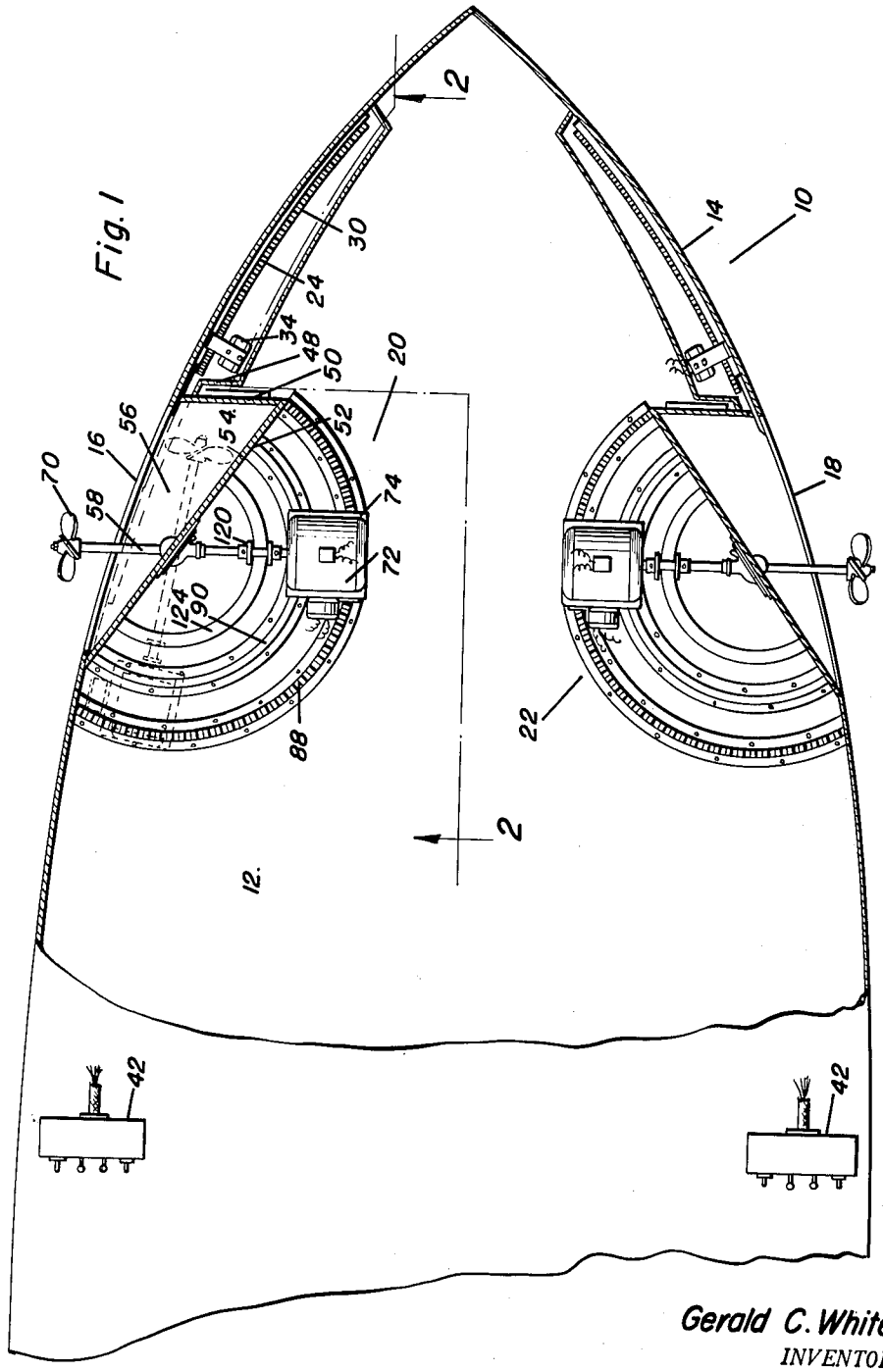
Feb. 21, 1956 G. C. WHITE 2,735,393

SHIP PROPULSION AND STEERING ARRANGEMENT

Filed Oct. 29, 1953

4 Sheets-Sheet 1

Fig. 1



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SHIP PROPULSION AND STEERING ARRANGEMENT

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Fig. 2

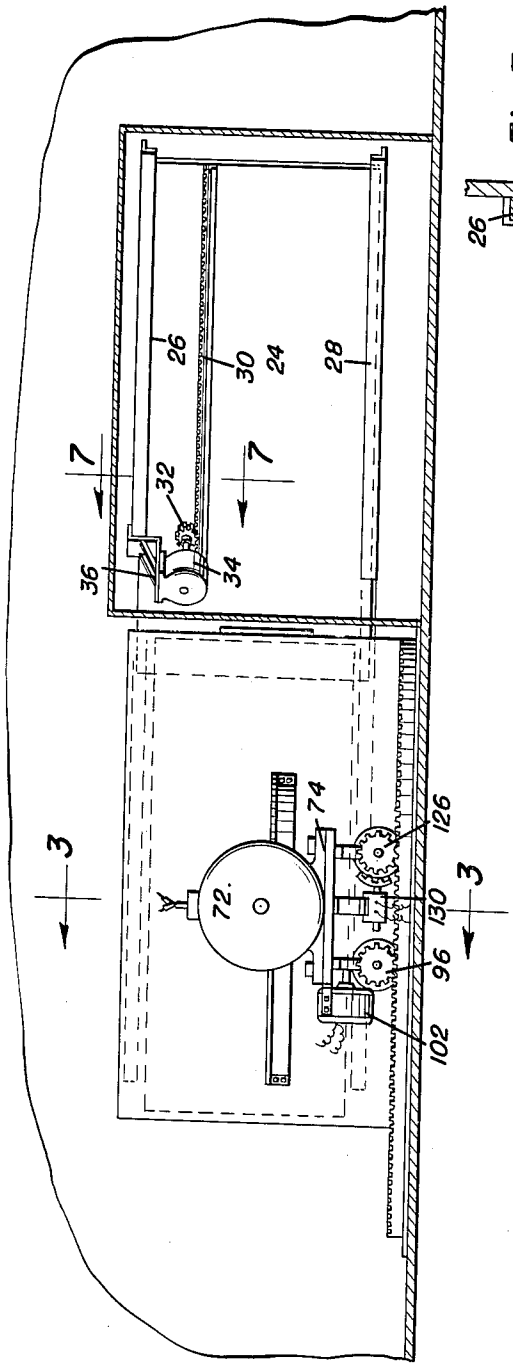


Fig. 7

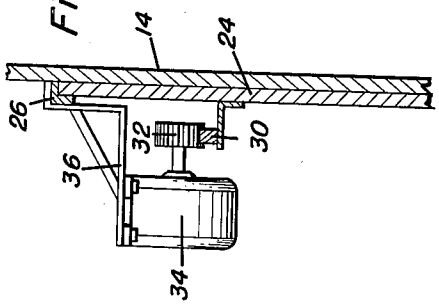
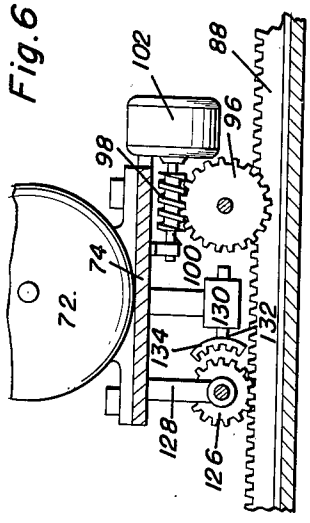


Fig. 6



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SHIP PROPULSION AND STEERING ARRANGEMENT

Filed Oct. 29, 1953 4 Sheets-Sheet 3

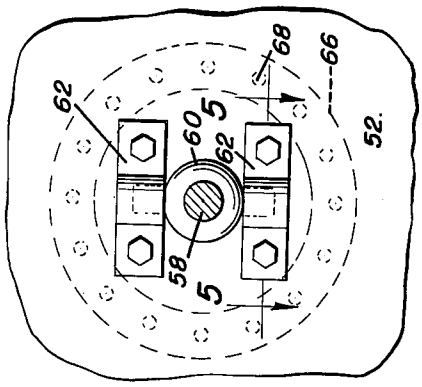


Fig. 4

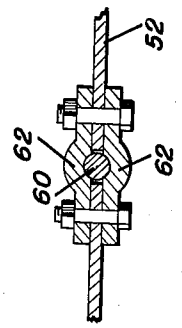


Fig. 5

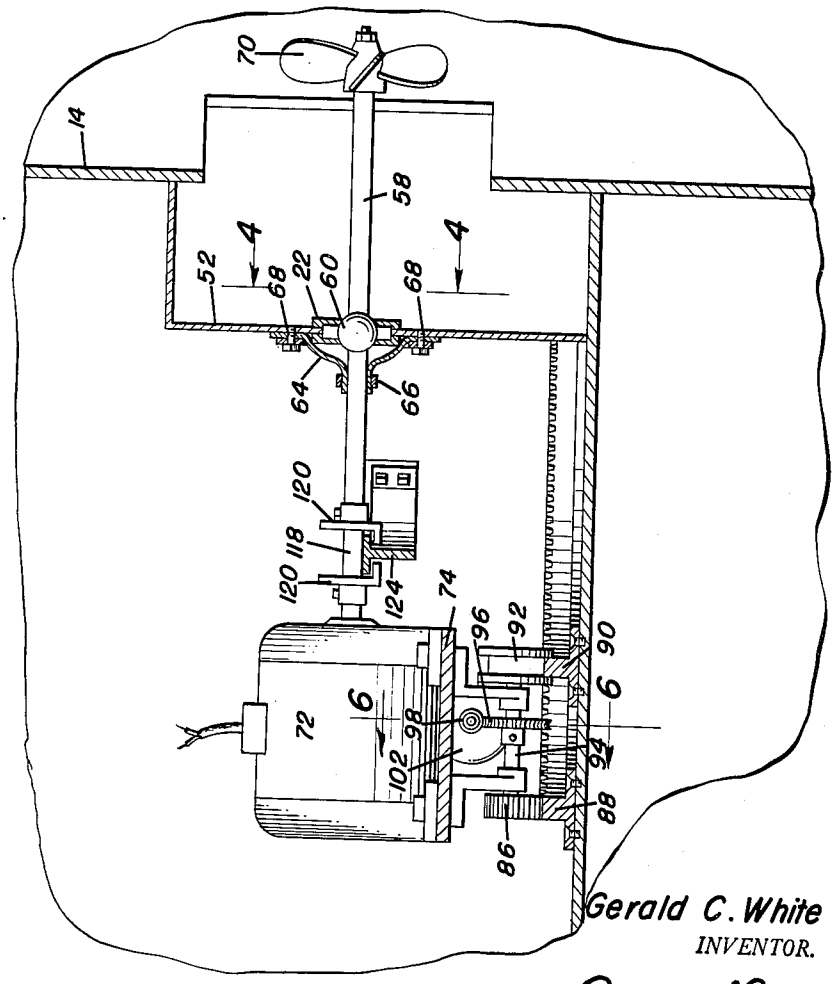


Fig. 3

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SHIP PROPULSION AND STEERING ARRANGEMENT

Filed Oct. 29, 1953 4 Sheets-Sheet 4

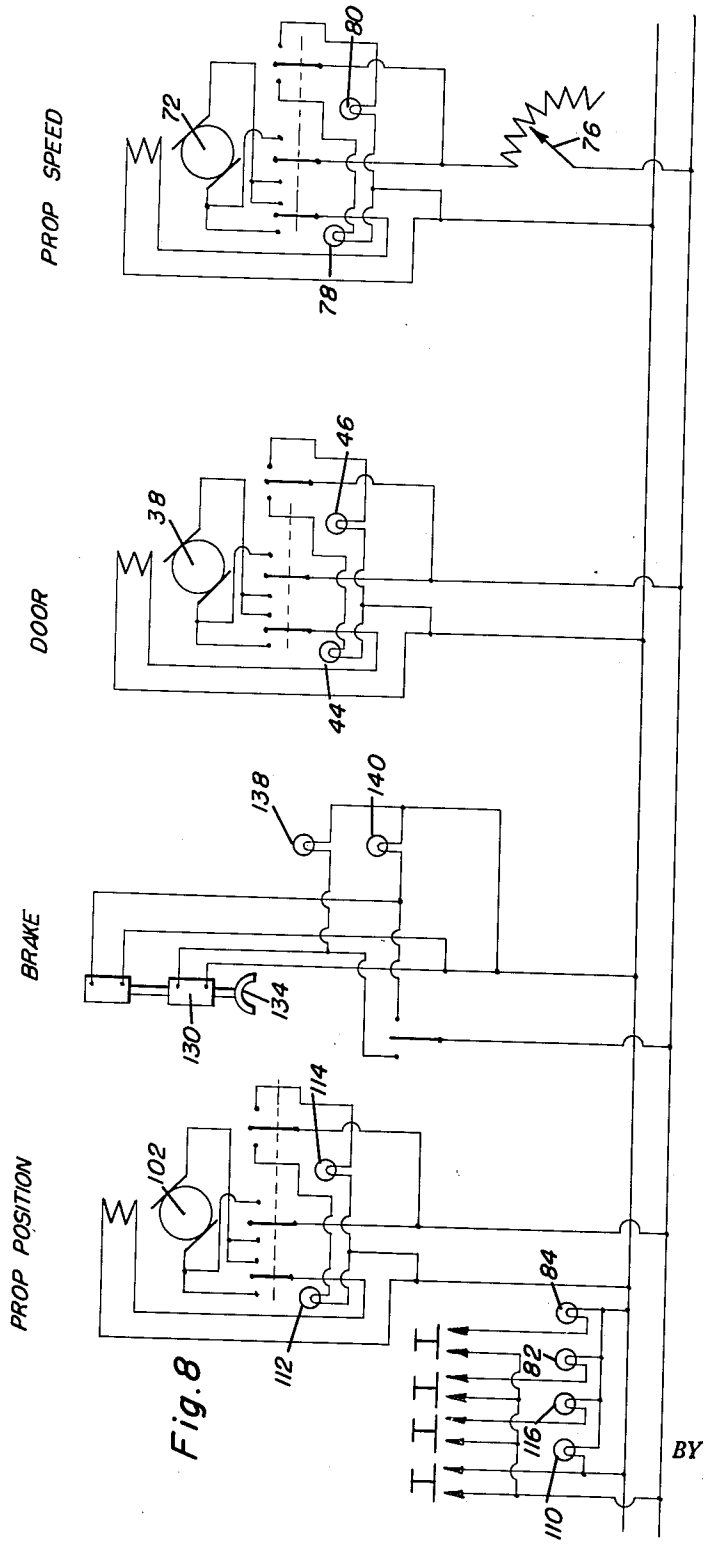


Fig. 8

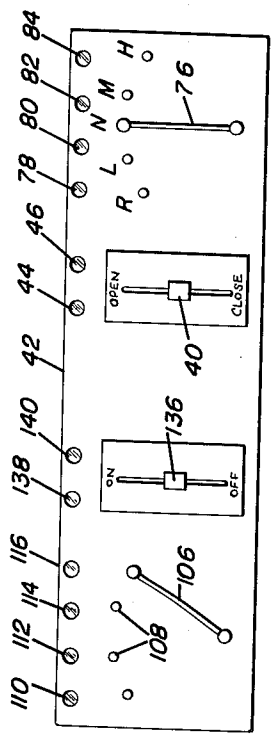


Fig. 9

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United States Patent Office 2,735,393 Patented Feb. 21, 1956

2,735,393

SHIP PROPULSION AND STEERING ARRANGEMENT

Gerald C. White, Macon, Ill.

Application October 29, 1953, Serial No. 389,001

6 Claims. (Cl. 114—147)

This invention relates to a novel ship propulsion arrangement and more particularly to apparatus for simplifying the maneuvering of vessels.

As is well known, it is often difficult, if not impossible, to maneuver a vessel when berthing or docking against the effects of current, tide and wind, due to the limited effect of the conventional main propulsion screws and rudder on the vessel when maneuvering at slow speed as is necessary in confined waters. Further, it is often necessary to radically shift the bow of the vessel when maneuvering in confined channels. Therefore, the primary object of this invention resides in the provision of means for assisting the maneuvering of a vessel while being able to be retracted when not in use so as to provide no appreciable detrimental effect upon the streamlines of the hull of the vessel.

The construction of this invention features novel bulkheads which extend convergingly inwardly and forwardly. These bulkheads have shafts with propellers mounted thereon pivotally mounted therein. The bulkheads together with other structural members form chambers into which the shafts which extend outwardly when in use can be pivoted. Incorporated in the invention are sliding doors for closing the openings in the hull through which the shafts are adapted to extend.

Still further objects and features of this invention reside in the provision of a novel ship propulsion arrangement that is simple to install on various existing types of vessels, which is capable of being remotely controlled, which may utilize electric motors, diesel engines, or other types of internal combustion engines, steam, or other means of propulsion for providing the motor force for actuating the respective elements of the invention, and which propulsion arrangement will increase the ease of maneuvering a vessel to a great extent.

These, together with the various ancillary objects and features of the invention which will become apparent as the following description proceeds, are attained by this ship propulsion arrangement, a preferred embodiment of which has been illustrated in the accompanying drawings, by way of example only, wherein:

Figure 1 is a plan view illustrating the ship propulsion arrangement as operatively associated with the hull of a vessel;

Figure 2 is a vertical sectional view as taken along the plane of line 2—2 in Figure 1 illustrating one of the composite units comprising the ship propulsion arrangement in elevation;

Figure 3 is a vertical sectional view as taken along the plane of line 3—3 in Figure 2;

Figure 4 is a sectional detail view as taken along the plane of line 4—4 in Figure 3 illustrating the manner in which the drive shafts are pivotally mounted in the converging bulkheads;

Figure 5 is a sectional detail view as taken along the plane of line 5—5 in Figure 4 further illustrating the manner in which the drive shafts are arranged relative to the bulkheads;

Figure 6 is a sectional detail view as taken along the plane of line 6—6 in Figure 3 and illustrating the braking means for the carriages carrying the means for rotating the drive shafts;

Figure 7 is a sectional detail view as taken along the plane of line 7—7 in Figure 2 illustrating the structure utilized for opening and closing the doors;

Figure 8 is a wiring diagram of the control circuits for actuating the various driving elements of the invention; and

Figure 9 is an elevational view of a remote control switchboard which may be utilized in conjunction with this invention.

With continuing reference to the accompanying drawings wherein like reference numerals designate similar parts throughout the various views, reference numeral 10 generally designates a ship or vessel having a hull 12 provided with an outer skin 14, as is conventional. Openings 16 and 18 are formed in the outer skin 14 so that the ship propulsion units, as generally indicated at 20 and 22, can be operatively installed. The propulsion units 20 and 22 are substantially identical, being mirror images of each other, and are arranged on opposite sides of the forward portion of the vessel 10. Therefore, the structure as recited in the propulsion unit 20 will be incorporated in the propulsion unit 22.

Each of the propulsion units 20 and 22 consists of a variety of separately powered devices which include a door 24 slidably mounted between upper and lower angle-shaped guides 26 and 28. The door 24 has a rack 30 thereon adapted to be engaged by a gear 32 driven by a suitable drive member 34 which may be an electric motor, as illustrated in the drawings, or may be readily any other suitable prime mover. The motor 34 is secured on a bracket 36 which is shown attached to the upper guide 26, but, as can be readily understood, the motor 34 may be otherwise installed in the hull 12. The motor 34 is controlled by a switch 40 mounted on an instrument panel 42 positioned in the pilot house of the vessel or in another remote position of the vessel especially adapted for ship control. The switch 40 is provided with suitable contacts for exciting indicator lamps as at 44 and 46 for indicating the direction of operation of the motor 34, as to whether it is opening or closing the door.

The door 24 is adapted to slide through a vertical opening 48 in a partial transverse bulkhead 50 which together with an inwardly converging bulkhead 52 and upper and lower deck structures 54 form a chamber 56 open to the sea except when the door 24 is closed.

Mounted in the bulkhead 52 is a drive shaft 58 which extends through a spherical bearing 60 which pivotally mounts the shaft 58 in bearing holders 62 attached to the bulkhead 52. A suitable gasket 64 is attached to the shaft, as at 66, and to the bulkhead, as at 68, for sealing the bulkhead 52 where pierced by the shaft 58. A propeller 70 is mounted on the free end of the shaft 58 which is driven by a motor 72 mounted on a carriage 74. The motor 72 may be an electrical motor as is shown or may obviously be any other suitable type of prime mover and is controlled by a switch 76 mounted on the instrument panel 42. There are provided indicator lamps as 78, 80, 82 and 84 for indicating the speed and direction of the motor 72 and hence of the propeller 70, the motor 72 being readily reversible and the switch 76 may have positions, such as reverse and forward speeds of low, medium and high speed, as well as a neutral position.

Supporting the carriage 74 is a toothed wheel 86 adapted to engage a toothed track 88 of arcuate configuration and mounted within the hull 12 adjacent the bulkhead 52. Further, an arcuate guide 90 is provided for engagement by a roller 92 mounted on the shaft 94 on which the toothed wheel 86 is secured. The shaft 94

is driven by means of a gear **96** actuated by a worm **98** mounted on a shaft **100** driven by a motor **102** secured to the carriage **74**. Since the motor **102** controls the position of the carriage **74** and hence of the propeller **70**, it is controlled by a suitable lever **106** mounted on the control panel **42** and adapted to engage one of a series of contacts, as at **108**, for controlling the direction of rotation of the motor **102** and the speed thereof. Lamps as **110**, **112**, **114** and **116** are provided for indicating the position of the lever **106** and are actuated by closing suitable contacts.

It is noted that the shaft **58** has a bearing sleeve **118** journaled thereon which carries a pair of guides **120** and **122** for engaging an arcuate guide **124** positioned above but concentric with the track **88**, thus forming a support for the shaft **58** for rigidifying the shaft **58**.

Means for stopping the carriage **74** on which the motor **72** is mounted is provided and includes a gear **126** rotatably mounted on a support member **128** suspended from the carriage **74**. The teeth of the gear **126** engage the track **88** and a solenoid **130** actuating a core **132** having a toothed member **134** mounted thereon and adapted to mesh with the teeth of the gear **126** is likewise suspended from the carriage **74**. When the solenoid **130** is actuated by remote control of the switch **136** as mounted on the instrument panel **42**, the toothed member **134** will be interengaged with the gear **126** or withdrawn therefrom, thereby either locking the carriage **74** instantaneously in a desired position or releasing it for further movement. Further, the brake provides means for lockingly holding the carriage **74** and hence the screw **70** in a selected position. Suitable signal lamps **138** and **140** are provided for indicating the position of the switch **136**. Hence, by merely glancing at the instrument panel **42** and noting which of the lamps mounted thereon are excited, the status of the various elements of the ship propulsion arrangement can be easily ascertained. It is to be realized that the control instruments for the ship propulsion unit **22** can be mounted on the same instrument panel **42** as the control instruments for the ship propulsion unit **20** or may be on a separate control panel.

Since from the foregoing, the construction and advantages of this ship propulsion unit are readily apparent, further description is believed to be unnecessary. However, since numerous modifications will readily occur to those skilled in the art after a consideration of the foregoing specification and accompanying drawings, it is not intended to limit the invention to the precise embodiment shown and described, but all suitable modifications may be readily resorted to.

What is claimed as new is as follows:

1. A ship propulsion arrangement in the forward part of the hull of a vessel and adapted to be used in the maneuvering of a vessel comprising opposed openings in the outer skin of the hull of the vessel, doors slidably mounted in said hull for closing said openings, chambers formed in said hull in communication with said openings sealing the rest of said hull from said openings, said chambers including forwardly converging bulkheads, drive shafts pivotally mounted in said bulkheads and extending therethrough, propellers on the free ends of said shafts, means in said hull for rotating said shafts and hence said propellers, said shafts being capable of being pivoted into said chamber, arcuate toothed tracks in said hull adjacent said bulkheads, carriages carrying said shafts having said means for driving said shafts mounted thereon, motors suspended below said carriages and driving toothed wheels, said toothed wheels engaging said tracks so that upon actuation of said motors, said carriages will be displaced along said tracks thus pivoting said shafts.

2. A ship propulsion arrangement in the forward part of the hull of a vessel and adapted to be used in the maneuvering of a vessel comprising opposed openings in the outer skin of the hull of the vessel, doors slidably mounted in said hull for closing said openings,

chambers formed in said hull in communication with said openings sealing the rest of said hull from said openings, said chambers including forwardly converging bulkheads, drive shafts pivotally mounted in said bulkheads and extending therethrough, propellers on the free ends of said shafts, means in said hull for rotating said shafts and hence said propellers, said shafts being capable of being pivoted into said chamber, arcuate toothed tracks in said hull adjacent said bulkheads, carriages carrying said shafts having said means for driving said shafts mounted thereon, motors suspended below said carriages and driving toothed wheels, said toothed wheels engaging said tracks so that upon actuation of said motors, said carriages will be displaced along said tracks thus pivoting said shafts, arcuate guides spaced from said tracks, supporting sleeves journaled on said shafts, and guide elements carried by said shafts engaging said guides to support said shafts.

3. A ship propulsion arrangement in the forward part of the hull of a vessel and adapted to be used in the maneuvering of a vessel comprising opposed openings in the outer skin of the hull of the vessel, doors slidably mounted in said hull for closing said openings, chambers formed in said hull in communication with said openings sealing the rest of said hull from said openings, said chambers including forwardly converging bulkheads, drive shafts pivotally mounted in said bulkheads and extending therethrough, propellers on the free ends of said shafts, means in said hull for rotating said shafts and hence said propellers, said shafts being capable of being pivoted into said chamber, said chambers being defined by said bulkheads, upper and lower deck structures and partial transverse bulkheads joining the forwardmost portions of said converging bulkheads and said outer skin of said vessel, arcuate toothed tracks in said hull adjacent said bulkheads, carriages carrying said shafts having said means for driving said shafts mounted thereon, motors suspended below said carriages and driving toothed wheels, said toothed wheels engaging said tracks so that upon actuation of said motors, said carriages will be displaced along said tracks thus pivoting said shafts.

4. A ship propulsion arrangement in the forward part of the hull of a vessel and adapted to be used in the maneuvering of a vessel comprising opposed openings in the outer skin of the hull of the vessel, doors slidably mounted in said hull for closing said openings, chambers formed in said hull in communication with said openings sealing the rest of said hull from said openings, said chambers including forwardly converging bulkheads, drive shafts pivotally mounted in said bulkheads and extending therethrough, propellers on the free ends of said shafts, means in said hull for rotating said shafts and hence said propellers, said shafts being capable of being pivoted into said chamber, said chambers being defined by said bulkheads, upper and lower deck structures and partial transverse bulkheads joining the forwardmost portions of said converging bulkheads and said outer skin of said vessel, upper and lower guides secured to the inner surface of said outer skin forward of said openings, said doors being slidably mounted between said upper and lower guides, racks rigidly attached to said doors, drive members attached to said hull for driving gears engaging said racks to slidably move said doors to open and close said openings, arcuate toothed tracks in said hull adjacent said bulkheads, carriages carrying said shafts having said means for driving said shafts mounted thereon, motors suspended below said carriages and driving toothed wheels, said toothed wheels engaging said tracks so that upon actuation of said motors, said carriages will be displaced along said tracks thus pivoting said shafts.

5. A ship propulsion arrangement in the forward part of the hull of a vessel and adapted to be used in the maneuvering of a vessel comprising opposed openings in the outer skin of the hull of the vessel, doors slidably mounted in said hull for closing said openings, chambers

formed in said hull in communication with said openings sealing the rest of said hull from said openings, said chambers including forwardly converging bulkheads, drive shafts pivotally mounted in said bulkheads and extending therethrough, propellers on the free ends of said shafts, means in said hull for rotating said shafts and hence said propellers, said shafts being capable of being pivoted into said chamber, said chambers being defined by said bulkheads, upper and lower deck structures and partial transverse bulkheads joining the forwardmost portions of said converging bulkheads and said outer skin of said vessel, upper and lower guides secured to the inner surface of said outer skin forward of said openings, said doors being slidably mounted between said upper and lower guides, racks rigidly attached to said doors, drive members attached to said hull for driving gears engaging said racks to slidably move said doors to open and close said openings, arcuate toothed tracks in said hull adjacent said bulkheads, carriages carrying said shafts having means for driving said shafts mounted thereon, motors suspended below said carriages and driving toothed wheels, said toothed wheels engaging said tracks so that upon actuation of said motors, said carriages will be displaced along said tracks thus pivoting said shafts, arcuate guides spaced from said tracks, supporting sleeves journaled on said shafts, and guide elements carried by said shafts engaging said guides to support said shafts, and brake means for stopping said carriages secured to said carriages and engaging said toothed wheels.

6. A ship propulsion arrangement in the forward part of the hull of a vessel and adapted to be used in the maneuvering of a vessel comprising opposed openings in the outer skin of the hull of the vessel, doors slidably mounted in said hull for closing said openings, chambers formed in said hull in communication with said openings sealing the rest of said hull from said openings, said chambers including forwardly converging bulkheads, drive shafts pivotally mounted in said bulkheads and extending therethrough, propellers on the free ends of said shafts, means in said hull for rotating said shafts and hence said propellers, said shafts being capable of being pivoted into said chamber, said chambers being defined by said bulkheads, upper and lower deck structures and partial transverse bulkheads joining the forwardmost portions of said converging bulkheads and said outer skin of said vessel, upper and lower guides secured to the inner surface of said outer skin forward of said openings, said doors being slidably mounted between said upper and lower guides, racks rigidly attached to said doors, drive members attached to said hull for driving gears engaging said racks to slidably move said doors to open and close said openings, arcuate toothed tracks in said hull adjacent said bulkheads, carriages carrying said shafts having means for driving said shafts mounted thereon, motors suspended below said carriages and driving toothed wheels, said toothed wheels engaging said tracks so that upon actuation of said motors, said carriages will be displaced along said tracks thus pivoting said shafts, arcuate guides spaced from said tracks, supporting sleeves journaled on said shafts, and guide elements carried by said shafts engaging said guides to support said shafts, and brake means for stopping said carriages secured to said carriages and engaging said toothed wheels, a remote control switchboard having switch means on said switchboard for controlling said means for rotating said shafts, said drive members, said motors, and said brake means operatively electrically connected thereto.

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