(No Model.)

W. B. COWLES.

HYDRAULIC SYSTEM FOR CLOSING WATER TIGHT BULKHEADS ON BOARD SHIPS, &c.

No. 589,958. Patented Sept. 14, 1897.

FIG. 1.

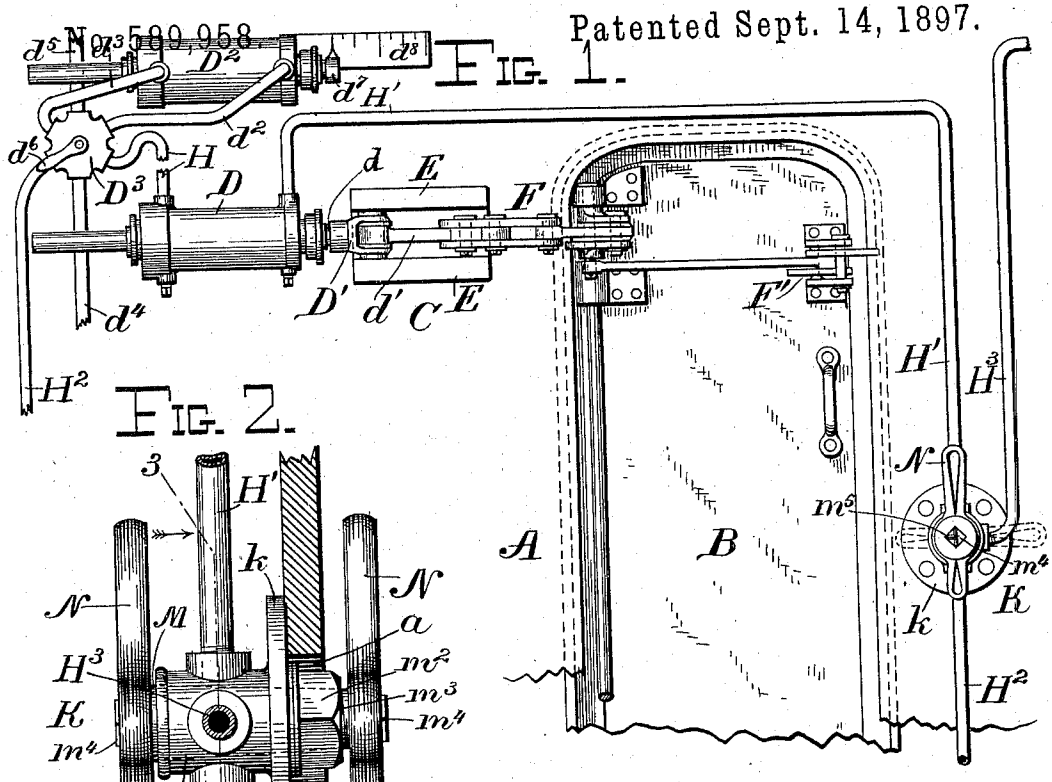
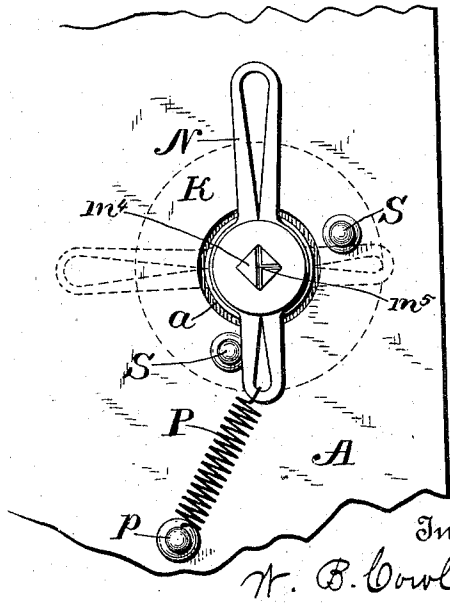


FIG. 2.

FIG. 4.



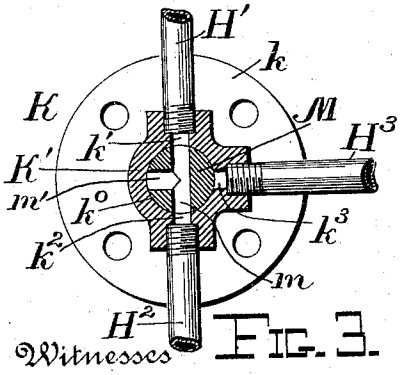


FIG. 3.

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UNITED STATES PATENT OFFICE.

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HYDRAULIC SYSTEM FOR CLOSING WATER-TIGHT BULKHEADS ON BOARD SHIPS, &c.

SPECIFICATION forming part of Letters Patent No. 589,958, dated September 14, 1897.

Application filed January 7, 1897. Serial No. 618,306. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM BARNUM COWLES, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Hydraulic Systems for Closing Water-Tight Bulkheads on Board Ships, and for other Like Purposes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in systems for operating water-tight doors for bulkheads and the like, and is designed to be an improvement on Letters Patent No. 564,474, granted to me July 21, 1896.

The present invention contemplates the use of a releasing-valve at the bulkhead-door to enable a man at the door to have sufficient control over it to prevent being caught in the door or imprisoned in the compartment when the door is closed from the central station, and also to enable any one to signal the central station to open the door when necessary; and it consists of the several parts constructed and arranged as hereinafter described and claimed.

Reference is had to the accompanying drawings, in which like letters of reference designate corresponding parts in the several views.

Figure 1 represents an elevation of a bulkhead-door with my improved system for opening and closing applied thereto, showing the releasing-valve in position at the right-hand side of the door. Fig. 2 represents a vertical section through the bulkhead, showing the releasing-valve in side elevation. Fig. 3 is a sectional view through the valve taken on the line 3 3 of Fig. 2, looking in the direction of the arrows. Fig. 4 represents an elevation of the valve looking at the opposite side of the bulkhead from that shown in Fig. 1.

A designates the bulkhead, B the door therein, and C the system for opening and closing the same, which is substantially the same as that described in my patent above referred to and may be briefly described as follows:

D designates the power-cylinder having the operating-piston therein, from which piston extends the piston-rod d, connected to the cross-head D′, which slides in the guides E.

D^2 designates the telltale-cylinder at the central station, which has the same piston displacement as the power-cylinder D, and D^3 designates the six-way valve, also at the central station, for controlling the system. This six-way valve D^3 is connected with the telltale-cylinder D^2 by the pipes d^2 and d^3, one to each end of the cylinder, and is connected with the end of the power-cylinder for opening the door by the pipe H and with the end for closing the door by the pipe H^2, which extends to the releasing-valve K and by the pipe H′, which extends from the releasing-valve K to the power-cylinder.

Fluid under pressure is conducted to the system through the pipe d^4 and may be admitted to either end of the power-cylinder by the six-way valve D^3, which is provided with a handle d^6 for that purpose. When the six-way valve D^3 is turned to admit the fluid to one end of the power-cylinder, it will also connect the opposite end of the power-cylinder with one end of the telltale-cylinder D^2 and will open the other end of the telltale-cylinder to the exhaust-pipe d^5, thus causing both cylinders to move in unison. If desirable, the exhaust-pipe d^5 may open into an exhaust-tank, in which a certain amount of back pressure is maintained.

A pointer d^7 or other indicating device is provided on or connected to one end of the piston-rod of the telltale-cylinder, which will indicate on a scale d^8 the distance the pistons move, and a signal device may be employed on one or both cylinders to sound while the cylinders are moving. A connecting-rod d' connects the said cross-head D′ with the levers and arms F for opening and closing the door, and the door is locked in its closed position by means of the locking mechanism F′, the details of which form no part of the present invention and need not be more fully described.

The fluid under pressure is admitted to the end of the cylinder for opening the door through the pipe H, and to the end for closing through the pipe H′, which leads from the releasing-valve K. This releasing-valve K consists of a tubular casing K′, bored out in the

direction of its axis, as at k^0, to receive the valve-plug M, and provided with a flange k, which is secured to the bulkhead in any suitable manner to make a water-tight joint, an opening a being formed in the bulkhead for the end of the valve-plug to extend through, as shown in Figs. 2 and 4.

The casing K′ has three vents or apertures k', k^2, and k^3 opening through the sides into the central opening, the apertures k' and k^2 being on opposite sides and in line, and the aperture k^3 is at right angles to the other two. These apertures are all tapped to receive the screw-threaded ends of the pipes H′, H^2, and H^3, the pipe H′ being connected to the vent k', the pipe H^2 to the vent k^2, and the pipe H^3 to the vent k^3.

The valve-plug M is bored through at right angles to its axis, as at m, and bored in from one side, opening into the passage m at right angles thereto, as at m'. These passages m and m' are arranged to register with the vents k', k^2, and k^3, and when the valve is in its normal position the passage m will form a continuous passage through the valve from the pipe H^2 to the pipes H′, and the passage m' will be turned to the opposite side of the casing from the passage k^3, thus closing the pipe H^3, as shown in Fig. 3.

The plug M extends through the casing K′ and is held therein by any suitable means—as, for instance, a nut m^2, screwed upon a screw-threaded portion m^3 thereof. One end of the said plug extends through the opening a in the bulkhead, and both ends are squared, as at m^4, to receive the handles N, one of which is on each side of the bulkhead.

When the valve is in its normal position—*i. e.*, with the passage m open from the pipe H^2 to the pipe H′—the fluid will be free to pass through these pipes to the power-cylinder to close the bulkhead-door and hold it in its closed position. In this position the handles of the valve will be preferably vertical, as shown, and held by the tension of a spring P, which is connected with the said handle and extends to a suitable holding device p on the bulkhead. Stops S are also provided for the handle to strike against when the passages m or m' register with the vents in the casing K′. The square ends of the plug M are preferably scored or grooved in line with the passages m and m', as shown at m^5 in Figs. 1 and 4, to indicate the position of the said passages.

The operation of the device is as follows: When the releasing-valve K is in its normal position, the system can operate to open or close the bulkhead-doors without interference; but should it be necessary to prevent the door from closing—as, for instance, when persons are passing through—one can turn the handle of the valve to the position shown in dotted lines in Figs. 1 and 4. This movement will turn the passage m, causing it to register with the vent k^3 and the passage m' to register with the vent k' and will close the vent k^2, thus cutting off the pressure from the pipe H^2 and opening the pipe H′ into the pipe H^3, which is open to the atmosphere. This will relieve the pressure on the side of the piston for closing the door and the back pressure in the pipe H will tend to move the piston in the direction for opening the door. This tendency and back pressure on the piston will be duplicated on the piston in the telltale-cylinder at the central station, and the operator when starting to close the door will know from the non-response of the telltale-piston that some one wishes the door to remain open a while longer and will act accordingly. When the door is closed, which is the normal position of the bulkhead-doors, and some one wishes it opened, that person will turn the handle N to the position shown in dotted lines, which will, as before, cut off the pressure from the pipe H^2 and open the pipe H′ to the pipe H^3, thus relieving the pressure in the power-cylinder, which tends to hold the door closed and allowing the back pressure in the pipe H to move the piston in the direction to swing the door open. This movement of the piston will be repeated by the piston in the telltale-cylinder at the central station, which may have a signal device attached thereto to notify the operator when such movement takes place, so that he can turn the proper valves to cause the door to swing open. These signals may be so arranged that the signal at the central station will sound continuously while the bulkhead-door is swinging open and to remain silent while the door is closing, and thus apprise the operator of the opening of the bulkhead-door. The signal at the door may be arranged to sound only when the door is closing, and thus apprise the person at the door, so they may either move out of the way or open the releasing-valve to stop further movement of the door. As soon as the person at the door lets go the handle N of the valve the spring P will cause the valve-plug K′ to return to its normal position and restore the system to an operative condition.

A signaling device may be attached to the power-cylinder at the door to give notice when the door begins to close.

The pipe H^3, which is open to the atmosphere, is extended upwardly above the level of the power-cylinder, so that when the pipe H′ is opened to the said pipe H^3 it will not drain the fluid from the cylinder and the pipe H′ and the little fluid that is forced through the pipe H^3 may be conducted to any desirable point.

In order to distinguish the closing or operating effect of the piston on the door or other article to be moved and the opening or releasing effect, I shall refer in the claims to the fluid supplied to the operating end of the power-cylinder in contradistinction to the fluid in the releasing end of the power-cylinder.

It will be obvious that various modifications

of my structure might be made which could be used without departing from the spirit of my invention.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a hydraulic system of the character described, the combination with an operating-cylinder, a piston therein, and mechanism operated by said piston, of pipes adapted to contain fluid under pressure connected to each end of said cylinder, a device for indicating the flow of fluid through said pipes, and a hand-operated releasing-valve contained in said circuit located in the pipe for supplying fluid-pressure to the operating end of the power-cylinder, substantially as described.

2. In a hydraulic system of the character described, the combination with an operating-cylinder, provided with a piston therein, and mechanism operated by said piston, of means for injecting fluid under pressure into one end of said operating-cylinder, and means for registering the fluid expelled from the opposite end of said cylinder, and a hand-operated releasing-valve contained in said circuit located in the pipe for supplying fluid-pressure to the operating end of the power-cylinder, substantially as described.

3. In a hydraulic system of the character described, the combination with an operating-cylinder and mechanism operated thereby, of a pipe connected to a source of fluid-pressure, and an exhaust-pipe, a valve for forcing fluid under pressure into either end of the operating-cylinder, means for registering the flow of fluid through the system, and a hand-operated releasing-valve contained in said circuit located in the pipe for supplying fluid-pressure to the operating end of the power-cylinder, substantially as described.

4. In a hydraulic system of the character described, the combination with an operating-cylinder, a piston therein, of a door and mechanism operated by said piston for moving said door, pipes adapted to contain fluid under pressure connected to each end of said cylinder, means for causing a flow of fluid through said pipes, a device for indicating the flow of fluid through the said pipes, and a hand-operated releasing-valve contained in said circuit located in the pipe for supplying fluid-pressure to the operating end of the power-cylinder, substantially as described.

5. In a hydraulic system of the character described, the combination with an operating-cylinder, provided with a piston therein, of a swinging door, and mechanism operated by said piston for swinging said door, means for injecting fluid under pressure into one end of said operating-cylinder, means for registering the fluid expelled from the opposite end of said cylinder, and a hand-operated releasing-valve contained in said circuit located in the pipe for supplying fluid-pressure to the operating end of the power-cylinder, substantially as described.

6. In a hydraulic system of the character described, the combination with an operating-cylinder of a door and mechanism operated by said cylinder for moving said door, an indicating-cylinder, a double system of pipes connecting the two cylinders and means for forcing fluid under pressure into one end of the operating-cylinder, and for permitting the flow of fluid from the other end of the operating-cylinder to the indicating-cylinder, and a hand-operated releasing-valve contained in said circuit located in the pipe for supplying fluid-pressure to the operating end of the power-cylinder, substantially as described.

7. In a hydraulic system of the character described, the combination with an operating-cylinder, of a door and mechanism operated by said cylinder for moving said door, a pipe connected to a source of fluid-pressure, and an exhaust-pipe, a valve for forcing fluid under pressure into either end of the operating-cylinder, means for registering the flow of fluid through the system, and a hand-operated releasing-valve contained in said circuit located in the pipe for supplying fluid-pressure to the operating end of the power-cylinder, substantially as described.

8. In an apparatus of the character described, the combination with a fluid-circuit, of an operating-piston with mechanism operated thereby, an indicating device moving synchronously with said operating-piston, and a hand-operated releasing-valve contained in said circuit located in the pipe for supplying fluid-pressure to the operating end of the power-cylinder, substantially as described.

9. In an apparatus of the character described, the combination with a fluid-circuit, of an operating-piston with mechanism operated thereby, an indicating-piston moving synchronously with said operating-piston, and a hand-operated releasing-valve contained in said circuit located in the pipe for supplying fluid-pressure to the operating end of the power-cylinder, substantially as described.

10. In a hydraulic system of the character described, the combination with a fluid-circuit, an operating-cylinder in said circuit, with a piston operated by the fluid, a signaling device for indicating the motion of said piston, and an independently-operated releasing-valve for controlling the flow of fluid in said circuit located in the pipe for supplying fluid-pressure to the operating end of the power-cylinder, substantially as described.

11. In a hydraulic system of the character described, the combination with a cylinder and an operating-piston of a door, and mechanism operated by said piston for moving said door, an indicating-cylinder, a double system of pipes connected thereto, a pipe for supplying fluid-pressure and an exhaust-pipe, a six-way valve located between said cylinders and adapted to connect said supply-pipe with

either end of said operating-cylinder, to connect the opposite end of the operating-cylinder with one end of the indicating-cylinder, and to connect the opposite end of the indicating-cylinder with the exhaust-pipe, and a hand-operated releasing-valve contained in said circuit located in the pipe for supplying fluid-pressure to the operating end of the power-cylinder, substantially as described.

12. In a hydraulic system of the character described, the combination with an operating-cylinder and mechanism operated thereby, and a reciprocating indicating device, of a double system of pipes connecting the two, a pipe for supplying fluid-pressure and an exhaust-pipe, a six-way valve placed between said cylinder and said device adapted to connect said supply-pipe with either end of said operating-cylinder, to connect the opposite end of the operating-cylinder with one end of the indicating device, and to connect the opposite end of the indicating device with the exhaust-pipe, and a hand-operated releasing-valve contained in said circuit located in the pipe for supplying fluid-pressure to the operating end of the power-cylinder, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

WM. BARNUM COWLES.

Witnesses:
HARRY H. SMITH,
HOWARD A. COUSE.