

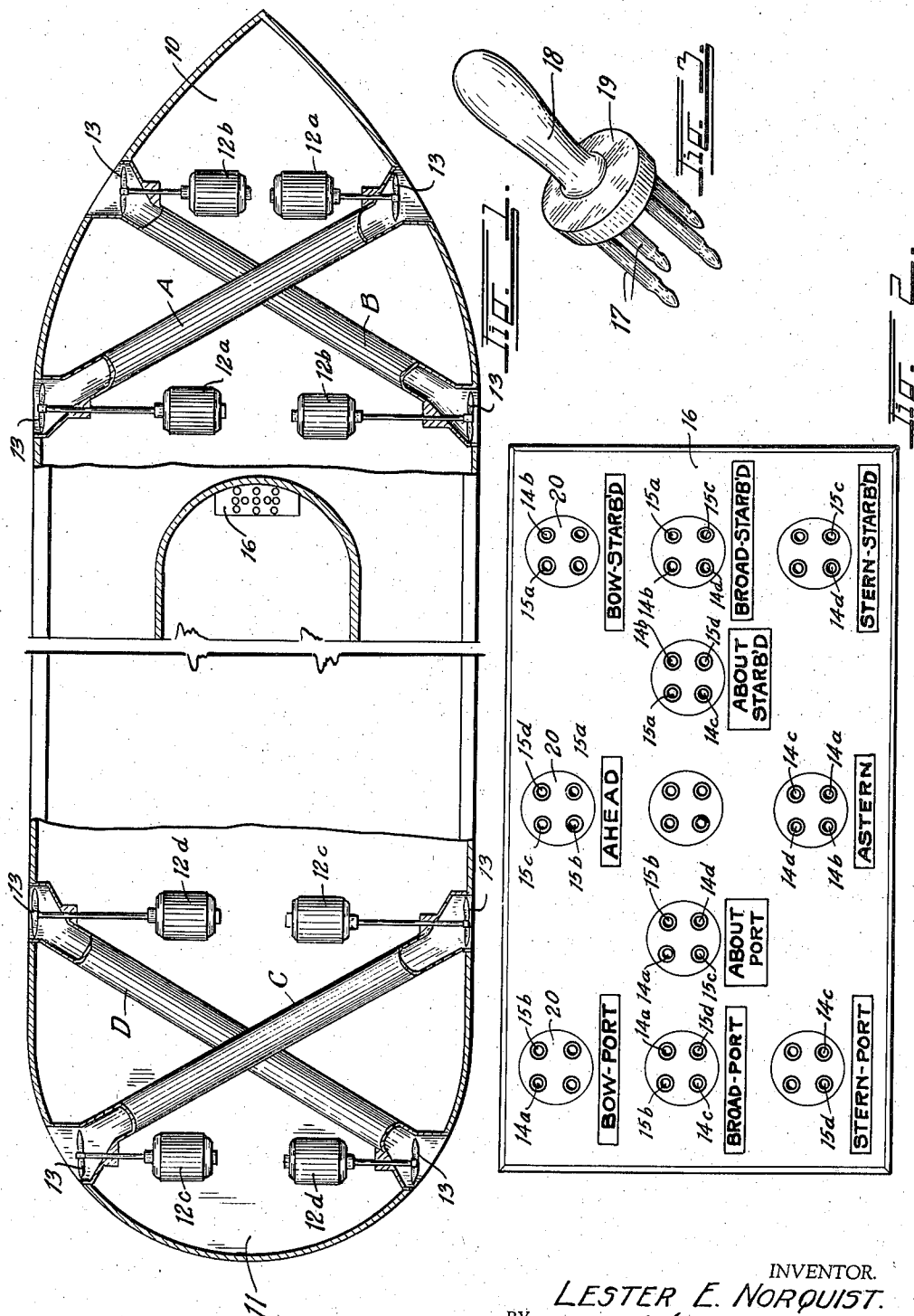
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SHIP CONTROL SYSTEM

2,145,493

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2 Sheets-Sheet 1



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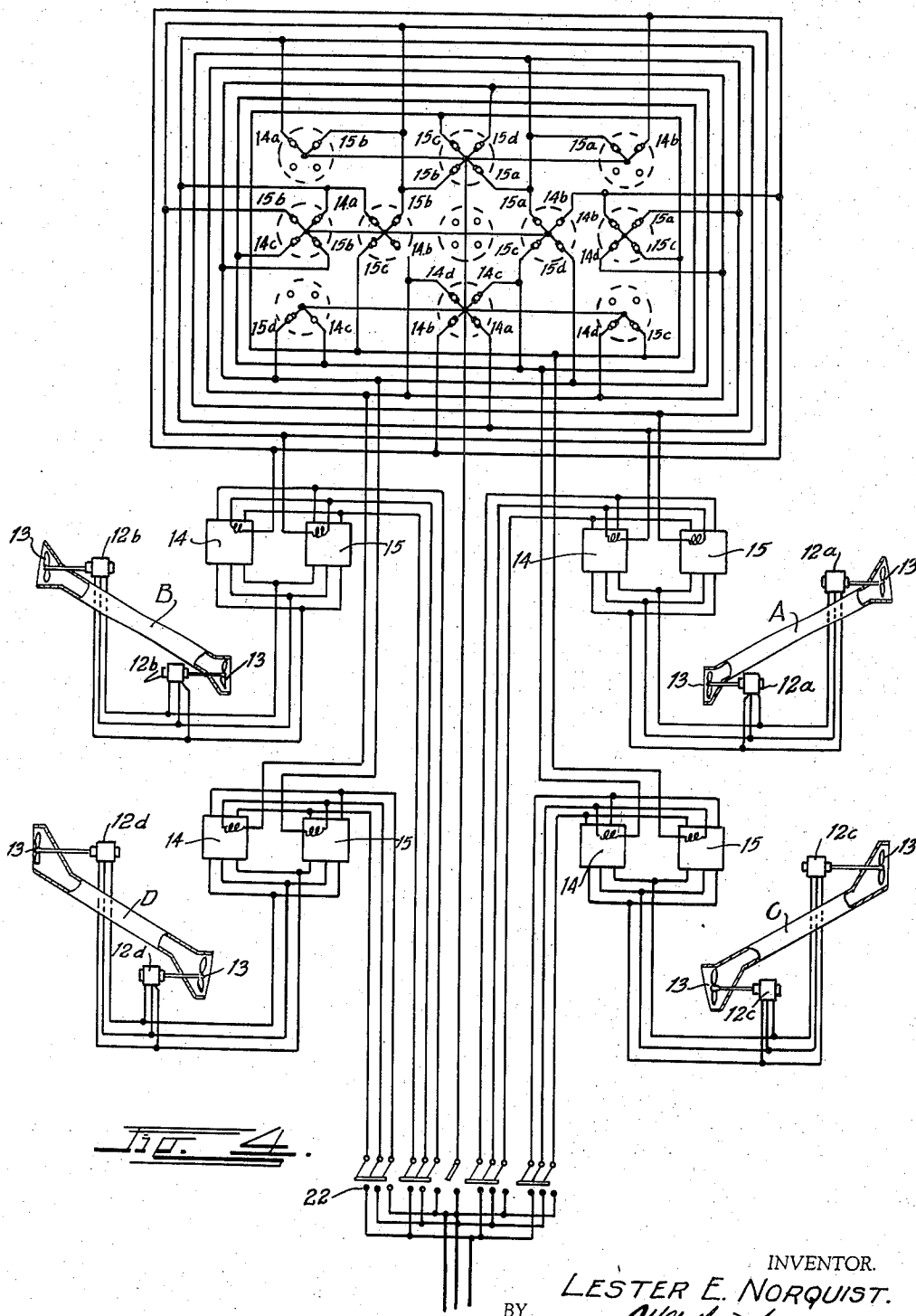
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SHIP CONTROL SYSTEM

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4 Claims. (Cl. 114—151)

This invention relates to a ship control system and has for its principal object the provision of a system of control which will be entirely independent of the speed of the vessel, whereby large ships can be manipulated in restricted waters without the necessity for the use of tug boats and without it being necessary that the vessel have any forward speed whatsoever.

Another object of the invention is to provide a ship control system which will be "fool proof", that is, in which it will be absolutely impossible for the control officer to make errors in the operation of the control devices.

Other objects and advantages reside in the detail construction of the invention, which is designed for simplicity, economy, and efficiency. These will become more apparent from the following description.

In the following detailed description of the invention reference is had to the accompanying drawings which form a part hereof. Like numerals refer to like parts in all views of the drawings and throughout the description.

In the drawings:

Fig. 1 is a fragmentary, diagrammatic, plan view of the vessel illustrating the position of the various elements of the improved control system.

Fig. 2 is a face view of the control panel.

Fig. 3 is a perspective view of the control plug employed with the panel of Fig. 2.

Fig. 4 is a circuit diagram of the complete system.

The invention is more particularly designed as an auxiliary to the regular boat propulsion apparatus and is to be used only for manipulating the ship in restricted waters where sufficient headway or steerageway cannot be obtained for the use of the regulation controls. By the use of this invention, the ship may be rotated about its vertical axis, may be moved broadside in either direction, or directly ahead or astern.

In Fig. 1 of the drawings the hull of a typical vessel is diagrammatically illustrated with the bow portion at 10 and the stern portion at 11. In applying the invention to a ship, a pair of diagonally positioned water tunnel tubes A and B are placed in the bow of the ship and open through the hull thereof at opposite sides. A similar pair of diagonally placed tunnel tubes C and D are placed in the stern portion 11. The tubes A and C incline in the same direction and at a diagonal to the tubes B and D.

At the point where each tube passes through the hull a propeller blade 13 is placed. Each

propeller is driven from an independent reversible, electric motor 12. In the drawing the motors for each tube are indicated by the numeral 12 with the initial of its tube, such as, 12a, 12b, 12c, and 12d for the tubes A, B, C, and D, respectively.

The two motors for each tube are controlled simultaneously by means of a pair of magnetic reversing switches. One switch of each pair, indicated at 14, causes the motors of that tube to rotate the propellers therein so as to pass water through the tube toward the bow of the ship. The other switch of each pair, indicated at 15, causes the motors of that tube to rotate in a direction to pass water toward the stern of the ship. All of these switches are controlled from one or more control panels 16 which are located at convenient points about the ship.

The control panel is provided with a series of receptacles 20, each of which is provided with four switch jacks. A control plug, as illustrated in Fig. 3, having four prongs or jack plugs 17 is provided for insertion in any desired one of the receptacles on the control panel. The plug is provided with a convenient hand grip 18 and insulated base 19.

The control panel preferably contains 11 of the receptacles 20, each having four jacks for the reception of the plugs 17. The switch jacks of the receptacles close circuits to the magnetic switches 14 and 15 and in the drawings the switch jacks are designated by the number of the switch and the initial of the tube in which the flow is controlled by each individual jack switch. For instance, the closing of the jack switch 14a would cause a flow towards the bow in tube A.

One of the receptacles, designated by the word "Ahead" carries jack switches 15a, 15b, 15c, and 15d so that when the plug is placed in this receptacle it causes all of the motors to force water through their respective tubes toward the stern of the vessel to cause it to move directly forward. Another of the receptacles, designated by the word "Astern" closes the jacks 14a, 14b, 14c and 14d, causing all of the motors to rotate so as to force water through their respective tubes toward the bow of the vessel thus causing the boat to move directly rearward.

Another of the receptacles, designated by the words "Broadside-port" closes the switch jacks 14a, 14c, 15b, and 15d. Thus, causing the motors of the tubes A and C to force water toward the bow and starboard side of the boat and the motors of the tubes B and D to force water toward the stern of the boat at the same side, thus caus-

ing a reaction which will force the vessel uniformly sidewise to port. Since the water is being forced simultaneously ahead and astern, there will be no forward or rearward movement.

5 The reverse of this can be accomplished by placing the plug in the receptacle marked "Broadside-starboard" which closes the circuits through the switch jacks 14b, 14d, 15a, and 15c, thus causing the motors of the tubes A and C
10 to force water toward the stern at the port side and the motors of the tubes B and D to force the water toward the bow at the port side. This creates a reaction to force the ship broadside starboard.

15 To move the bow of the ship to port, the plug is inserted in a receptacle marked "Bow-port" which closes circuits through the switch jacks 14a, and 15d causing the motors of the tube B to force water to the stern and starboard and
20 the motors of the tube A to force water toward the bow and starboard so that both tubes act to force the bow of the ship to port. The reverse of this is obtained by inserting the plug in the receptacle carrying the words "Bow-starboard"
25 which closes the circuits through the jacks 14b and 15a to cause the motors of the tubes A and B to simultaneously force water to the port side of the ship thus forcing the bow to starboard. The same control is had over the stern of the vessel
30 by inserting the plug in the receptacle marked "Stern-port" or "Stern-starboard" which causes the motors of the tubes D and C to simultaneously force water either toward port or starboard side of the stern.

35 The ship can be rotated about its vertical axis toward the port side by inserting the plug in the receptacle marked "About-port" which closes the circuits 14a, 15b, 15c and 14d. This causes the motors of the tubes A and B to simultaneously force water toward the starboard side
40 and the motors of the tubes D and C to simultaneously force water to the port side, thus rotating the boat without movement in any direction. The opposite of this can be obtained by inserting the plug in the receptacle marked "About-starboard" which closes the circuits 15a, 14b, 14c
45 and 15d causing the tubes A and B to project water to port while the tubes D and C project water to starboard.

50 The central receptacle of the control panel has no contacts and is simply for supporting the plug when not in use.

55 The current for operating the motors and switches is supplied from the main switchboard of the ship indicated at 22. The circuits are so arranged that any set of switches can be cut off the panel for repairs without disturbing the remainder.

60 It is desired to call attention to the advantages of the particular control panel and plug. By this arrangement it is impossible for an inexperienced person to fail to connect up the proper motors to obtain the desired result. It is also impossible to operate both switches of similar sets of motors simultaneously to cause short-circuiting and
65 damage to the system.

70 While a specific form of the improvement has been described and illustrated herein, it is desired to be understood that the same may be varied, within the scope of the appended claims, without departing from the spirit of the invention.

Having thus described the invention, what is claimed and desired secured by Letters Patent is:—

1. A control system for ships comprising: a pair of diagonally placed tubes extending through the hull of the ship adjacent the bow; a similar pair of diagonally placed tubes extending through
5 said hull adjacent the stern; a propeller in each tube for forcing water therethrough; a reversible motor actuating each propeller; and means for energizing any desired motors to force the water through said tubes in any desired direction to cause turning movements of said ship. 10

2. A control system for ships comprising: a pair of diagonally placed tubes extending through the hull of the ship adjacent the bow; a similar pair of diagonally placed tubes extending through
15 said hull adjacent the stern; a propeller in each tube for forcing water therethrough; a pair of motors for actuating the propellers in each tube, said motors rotating simultaneously to force the water through each tube in a common direction; a forward magnetic switch for controlling the forward
20 motion of each pair of motors; a reverse magnetic switch for controlling the reverse rotation of each pair of motors; a control panel; a series of receptacles in said panel; a series of switch jacks in each receptacle in circuit with
25 certain of said switches; and a control plug for insertion in said receptacles, the jacks of each receptacle being in circuit with the necessary switches to give a preset reaction and a different reaction on said ship for each receptacle. 30

3. In a ship of the type having a pair of diagonal water tubes crossing the hull at the bow and a second pair of diagonal water tubes crossing the hull at the stern, means for controlling the flow of water through said tubes comprising: 35
a propeller positioned in each extremity of each tube; a horizontal shaft extending inwardly toward and at right angles to, the axis of the ship from each propeller; an independent electric motor driving each shaft, the pair of motors driving the two propellers of each tube being electrically connected together to operate in unison; a pair of relays for each pair of motors, one relay controlling the forward motion thereof and the other relay controlling the rearward motion
45 thereof; a central control board; a receptacle in said board corresponding to each complete maneuver desired of said ship; contacts in each receptacle; conductors from the contacts of each receptacle to the relays of the necessary motors
50 for accomplishing the maneuver for which each receptacle is designated; a power line to each of said receptacles; and a single multiple plug for insertion in any desired one of said receptacles for simultaneously closing the circuits from all
55 of the contacts therein to said power line.

4. A control mechanism for controlling a series of independent propeller motors on a ship so that said motors will cooperate in various predetermined ways to cause a series of maneuvers of said ship comprising: a forward control relay for each motor; a rearward control relay for each motor; a central control board; a receptacle in said board corresponding to each complete maneuver desired of said ship; contacts in each
65 receptacle; conductors from the contacts of each receptacle to the relays of the necessary motors for accomplishing the maneuver for which each receptacle is designated; a power line to each of said receptacles; and a single multiple plug for
70 insertion in any desired one of said receptacles for simultaneously closing the circuits from all of the contacts therein to said power line.

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