

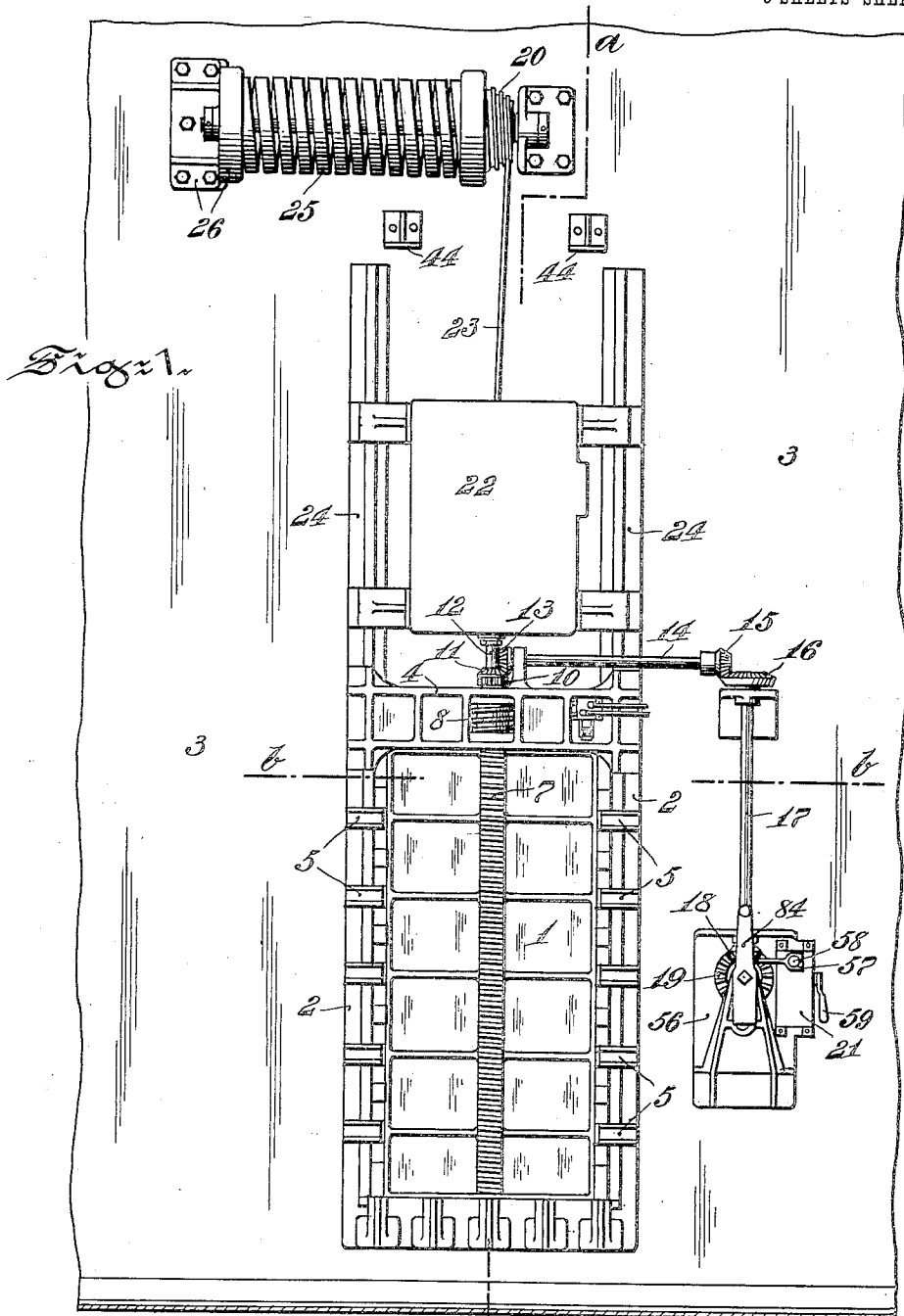
H. M. GLEASON.
 APPARATUS FOR OPERATING BULKHEAD DOORS.

APPLICATION FILED AUG. 21, 1906. RENEWED JULY 21, 1914.

1,131,832.

Patented Mar. 16, 1915.

5 SHEETS—SHEET 1.



WITNESSES:

Mae Hofmann
Jas. C. Wolensmith

INVENTOR

Henry M. Gleason
 BY

McKewin & Co.

ATTORNEY.

H. M. GLEASON.

APPARATUS FOR OPERATING BULKHEAD DOORS.

APPLICATION FILED AUG. 21, 1906. RENEWED JULY 21, 1914.

1,131,832.

Patented Mar. 16, 1915.

5 SHEETS—SHEET 2.

Fig. 3.

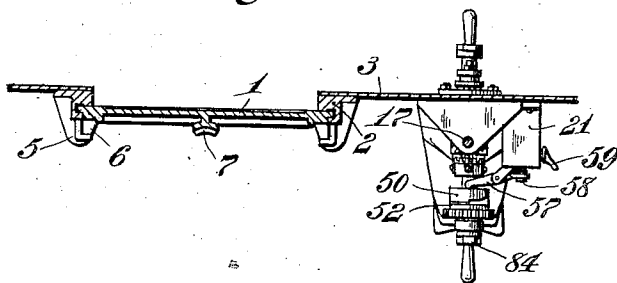


Fig. 2.

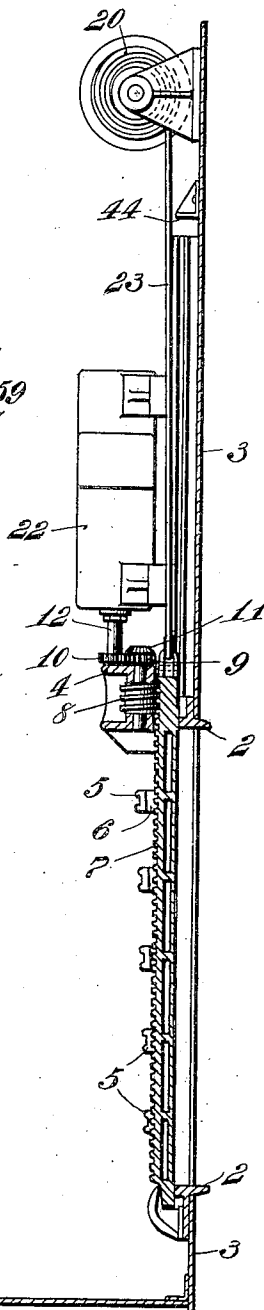
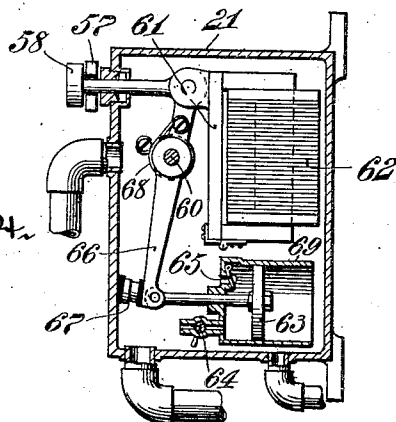


Fig. 4.



WITNESSES:

Mae Hofmann
Jas. C. Hobensmith

INVENTOR

Henry M. Gleason,

BY

Wm. G. Wardale

ATTORNEY.

H. M. GLEASON.

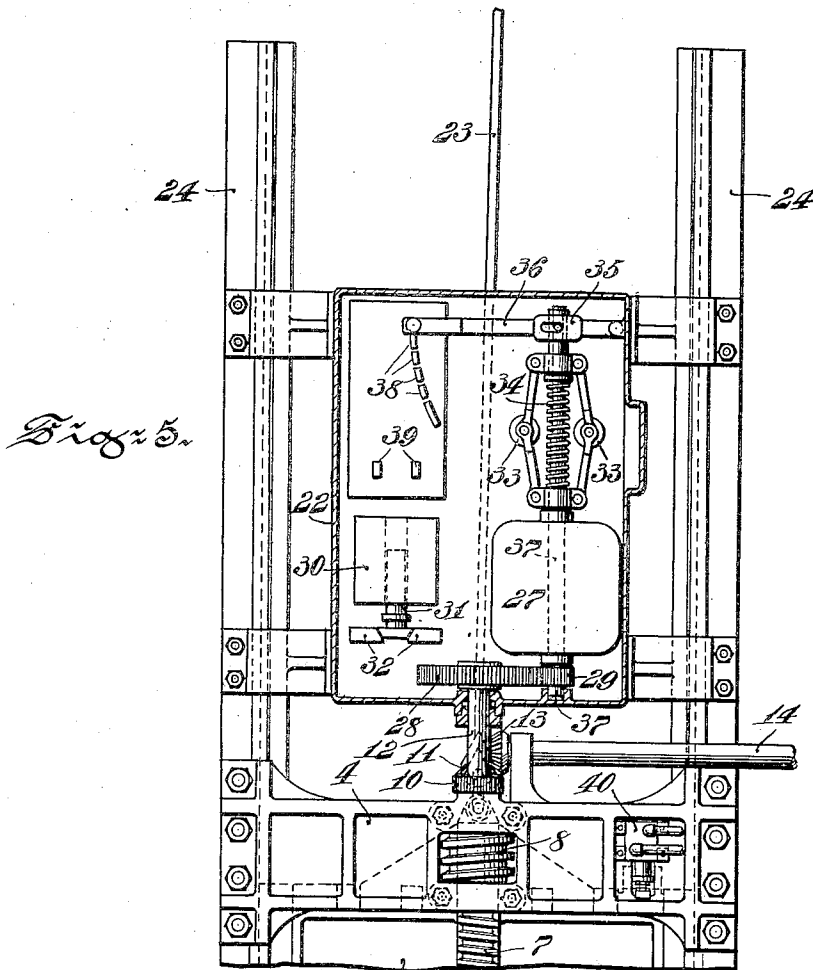
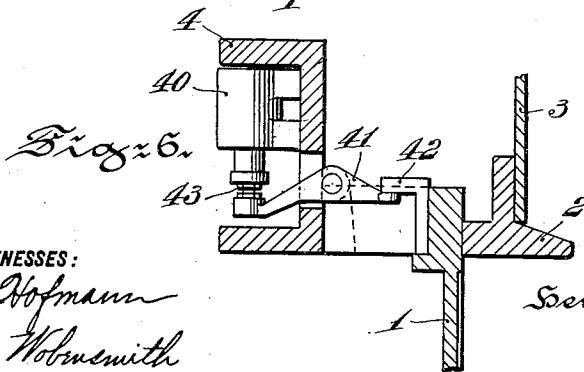
APPARATUS FOR OPERATING BULKHEAD DOORS.

APPLICATION FILED AUG. 21, 1906. RENEWED JULY 21, 1914.

1,131,832.

Patented Mar. 16, 1915.

5 SHEETS—SHEET 3.



WITNESSES:

Mac Hofmann
Geo. C. Wolensmith

INVENTOR

Henry M. Gleason,

BY

John C. Wadsworth

ATTORNEY.

H. M. GLEASON.

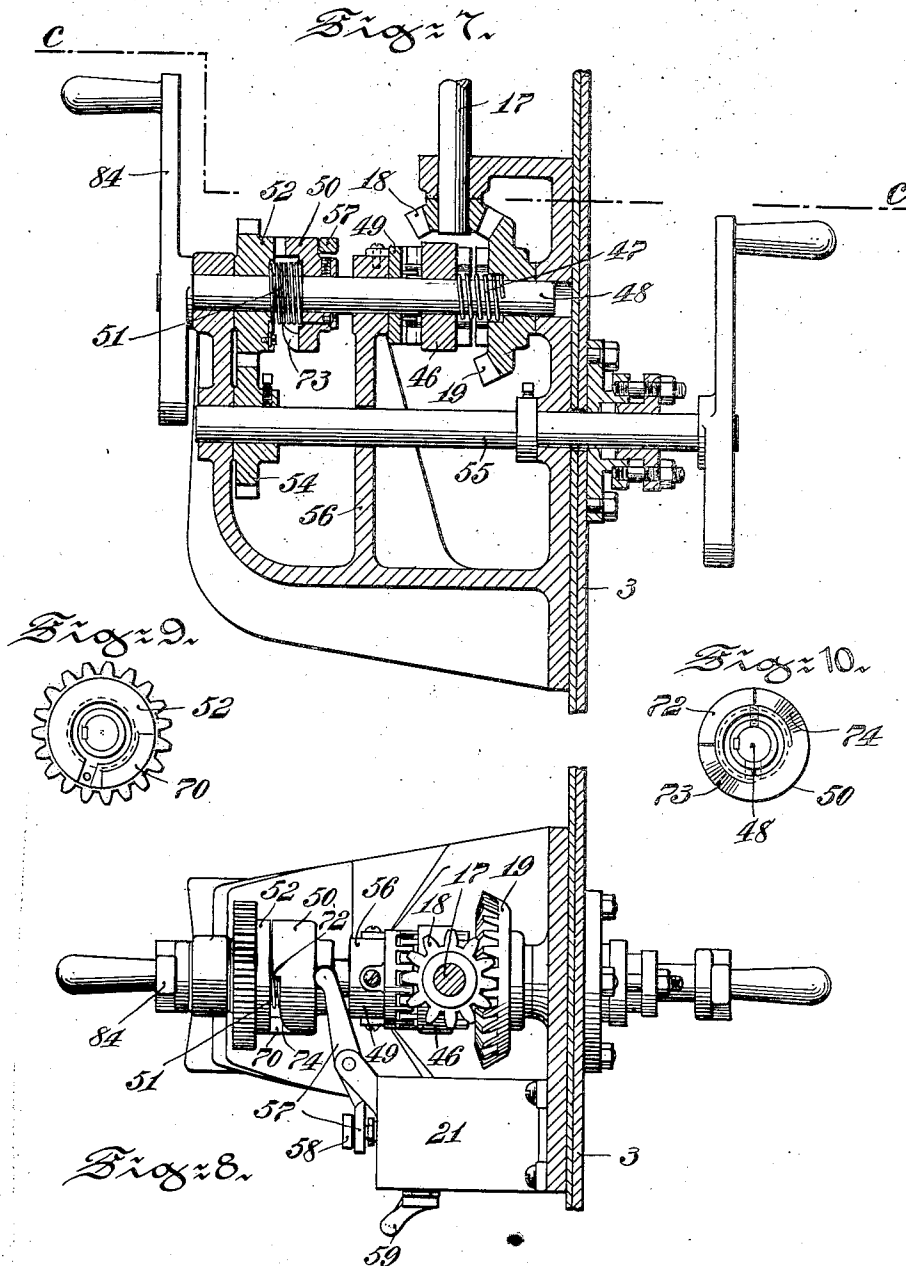
APPARATUS FOR OPERATING BULKHEAD DOORS.

APPLICATION FILED AUG. 21, 1906. RENEWED JULY 21, 1914.

1,131,832.

Patented Mar. 16, 1915.

5 SHEETS—SHEET 4.



WITNESSES:

Mae Hofmann
Jas. C. Wolensmith

INVENTOR

Henry M. Gleason,
BY

Att. Gen. Dale

ATTORNEY.

H. M. GLEASON.

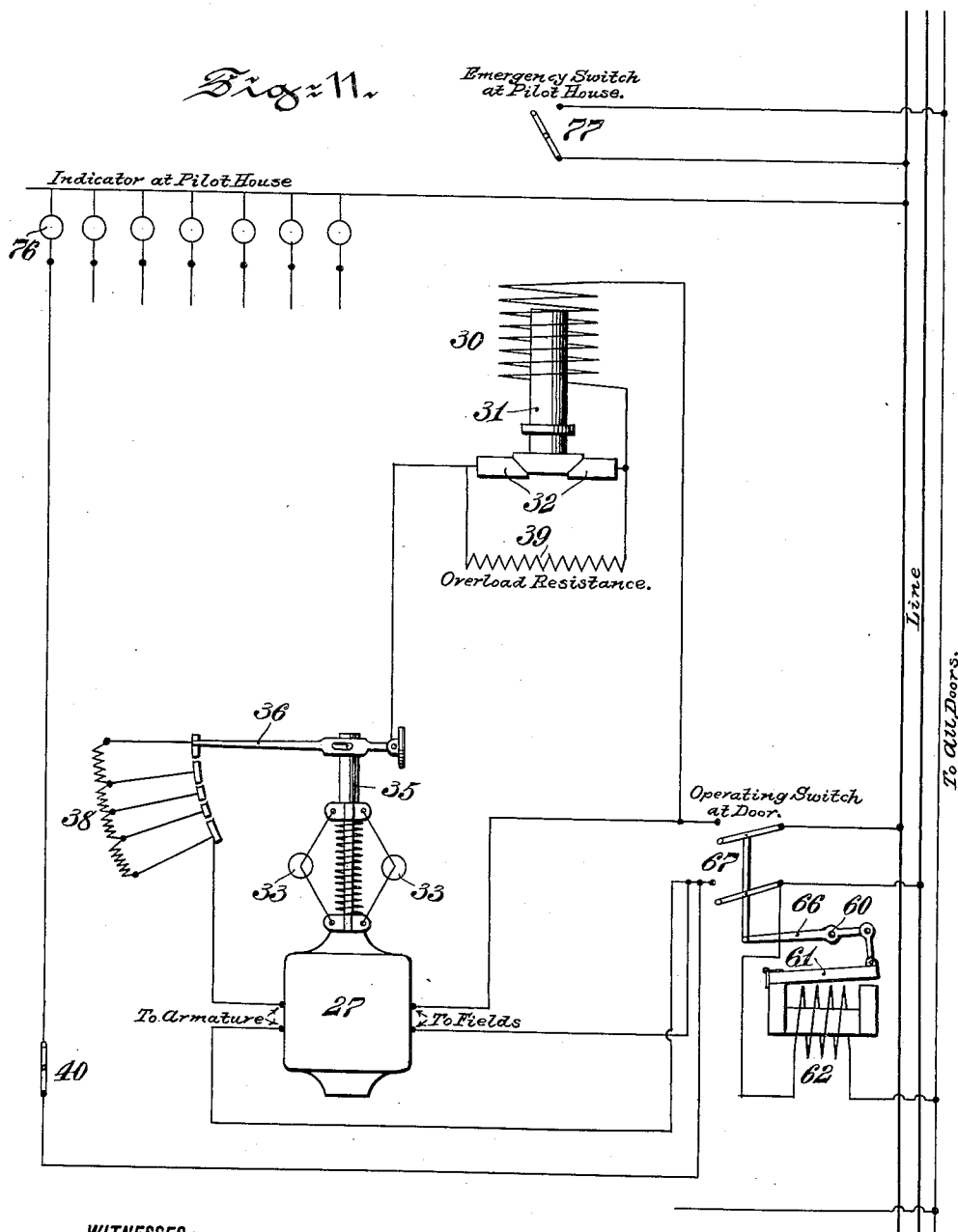
APPARATUS FOR OPERATING BULKHEAD DOORS.

APPLICATION FILED AUG. 21, 1906. RENEWED JULY 21, 1914.

1,131,832.

Patented Mar. 16, 1915.

5 SHEETS—SHEET 5.



WITNESSES:

Mae Hofmann
Jas. C. Holmsmith

INVENTOR

Henry M. Gleason,

BY

W. C. Crossdale

ATTORNEY.

UNITED STATES PATENT OFFICE.

HENRY M. GLEASON, OF PHILADELPHIA, PENNSYLVANIA.

APPARATUS FOR OPERATING BULKHEAD-DOORS.

1,131,832.

Specification of Letters Patent.

Patented Mar. 16, 1915.

Application filed August 21, 1906, Serial No. 331,449. Renewed July 21, 1914. Serial No. 852,312.

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 Apparatus for Operating Bulkhead-Doors, of which the following is a specification.

My invention relates to improvements in apparatus for operating bulkhead doors by electricity, and while being designed especially for use on board ships, it may be used to advantage on bulkheads in buildings, caissons, theaters, etc.

The object of my invention is to provide a watertight door that is capable of quick and easy action by hand, and at the same time capable of being closed by electric power either at the door itself or from some desired station in the ship.

The most common form of watertight bulkhead doors for use in the lower compartments of a ship, is of the vertical sliding type. These doors as at present fitted for electrical operation are very difficult and tedious to operate by hand. The mechanism is also very intricate and troublesome to keep in working condition. To do away with these difficulties, I provide a mechanism simplified as much as possible. The weight of the door is balanced by the action of a spring. This feature eliminates all work in operating the door except friction of the operating parts, and inertia of the door.

My invention comprises improved means whereby the door is always ready for closing or opening easily and quickly by hand power.

My invention also comprises improved means whereby the door is primarily hand operated and also capable of operation by electricity from a chosen station in cases of emergency.

My invention also comprises improved means whereby the motor works at its maximum efficiency by not having a constant resistance in series with it, and at the same time is protected from excessive rise of current at starting or any other time.

My invention also comprises improved means whereby the door is balanced by the action of the spring and requires a very small amount of power to operate it.

My invention also comprises improved

means whereby the hand power apparatus is independent of the motor and vice versa, except when the door is being closed by hand.

Referring to the drawings:—Figure 1 is a front elevation of my device. Fig. 2 is a vertical section on line *a-a* of Fig. 1. Fig. 3 is a horizontal section on line *b-b* of Fig. 1. Fig. 4 is a view in part elevation and part section of the automatically operated switch at the bulkhead door. Fig. 5 is an elevation of the motor and associated mechanism. Fig. 6 is a sectional elevation through the top of door and frame showing the device for making the electrical contact which indicates when the door is closed. Fig. 7 is a vertical section of the hand-crank mechanism. Fig. 8 is a plan view and horizontal section on line *c-c* of Fig. 7 of the hand-crank mechanism. Fig. 9 is a perspective view of member 52. Fig. 10 is a perspective view of member 50. Fig. 11 is a diagram showing the electrical connections.

Similar numerals refer to similar parts throughout the several views.

The movable member or door 1, is held in position against the bulkhead 3 by the frame 2, on which are located the lugs 5, which engage or bear against the wedges 6 forming part of the door. The frame 2 is carried above the opening in the bulkhead in the form of guide 24 to which are secured the box 22 containing the motor and its controlling appliances. At the top of the door frame is placed the girder 4 which carries the necessary gears, and acts to wedge the top of the door against the frame.

The door is balanced by means of the spring 25, which tends to turn the grooved drum 20 in such manner as to cause sufficient tension on the wire rope 23 to sustain said door. The spring 25 is shown to operate under torsion. It is prevented from turning at one end by the base and bracket 26 to which it is secured. The other end of the spring is attached to the grooved drum or fusee 20 on which is wound the wire rope 23. The grooves in the drum or fusee 20 are run spirally upon the surface of said drum. This feature insures a constant pull or tension, equal to the weight of the door, on the wire rope 23 which is secured to the door. When the spring is under maximum torsion the leverage of the wire rope over

the drum is a minimum, and vice versa. Stops 44 secured to the bulkhead are provided to limit the vertical travel of the door when the same is opened.

Referring to Figs. 1, 2 and 3 worm gear 8, which is on the same shaft as the spur-gear 9 and the bevel gear 11, engages in the worm rack 7 on the door. The motor operated shaft 12, carries the spurgear 10, which engages with gear 9. The bevel gear 13 on shaft 14 engages with bevel gear 11. The bevel gear 15, on shaft 14, engages with bevel gear 16 on shaft 17. Shaft 17 also carries the bevel gear 18 which engages with bevel gear 19. Bevel gear 19 is operated by the hand-crank 84 as fully described hereinafter. The operating switch 21 for closing the door by the electric motor is fully described later.

Referring to Figs. 5 and 6 shaft 12 previously mentioned passes through a stuffing box in the box 22, and terminates in the gear wheel 28 which engages the pinion 29 on the motor shaft 37. The motor 27 as shown is of the shunt wound type, but series or compound wound motors may be used if desired. Keyed and fixed to the motor shaft is the apparatus for carrying the governor balls 33. The upper end of support for the balls is provided with a sleeve 35 which is not free to rotate, but is free to move up or down under the controlling action of either the balls in rotation or the spring 34. The lever 36 which is pivoted against the box 22 is actuated around this pivot by the upward or downward motion of the sleeve 35. As the lever 36 is swung up or down different contacts of the starting resistance 38 are brought into connection. The overload resistance 39, the connections for which are shown, is connected to the contacts 32 as shown in the wiring diagram, Fig. 9. The starting resistance 38 and the overload resistance 39, though separate are contained in one form or frame. The electro-magnet 30 is of the plunger type. The lower end of the plunger is formed of suitable conducting material which when in connection with 32 forms practically a short circuit. The movable core or plunger is held in contact by its own weight. The operation of the parts above mentioned will be described in connection with Fig. 9.

Fig. 6 shows the device for making electrical contact when the door is closed. The receptacle 40, is of the usual type of contact makers. The contact is made when the door is closed, by the action of the lug 42 on the door 1, bearing against the pivoted lever 41 which causes the stud 43 to bear against a diaphragm in 40.

Referring to Figs. 7 and 8 the bevel gear 18 fixed on the shaft 17, meshes with gear 19 which is loose on the shaft 48. On the

face of gear 19 are clutch teeth which are suited to engage with similar clutch teeth on 46 which is fixed to the movable shaft 48. The spring 47 tends to hold 46 and 19 apart so that the clutch teeth cannot engage. Clutch teeth are also provided on the left hand face of 46 which are suited to engage in clutch teeth on 49, which is secured to the stationary bracket as shown. The shaft 48 is capable of lateral movement through the bearing in the bracket. On the end of this shaft is keyed and secured the cam and clutch 50. The cam 50 engages the cam 52 in such manner that when 52 is rotated ninety degrees in either direction, the shaft 48 is thrust to the right until the stop 72 on 50 engages 70 on 52. When this occurs the shaft 48, which has hitherto been prevented from turning by 49 engaging with 46, is free to turn with the crank 84 on the shaft 48 to which 52 is keyed and secured. The spring 51 is secured to both 50 and 52 and is designed to operate under torsion in such manner that the stop 70 on 52 is free of the cam face 73 or 74 on 50 when the crank 84 is not being operated. The gear wheel 54 on the shaft 55 is provided to make the apparatus capable of operation from either side of the bulkhead 3. The pivoted lever 57 is operated by the lateral movement of 50, which causes 58 to be pulled to the left, and the electric current cut off from the motor. The box or case 21 contains the apparatus for controlling the electric supply to the motor. The electrical connections are shown in the wiring diagram, Fig. 11. The electro-magnet 62, has a hinged armature which is connected to one end of the lever 66 pivoted and fixed on 60 which connects to the operating handle 59 as shown in Fig. 8. This same end of the lever 66 is connected to 58 which is operated by the apparatus previously described. The spring 68 tends to keep the lever 66 in such position that the electric contact 67 will be broken. At the lower end of the lever 66; a piston 63 is attached which works in a cylinder 69. A valve 65, prevents the escape of air when the piston is moved to the left, but allows the free entrance of air when the piston is moved to the right. The valve 64 is provided to regulate the escape of air when the piston is moved to the left.

The operation of the apparatus is as follows:—When an electric current flows through the electro-magnet the armature 61 is pulled against the poles of the magnet, causing the contact 67 to be made. At the same time the piston 63 compresses the air in the cylinder and after forcing all of the air out through the valve 64, the contact is made. This feature is for the purpose of regulating the time of operation of the operating switches at the various doors throughout the ship in such manner that

all doors will not close at the same instant and cause an abnormal fluctuation of current from the dynamos.

Having described the drawings in detail, the operation of the system will be best understood by referring to the wiring diagram, Fig. 11. Supposing that the door is open, and the emergency switch and operating switch are then open, which will be the condition in actual service. To close the door from the pilot house, close the emergency switch 77, this throws current through the electro-magnet 62 at the door. The armature 61 of the electro-magnet is drawn toward its poles and the lever 66 closes the operating switch. This allows current from the line to pass through the plunger magnet 30, through the contacts 32, through all of the starting resistance 38 to the motor. As the motor gathers speed the action of the governor gradually cuts out resistance until at full speed the resistance is all or practically all cut out. The door is closed by the motor operating through the shaft 12 and connecting mechanism. At the instant the door closes the current will rise unless some means is provided to obviate it. This is done by the spring 34, see Fig. 5, which, when the motor is at rest, acts upon the lever 36 and cuts in resistance to protect the motor. A further safety device is provided in the plunger electro-magnet 30. The line current flows through its coils, and when the current has reached a predetermined limit the plunger 31 is raised, and the current is then forced to pass through the overload resistance 39. This reduces the current and protects the motor as well as the dynamo. The plunger 31 will fall into its place as soon as the current becomes less than the prescribed limit. It will be seen that the door is now closed and the current will flow through the motor as long as the emergency switch is kept closed. If by any chance a man should be shut within the compartment and desires to escape while (or after) the door is being closed, he can open the door readily by hand as follows:—Turn the hand-crank to the right say ninety degrees, this will first cut off the current from the motor by the action of the lever 57, Fig. 8, previously described, and at the same time will throw the clutch in to connect the hand-crank and gears with the gear 19, see Figs. 1 and 7. The door may then be opened by hand power. When the hand-crank is released by the operator the action of the springs 51 and 47, Fig. 7, will throw the clutch out and the hand-crank will be then disconnected from the gear 19. At the same time the action of the electro-magnet 62 will

cause current to pass to the motor and the door will immediately be closed by electric power. It may be noted that the action of the motor and its train of gearing is independent of the hand-crank and its gears. Just at the instant the door closes the contact maker 40, causes current to flow to the indicator in the pilot house, lighting an incandescent lamp that indicates the closing of the door.

The above description applies to only one door, but a number of doors may be operated by closing the emergency switch.

What I claim is:—

1. The combination of a vertically movable bulkhead door for ships, a counterbalance therefor, manually operated mechanism and motor actuated mechanism, each adapted to operate independently of the other, for moving said door.

2. The combination of a vertically movable bulkhead door for ships, spring means for exerting a counterbalancing effect thereon, manually operative mechanism and motor actuated mechanism, each adapted to operate independently of the other, for moving said door.

3. In combination with a vertically movable bulkhead door, a counterbalance therefor, mechanism for operating said door, an electric circuit, a motor in said circuit for actuating the said door operating mechanism, means for arbitrarily controlling the circuit of the motor at a distance therefrom, and means at the door for retarding the arbitrary control of the motor from a distance.

4. In combination with a vertically movable bulkhead door, a counterbalance therefor, mechanism for operating said door, an electric circuit, a motor in said circuit for actuating the said door operating mechanism, hand operated means for actuating said door operating mechanism and at the same time cutting out of circuit the motor.

5. In combination with a vertically movable bulkhead door, a counterbalance therefor, mechanism for operating said door, an electric circuit, a motor in said circuit for actuating the said door operating mechanism, hand operated means for actuating said door operating mechanism and at the same time cutting out of circuit the motor, and means for automatically returning the motor into circuit when force is withdrawn from the hand operated mechanism.

HENRY M. GLEASON.

Witnesses:

MAE HOFMANN,
P. M. MACLAREN.