H. M. GLEASON.

MECHANISM FOR OPERATING WATER TIGHT BULKHEAD DOORS.

APPLICATION FILED MAY 9, 1907.

926,111.

Patented June 29, 1909.

3 SHEETS—SHEET 1.

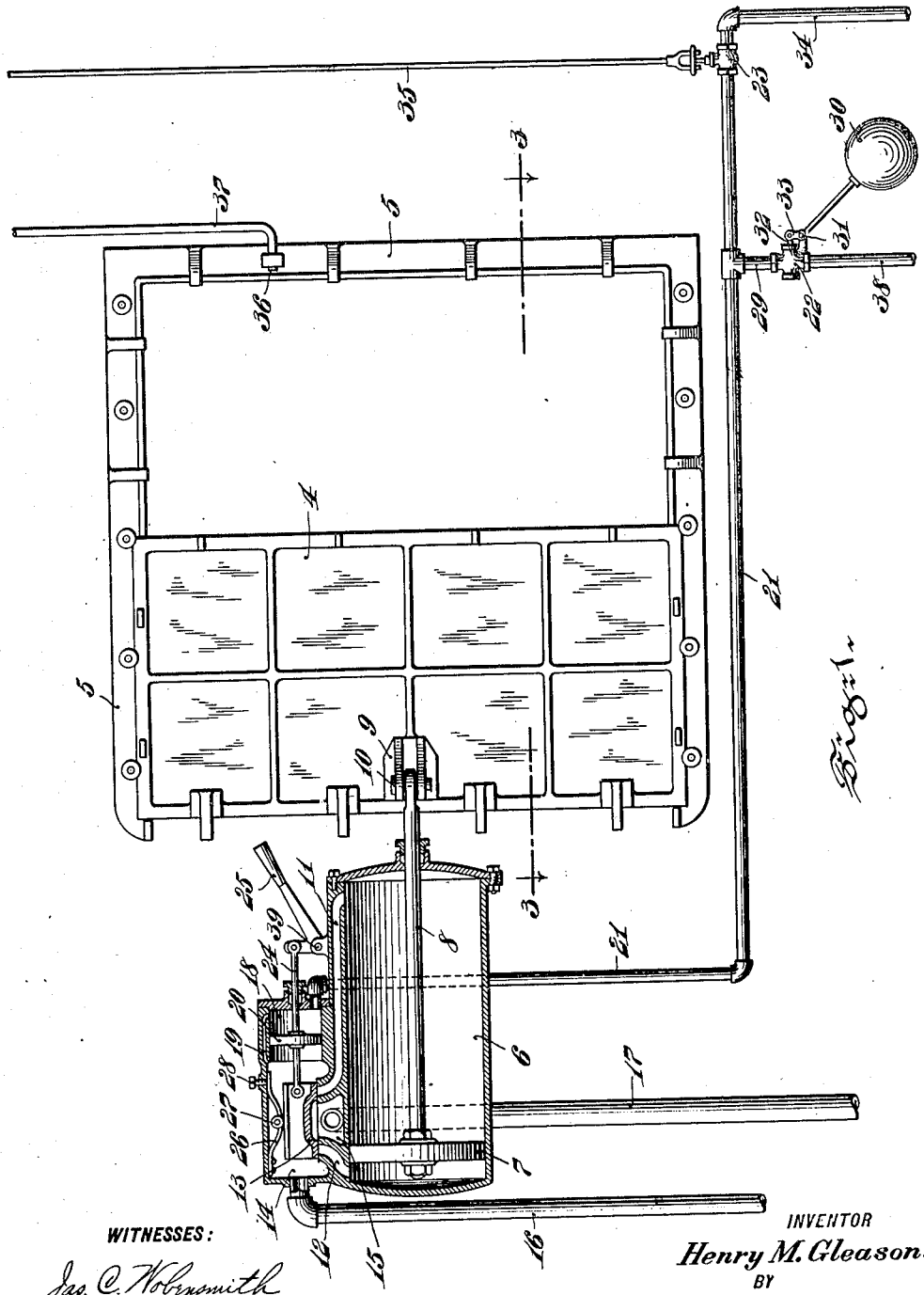

Fig. 1.

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3 SHEETS—SHEET 2.

Fig. 2.

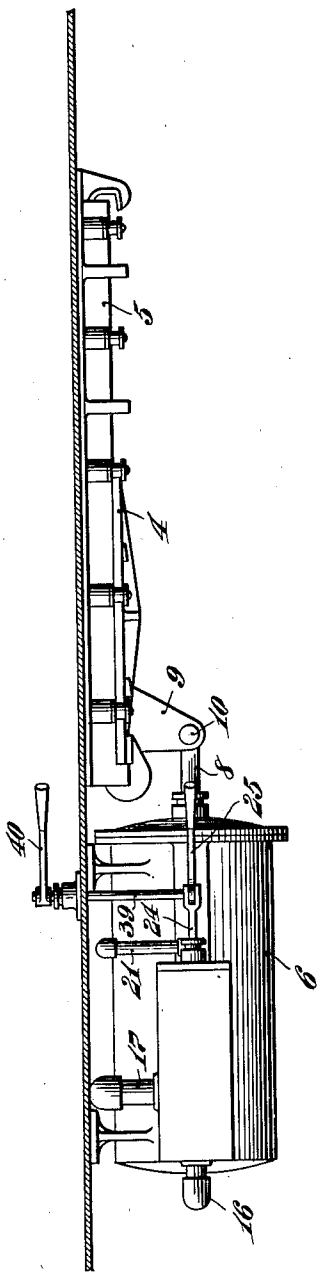
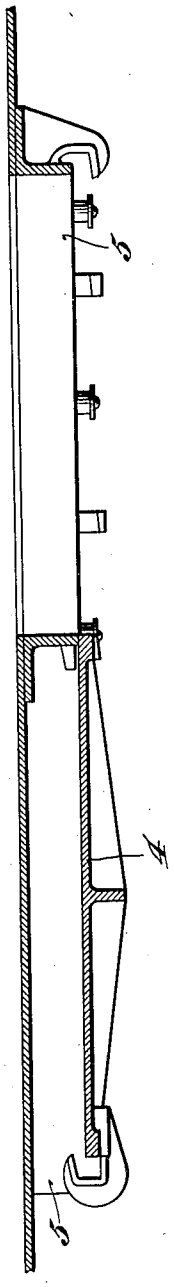


Fig. 3.



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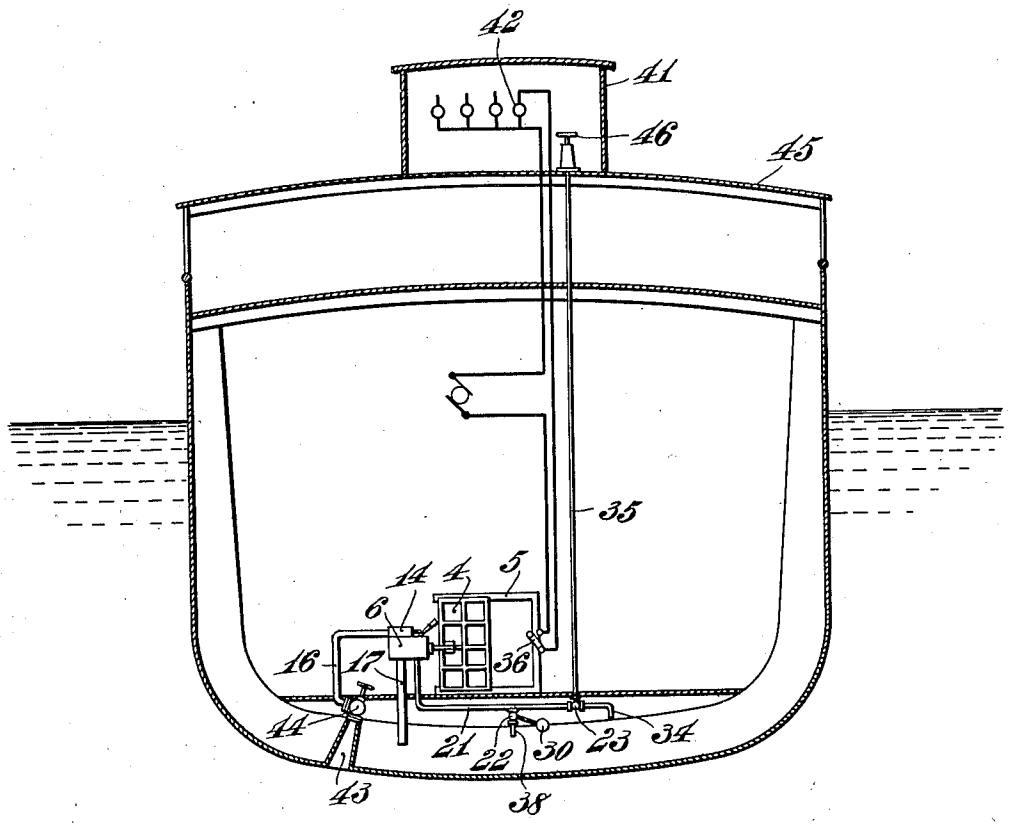
3 SHEETS—SHEET 3.

Fig. 4.



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MECHANISM FOR OPERATING WATER-TIGHT BULKHEAD-DOORS.

No. 926,111. Specification of Letters Patent. Patented June 29, 1909.

Application filed May 9, 1907. Serial No. 372,796.

To all whom it may concern:

Be it known that I, HENRY M. GLEASON, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Mechanism for Operating Water-Tight Bulkhead-Doors, of which the following is a specification.

My invention relates to improvements in mechanism for operating watertight bulkhead doors on ships.

The object of my invention is to provide means for operating watertight bulkhead doors that is entirely independent of power generated by appliances aboard ship, thus obviating complicated and expensive mechanisms with their attendant disadvantages.

I accomplish my object by providing a watertight door, which may be opened or closed through suitable mechanism by the pressure of the head of water in which the ship is floating. The location of watertight doors, which are required to be operated by power, is some distance below the level of the water in which the ship is floating, and the pressure of the head of water at this location is a source of power. This power, I utilize, by suitable means, to operate the watertight door at the door itself, and I also provide means for controlling from a distance, said operating means.

Various systems for operating watertight doors have been employed, using pneumatic, hydraulic, or electric power, but in all these systems the necessary power has been generated by appliances in the ship.

Referring to the drawings:—Figure 1 is a front elevation of the bulkhead door and its operating mechanism; the cylinders being shown in section. Fig. 2 is a top plan view. Fig. 3 is a section on line 3, 3 of Fig. 1. Fig 4 is a cross-sectional view of the ship's hull, with my improved mechanism shown diagrammatically.

Similar numerals refer to similar parts throughout the several views.

The movable member or door 4 is of the horizontal sliding type, and is provided with the frame 5, and the usual wedges, fittings, etc.

The cylinder 6, contains the piston 7, fixed to the piston rod 8, which is secured to the door 4, by the bracket 9, and the pin 10. From the cylinder 6 the passages 11 and 12 are arranged as shown, so that by the movement of the slide valve 13 in one direction the passage 11 will communicate with chamber 14, and the passage 12 with chamber 15, and vice versa when the slide valve is moved in the opposite direction. Chamber 14 is in communication with water from the outside of the ship by means of the pipe 16 which is connected to the sea chest 43 controlled by valve 44 nearest the door. Chamber 15 is in communication with the bilges of the ship by means of the drain pipe 17. The chamber 14 is in communication with the chamber 18 by means of the small passage 19 which serves to equalize the pressure of water on both sides of the small piston 20. From chamber 18 a drain pipe 21 communicates with the bilges when either the automatic valve 22, or the emergency valve 23 is open. The small piston rod 24 on which is secured the piston 20, is attached to the slide valve 13, so that the movement of the slide valve corresponds to that of the small piston. The small piston rod 24 is operated in either direction by the hand lever 25. The slide valve 13 is held in place against the valve seat by the spring 26, the roller 27 being provided to decrease friction. The set screw 28 is provided for adjusting the effort of the spring 26 when necessary.

Communicating with the drain pipe 21 is the pipe 29, in which is fitted the automatic valve 22. The automatic valve is kept closed by the action of the weight of the float 30 about the pivot 31. The valve rod 32 is secured to the lever 33. When water rises in the compartment the float in rising causes the valve to be opened. There is also communicating with drain pipe 21, the emergency valve 23, from which leads the pipe 34 to the bilges. The valve 23 may be operated by the valve rod 35 and hand wheel 46 from the emergency station usually in pilot house 41 on the bridge 45. When the door is entirely closed an electric contact maker 36 of the usual type is operated and the closing of the door indicated at the emergency station by the lighting of an incandescent lamp 42. The wires connecting the contact maker with the lamp are carried in the conduit 37, see Figs. 1 and 4.

The operation of the mechanism is as follows:—With the door open as shown in Fig. 1, and the valves 22 and 23 in their usual condition, that is, closed, the said door may be closed, at the door itself, by operating the hand lever 25 in such a manner that the slide valve 13 is moved to the right. This allows

water from the sea to enter the left end of the cylinder and exhaust from the right end into the drain pipe 17 to the bilges. The pressure of the water moves the piston and closes the door. To open the door the operation is reversed. The off position of the valve is shown in the drawing, Fig. 1.

In Fig. 2 is shown a second hand-lever 40 operatively connected with lever 25 by shaft 39. This lever 40 is on the other side of the bulkhead from lever 25, so that valve 13 may be operated by hand from either side of the bulkhead.

To close the door from the emergency station, the valve 23 is opened by the valve rod 35. This allows water in the chamber 18 to escape and the pressure on that side of the small piston 20 is likewise released. The pressure of water in the chamber 14 acting on the other side of the small piston operates the slide valve in such a manner that the pressure of water in chamber 14 is communicated to the left end of the piston 7 and the door is closed. If while the door is thus closed by the emergency action, it is necessary to open it for any cause at the door itself, this may be done by operating the hand lever 25. In so doing the pressure of water in chamber 14 against the small piston must be overcome. When the hand lever is released the pressure of water against the small piston immediately operates the slide valve to close the door again.

The door is closed automatically, when water gains admittance to the compartment, by the action of the float 30 which rises and actuates the valve rod 32. This opens the valve 22 and allows the water in pipe 21, and consequently chamber 18, to drain into the bilges through the pipe 38. The release of water from chamber 18 causes the pressure of water in chamber 14 to operate the small piston 20, as described above in case of the emergency station.

The system above described for one door may be extended to include any desired number of doors.

The door shown in the drawing is of the horizontal sliding type, but my device is also adapted to be employed for operating watertight doors, differently supported or moving in different directions.

What I claim is:—

1. In combination with a bulkhead door on ships, mechanism for operating said door, said mechanism actuated directly by the force exerted by the head of water of the ship's flotation.

2. In combination with a bulkhead door on ships, mechanism for operating said door, said mechanism actuated directly by the force exerted by the head of water of the ship's flotation, and means for controlling said actuation.

3. In combination with a bulkhead door on ships, mechanism for operating said door, said mechanism actuated directly by the force exerted by the head of water of the ship's flotation, and hand operated means for controlling said actuation.

4. In combination with a bulkhead door on ships, mechanism for operating said door, said mechanism actuated directly by the force exerted by the head of water of the ship's flotation, and hydraulic means for controlling said actuation.

5. In combination with a bulkhead door on ships, mechanism for operating said door, said mechanism actuated directly by the force exerted by the head of water of the ship's flotation, and hand controlled hydraulic means for controlling said actuation.

6. In combination with a bulkhead door on ships, mechanism for operating said door, said mechanism actuated directly by the force exerted by the head of water of the ship's flotation, and hydraulic means adapted to be arbitrarily controlled at a distance from said actuating means for controlling said actuation.

7. In combination with a bulkhead door on ships, mechanism for operating said door, said mechanism actuated directly by the force exerted by the head of water of the ship's flotation, and automatic means adapted to be operated when the water within the ship or a compartment thereof reaches a predetermined height.

8. In combination with a bulkhead door on ships, means for operating the same by the pressure of the head of water in which the ship is partially immersed, and means for indicating at a distance that said door is closed.

9. In combination with a bulkhead door on ships, means for closing the same by the pressure of the head of water in which the ship is partially immersed, means for controlling at a distance said closing means, and means for indicating at a distance that said door is closed.

10. In combination with a bulkhead door on ships, means for operating the same by the pressure of the head of water in which the ship is partially immersed, means for automatically controlling the operating means to close said door when the compartment is flooded, and means for indicating at a distance that said door is closed.

11. In combination with a bulkhead door on ships, mechanism for closing the same, actuated directly by the pressure of the head of water in which the ship is partially immersed, means for controlling said closing mechanism operated by predetermined leakage.

12. In combination with a bulkhead door on ships, a piston for operating said door by the pressure of the head of water in which the ship is partially immersed, a cylinder inclos-

ing said piston, and means for admitting water from the sea to either end of said cylinder and at the same time allowing water to escape from the opposite end.

13. In combination with a bulkhead door on ships, a piston for operating said door, said piston actuated by the pressure of the head of water in which the ship is partially immersed, a cylinder inclosing said piston, and means, operated from a distance, for admitting water from the sea to one end of said cylinder and at the same time allowing water to escape from the opposite end.

14. In combination with a bulkhead door on ships, a piston for operating said door, said piston actuated by the pressure of the head of water in which the ship is partially immersed, a cylinder inclosing said piston, and means, automatically operated when the compartment is flooded, for admitting water from the sea to one end of said cylinder and at the same time allowing water to escape from the opposite end.

15. In combination with a bulkhead door on ships, a piston for operating said door, said piston actuated by the pressure of the head of water in which the ship is partially immersed, a cylinder inclosing said piston, means, at the door itself, for admitting water from the sea to either end of said cylinder and at the same time allowing water to escape from the opposite end, means, operated from a distance, for admitting water from the sea to one end of said cylinder and at the same time allowing water to escape from the opposite end, and means, automatically operated when the compartment is flooded, for admitting water from the sea to one end of said cylinder and at the same time allowing water to escape from the opposite end.

16. In combination with a bulkhead door on ships, a piston operating said door by the pressure of water in which the ship is partially immersed, a cylinder inclosing said piston, a chamber communicating by a pipe with sea and with each end of said cylinder by means of a slide valve, a small piston in said chamber attached to said slide valve, means for equalizing the pressure of water on both ends of said small piston, and means, operated at a distance for allowing the escape of water from one end of said small piston in such manner that the pressure of water on the opposite end causes said small piston to operate said slide valve.

17. In combination with a bulkhead door on ships, a piston operating said door by the pressure of water in which the ship is partially immersed, a cylinder inclosing said piston, a chamber communicating by a pipe with sea and with each end of said cylinder by means of a slide valve, a small piston in said chamber attached to said slide valve, means for equalizing the pressure of water on both ends of said small piston, and, means, automatically operated when the compartment is flooded, for allowing the escape of water from one end of said small piston in such manner that the pressure of water on the opposite end causes said small piston to operate said slide valve.

18. In combination with a bulkhead door, mechanism for operating the same, comprising a piston operated by the pressure of the water in which the ship floats, a cylinder for said piston, a chamber communicating with the cylinder and with the water pressure and a valve for controlling the communication between the chamber and either end of the cylinder, a piston operating in the chamber for controlling the valve, a by-pass around said piston for equalizing the pressure on either side thereof, and a hand lever for arbitrarily operating said piston.

19. In combination with a bulkhead door, mechanism for operating the same, comprising a piston operated by the pressure of the water in which the ship floats, a cylinder for said piston, a chamber communicating with the cylinder and with the water pressure, a valve for controlling the communication between the chamber and either end of the cylinder, a piston operating in the chamber for controlling the valve, a by-pass around said piston for equalizing the pressure on either side thereof, a hand lever for arbitrarily operating said piston, and a hand operated valve for relieving the pressure on one side of the piston.

20. In combination with a bulkhead door, mechanism for operating the same, comprising a piston operated by the pressure of the water in which the ship floats, a cylinder for said piston, a chamber communicating with the cylinder and with the water pressure, a valve for controlling the communication between the chamber and either end of the cylinder, a piston operating in the chamber for controlling the valve, a by-pass around said piston for equalizing the pressure on either side thereof, a hand lever for arbitrarily operating said piston, and an automatically operated valve for relieving the pressure on one side of the piston.

HENRY M. GLEASON.

Witnesses:
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