11. The pawls on one gear hub ride free while the pawls on the other gear hub engage. This is due to the fact that when the propelling mechanism is in operation, shaft 14 is rotated alternately in one direction and then in the other. The gears 17 and 18 will thus be alternately rotated and reversed, but as they merely form drivers, and as the pawls alternately engage, continuous motion in one direction will be transmitted to the propeller shaft 11.

Adjustably secured to the forward end of the housing is a clevis member 24; extending therethrough is a bearing pin 25, and journaled thereon is a sprocket gear 15a which cooperates with the sprocket gear 15. That is, an endless chain 26 is carried by the sprockets 15 and 15a, and is

divided by said sprockets into two reach portions 27 and 28.

Extending into the housing are a pair of rods 30 and 31. These are disposed one on each side of the sprocket chain 26 and adjacent the reaches 27 and 28 thereof. On the inner end of each rod is secured a drive arm, one being indicated at 30*a* and the other at 31*a*. These arms each carry a roller 32 which engages the other side of the angle iron track 33. Also, each arm carries a guide roller 34 which rides on and is guided by a rod 35. That is, there is one rod and roller 34 for each of the arms 30*a* and 31*a*, and there is a roller 32 and guide track 33 for each of the arms. It may furthermore be stated that the inner end of the arm 31*a* is secured as at 28*a* to the reach 28 of the chain, while the opposite arm 30*a* is secured as at 27*a* to the reach 27 of the chain.

Reciprocal movement is transmitted to the rods 30 and 31 as will hereinafter be described, when the propelling mechanism is in operation. This reciprocal movement is transmitted to the chain to alternately pull it back and forth, and thus movement is in turn transmitted to alternately rotate the drive shaft 14 first in one direction and then in another, said motion, however, being converted into continuous rotation in one direction at the propeller shaft, through the pawl clutches, as previously described. The rods 30 and 31, together with the chain 26, the sprocket gear 15, the drive shaft 14, gears 16, 17 and 18, together with the pawl clutches, form the driving mechanism whereby the propeller is driven.

Means are also provided for swinging the torpedo-shaped housing D, together with the propeller shaft and propeller, about the vertical axis of the drive shaft 14, so that the propelling mechanism may be employed not only for propelling purposes but also for steering and reversal of the boat. To permit steering and reversing, a sprocket gear 40 is secured on a shaft 41 which will hereinafter be referred to as the indicator shaft, as an indicating finger or pointer 42 is secured on the upper end thereof. Shaft 41 is journaled in the housing as shown. A similar shaft is also journaled in the housing as shown at 43. This shaft is provided with a steering crank 44 at its upper end, the lower end carrying a gear pinion 45, and this meshes with a gear 46 which is secured on shaft 41. By rotating shaft 43 through means of the steering crank 44, rotary motion will be transmitted to the shaft 41 through means of the gears 45 and 46, and as the sprockets 40 and 9 are also secured thereon, motion will be transmitted to rotate the steering column, as the sprockets 40 and 9 are connected by an endless chain 47. When motion is transmitted to the steering column, housing D which carries the propeller will swing with it, and the propeller may thus be pointed in any direction from full ahead to full reverse, and as shaft 41 rotates when shaft 43 is rotated, an indicator 42 may be employed, which indicates the direction in which the boat is being propelled. That is, its pointer end always assumes a position opposite to that assumed by the propeller. If the propeller is driving the boat ahead, it will point rearwardly, as shown in Fig. 1, while the pointer 42 will point ahead. If the propeller is swung 90° towards the left side of the boat, the pointer will point directly in the opposite direction, as that is the direction in which the steering end of the boat will be propelled or pushed by the propeller. Again, if the propeller is swung to reverse position, or that indicated by dotted lines at 12*a* in Fig. 1, the pointer would point directly astern, showing that the boat is being reversed. Hence the pointer always points in a direction in which the boat is being propelled.

While different types of manually controlled mechanisms may be employed for the purpose of imparting a reciprocal movement to the rods 30 and 31, a type of mechanism such as shown in Figs. 4 and 8 is preferable, as it permits the maximum number of men or individuals in the boat to operate the same. Two rods such as indicated at 50 and 51 are employed. These are disposed above the seats or thwarts of the boat, and are supported by guide rollers 52, so as to reduce friction to a minimum. Sleeves 53 having a pair of handles 54 affixed thereto at each end are applied to the rods 50 and 51, and secured thereto. With three sets of hand grips secured to each rod, it becomes possible to employ eighteen men, six in the middle between the rods, and six on the exterior side of each rod. Thus considerable man-power may be used if required, the men standing between the rods using both hands to push and pull on the rods, while the men standing on the outer sides of the rods use only one hand to push and pull. The reciprocal movement thus transmitted to the rods 50 and 51 may be directly transmitted to the rods 30 and 31, if they align properly; on the other hand, if they do not, the movement may be transmitted from one set of rods to another, through link and bracket connections such as shown at 60, 61 and 62. Suffice it to say that the direct push and pull action of the crew or other occupants of the boat which is transmitted to the rods is in turn transmitted to the chain 26 through the arms 30*a* and 31*a*. This in turn transmits motion through the drive shaft 14 to the propeller shaft 11, and transmission lost through friction is reduced to a minimum. The propelling mechanism permits propulsion, steering and reverse, and a rudder and reversing mechanism may thus be entirely eliminated.

The propeller and housing, regardless of its position, is protected by the keel while in shallow water, as it is positioned above the bottom of the boat. This is an important feature when beaching a boat. Also the propeller housing, being substantially under the stern within the recess and above the keel, is protected from impact with other objects such as boats or wharves, etc.

There is also a special casting 63 (see Figs. 1 and 9) to provide a reinforcement for the recess formed in the stern of the boat. This casting is secured to the keel and sternpost to insure a rigid foundation for the mounting of the bearing sleeve or tube 6, said sleeve or tube in turn supplying support for one end of the housing C. The reinforcing casting is provided with a flange 64 on each side to which the planking of the boat is riveted or otherwise secured. The casting conforms in shape to the contour of the recess formed in the stern of the boat, and a portion of the casting shown at 65 is substantially V-shaped in cross-section, as shown in Fig. 11, to permit the stern portion of the boat adjacent the recess to be tapered off so that there will not be any appreciable drag. It should be clearly understood that the recess is built

within the lines of the boat and is not formed by an extension of the keel and the sternpost.

While these and other features of the present invention have been more or less specifically described and illustrated, I wish it understood that various changes may be resorted to within the scope of the appended claims, and that the materials and finish of the several parts employed may be such as the judgment and experience of the manufacturer may dictate or other conditions may demand.

Having thus described and illustrated my invention, what I claim and desire to secure by Letters Patent is—

1. A boat propelling mechanism comprising a support, a vertically disposed drive shaft, a sprocket gear journaled in the support at one end thereof, a sprocket gear secured to the drive shaft and disposed adjacent the opposite end of the support, an endless chain carried by said sprocket gears, said chain presenting two reach portions, a pair of reciprocal members in the support, one adjacent each reach of the chain, and a connection between each reciprocal member and the adjacent reach of the chain, whereby the chain may be pulled back and forth, and rotary movement is transmitted to the sprocket and the drive shaft to alternately rotate the shaft in opposite directions.

2. A boat propelling mechanism comprising a support, a vertically disposed drive shaft, a sprocket gear journaled in the support at one end thereof, a sprocket gear secured to the drive shaft and disposed adjacent the opposite end of the support, an endless chain carried by said sprocket gears, said chain presenting two reach portions, a pair of reciprocal members in the support, one adjacent each reach of the chain, a connection between each reciprocal member and the adjacent reach of the chain, whereby the chain may be pulled back and forth, and rotary movement is transmitted to the sprocket and the drive shaft to alternately rotate the shaft in opposite directions, a steering column adapted to be journaled in the boat, through which the drive shaft extends, a housing secured on the lower end of said column, a propeller shaft journaled in the housing and projecting through the same to support a propeller, a driving connection between the drive and propeller shafts, and means for transmitting the alternate rotations of the drive shaft to rotate the propeller shaft in one direction.

3. A boat propelling mechanism comprising a support, a vertically disposed drive shaft, a sprocket gear journaled in the support at one end thereof, a sprocket gear secured to the drive shaft and disposed adjacent the opposite end of the support, an endless chain carried by said sprocket gears, said chain presenting two reach portions, a pair of reciprocal members in the support, one adjacent each reach of the chain, a connection between each reciprocal member and the adjacent reach of the chain, whereby the chain may be pulled back and forth, and rotary movement is transmitted to the sprocket and the drive shaft to alternately rotate the shaft in opposite directions, a steering column adapted to be journaled in the boat, through which the drive shaft extends, a propeller shaft journaled at the lower end of the steeling column and driven by the drive shaft, a propeller on the propeller shaft, and means for rotating the steering column and the propeller shaft about the drive shaft to point the propeller shaft and propeller in any direction from ahead to reverse to steer and to reverse the boat.

4. A boat propelling mechanism comprising a support, a sprocket gear journaled at each end of the support, an endless sprocket chain carried by the sprocket gears, said gears separating the chain into two reach portions, a pair of reciprocal rods mounted in the support, one adjacent each reach of the chain, a drive shaft driven by one of the sprockets, and a connection between each rod and the adjacent reach of the chain whereby reciprocal movement of the rods is transmitted to impart a back and forth movement of the chain and alternate rotation of the drive shaft in opposite directions.

5. A boat propelling mechanism comprising a support, a sprocket gear journaled at each end of the support, an endless sprocket chain carried by the sprocket gears, said gears separating the chain into two reach portions, a pair of reciprocal rods mounted in the support, one adjacent each reach of the chain, an arm on each rod, a connection between each arm and the adjacent reach of the chain whereby reciprocal movement of the rods is transmitted to impart a back and forth movement of the chain and alternate rotation of the sprocket gears in opposite directions, a drive shaft driven by one of the sprockets, and means for guiding the reciprocal rods and the arms secured thereto.

6. A boat propelling mechanism comprising a support, a sprocket gear journaled at each end of the support, an endless sprocket chain carried by the sprocket gears, said gears separating the chain into two reach portions, a pair of reciprocal rods mounted in the support, one adjacent each reach of the chain, an arm on each rod, a connection between each arm and the adjacent reach of the chain whereby reciprocal movement of the rods is transmitted to impart a back and forth movement of the chain and alternate rotation of the sprocket gears in opposite directions, a drive shaft driven by one of the sprockets, guide tracks disposed adjacent each reciprocal rod, and rollers carried by the rods and arms and engaging the guide tracks.

7. A boat propelling mechanism comprising a support, a sprocket gear journaled at each end of the support, an endless sprocket chain carried by the sprocket gears, said gears separating the chain into two reach portions, a pair of reciprocal rods mounted in the support, one adjacent each reach of the chain, a drive shaft driven by one of the sprockets, a connection between each rod and the adjacent reach of the chain whereby reciprocal movement of the rods may be transmitted to impart a back and forth movement of the chain and alternate rotation of the drive shaft in opposite directions, a steering column through which the drive shaft extends, a housing on the lower end of the steering column, a propeller journaled in the housing and driven by the drive shaft, a sprocket gear secured to the steering column, a cooperative sprocket gear in the housing, a chain connecting the two sprocket gears to rotate them in unison, and a reduction gear drive for rotating the cooperating sprocket gear and, through the chain, the sprocket on the steering column and the housing secured at the lower end thereof so as to swing the propeller in different directions.

8. A boat propelling mechanism comprising a support, a sprocket gear journaled at each end of the support, an endless sprocket chain carried by the sprocket gears, said gears separating the

chain into two reach portions, a pair of reciprocal rods mounted in the support, one adjacent each reach of the chain, a drive shaft driven by one of the sprockets, a connection between each rod and the adjacent reach of the chain whereby reciprocal movement of the rods is transmitted to impart a back-and-forth movement to the chain and alternate rotation of the drive shaft in opposite directions, a second pair of reciprocal rods mounted in the boat and slidably mounted with relation to the thwarts in the boat, a plurality of spaced sleeve-like members on each rod, a plurality of vertically disposed hand grips on each sleeve whereby reciprocal movement is transmitted to the rods, and means whereby reciprocal movement of said rods is transmitted to the first named reciprocal rods.

9. In a boat propelling mechanism of the character described a rod adapted to extend longitudinally of a boat, means for slidably supporting the rod with relation to thwarts on the boat, a plurality of spaced sleeve-like members secured to the rod, four spaced vertically extending hand grips formed on each sleeve whereby reciprocal movement is transmitted to the rod, and means whereby reciprocal movement of the rod is transmitted to drive the propelling mechanism.

10. A boat propelling mechanism comprising a support, a sprocket gear journaled at each end of the support, an endless sprocket chain carried by the sprocket gears, said gears separating the chain into two reach portions, a pair of reciprocal members disposed in the support one adjacent each reach of the chain, a driving connection between each reciprocal member and the adjacent reach of the chain, whereby reciprocal movement of the reciprocal members is transmitted to impart a back-and-forth movement to the chain, and whereby the chain alternately rotates the sprocket gears first in one direction and then in an opposite direction, a propeller shaft, and a driving connection between one of the sprocket gears and the propeller shaft whereby the alternate rotation of the sprocket gears in opposite directions is transmitted to rotate the propeller shaft in one direction.

11. A boat propelling mechanism comprising a support, a vertically disposed drive shaft mounted therein, a sprocket gear secured on said shaft, an idler, a single chain surrounding the sprocket and the idler, said sprocket and idler dividing the chain into two reach portions, means for exerting a pull first on one reach portion and then on the other to transmit a back-and-forth movement to the chain, said back-and-forth movement of the chain alternately rotating the sprocket gear first in one direction and then in an opposite direction, a propeller shaft, and a driving connection between the drive and the propeller shaft whereby the alternate rotation of the sprocket gear and drive shaft in opposite directions is transmitted to rotate the propeller shaft in one direction.

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