

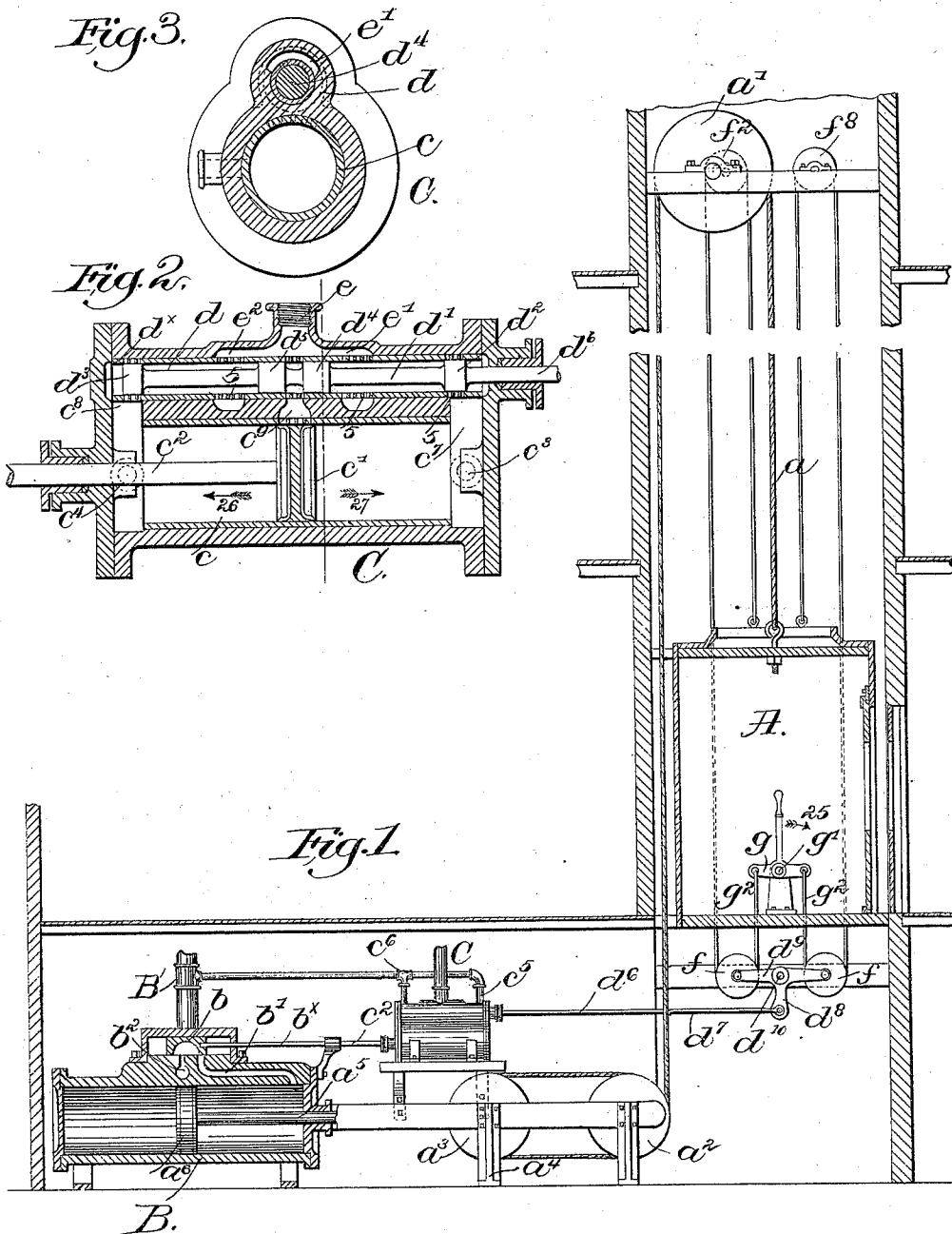
(No Model.)

J. H. CLARK.

VALVE OPERATING DEVICE FOR ELEVATORS.

No. 542,628.

Patented July 16, 1895.



Witnesses.

Louis N. Lowell

Edward F. Allen.

Inventor:

John H. Clark

By Crosby & Gregory Attys.

UNITED STATES PATENT OFFICE.

JOHN H. CLARK, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE WHITTIER MACHINE COMPANY, OF SAME PLACE.

VALVE-OPERATING DEVICE FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 542,628, dated July 16, 1895.

Application filed December 14, 1891. Serial No. 414,983. (No model.)

To all whom it may concern:

Be it known that I, JOHN H. CLARK, of Boston, county of Suffolk, State of Massachusetts, have invented an Improvement in Valve-Operating Devices for Elevators, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

This invention has for its object to provide an improved device by which to move the valve of a hydraulic-elevator cylinder.

The particular features of which my invention consists will be hereinafter described, and pointed out in the claims.

Figure 1 is a sectional view showing a hydraulic-elevator system, the valve-operating device being represented in elevation; Fig. 2, a longitudinal section of the valve-operating device on an enlarged scale; and Fig. 3 a cross-section taken on the line $x x$, Fig. 2.

Referring to the drawings, A represents an elevator-car suspended in usual manner by the cable a , passed over the sheave a' at the top of the elevator-well, thence down and about the fixed and movable sheaves $a^2 a^3$, mounted in a suitable frame a^4 , the movable sheave a^3 being connected by the piston-rod a^5 with the piston a^6 in the main hydraulic cylinder B, all of which may be of usual construction common to elevators of this class.

The operating device C, shown separately in Figs. 2 and 3, contains a cylinder c , the piston c' of which has its piston-rod c^2 connected with the stem b^x of the main valve b in Fig. 1.

The cylinder c , at its opposite ends, is provided with inlet ports or openings $c^3 c^4$, which are connected respectively by pipes $c^5 c^6$ with the main pressure-supply pipe B' for the hydraulic cylinder B, or with any other suitable source of pressure, the said cylinder c at its opposite ends also having suitable outlet-ports $c^7 c^8$, which communicate with the auxiliary valve-chamber d , in which is fitted the auxiliary piston-valve d' , represented as having four pistons, the two end pistons $d^2 d^3$ controlling the outlet-ports $c^7 c^8$ of the cylinder c , while the two middle pistons $d^4 d^5$, when the auxiliary valve is in its middle position,

lie at opposite sides of the middle exhaust-ports c^9 of the cylinder c . (See Fig. 2.)

The exhaust-outlet e communicates by the passages e' , e^2 with the portions of the auxiliary valve-chamber d between the pistons $d^2 d^4$ and $d^3 d^5$, the said exhaust also communicating directly with the middle exhaust-port c^9 of the cylinder c , between the pistons $d^4 d^5$. (See Fig. 2.)

As herein represented the auxiliary valve-chamber d is formed by a cylindrical or sleeve-like bushing d^x , the various ports and passages referred to communicating with the interior of the chamber through groups of small openings or perforations 5, arranged opposite said ports or passages, as clearly shown in Fig. 2. The stem d^6 of the auxiliary valve d is herein represented as connected with one end of a rod d^7 , jointed at its opposite end to the arm d^8 of the lever d^9 , pivoted at d^{10} and carrying at opposite sides of its pivotal point sheaves $f f'$.

The operating-lever g , carried by the elevator-car and pivoted at g' , has attached to its opposite ends ropes or cables g^2 , which pass down and about the sheaves $f f'$, thence upward to the top of the elevator-well about the sheaves $f^2 f^3$, and down to the top of the elevator-car to which they are attached, as represented, such arrangement permitting the elevator-car to travel in either direction without moving the operating-lever or the lever d^9 ; but should the operating-lever be tilted in either direction, one or the other of the sheaves $f f'$ will be raised to thus rock the lever d^9 on its pivot and move the valve d in one or the other direction.

While I have herein represented the valve d , as moved in the manner described, still I desire it to be understood that the valve d may be moved from the elevator-car in any other desired manner, the prime feature of this invention lying in the operating device, irrespective of the manner in which its auxiliary valve is controlled or moved.

Assuming the various parts to be in the positions represented in the drawings, the operation of the device is as follows: The main valve b being in its middle position, closes both the inlet and exhaust ports $b' b^2$ of the

main cylinder B, while the pressure from the pressure-supply pipe B will, through the pipes $c^5 c^6$, enter the cylinder c of the operating device at its opposite ends, and act equally upon the opposite side of the piston c' therein to hold the same in its middle position, the outlet-ports $c^7 c^8$ being closed by the pistons $d^2 d^3$ of the auxiliary valve d , and the middle port c^9 being closed by the pistons c' in the cylinder c . If, now, it be desired to raise the elevator-car, the operating-lever g will be moved to the right in the direction of arrow 25 to move the auxiliary valve d to the left from its middle position, so that the piston d^3 of the said valve will uncover the port c^8 and permit the pressure at that side of the piston c' to be relieved, the fluid as fast as it enters that side of the piston c' through the inlet c^4 passing out through the port c^8 , valve-chamber d , passage e^2 , to the exhaust e . The piston d^2 of the auxiliary valve, however, still cuts off communication between that end of the cylinder c and the passage e' , while the piston d^4 of the auxiliary valve has been moved to the left and closes the middle port c^9 , so that the normal pressure at the right of the piston c' will be in excess of the reduced pressure at the left of the piston, and will move said piston to the left in the direction of arrow 26, to move the main valve b also to the left and admit fluid under pressure in front of the piston in the main-cylinder B, to move the same to the left and lift the car.

To stop the car, the auxiliary valve is returned to its middle position, Fig. 2, the piston d^3 then closing the outlet c^8 to prevent further escape of fluid therethrough and thus restore the pressure at that side of the piston c' to its normal, while the piston d^4 has at the same time been moved to the right to uncover the middle port c^9 to relieve the pressure at the right of said piston, so that the excess of pressure will now be at the left of the piston c' and will move the same to the right in the direction of arrow 27, the fluid in the cylinder at the right of the piston escaping through the port c^9 to the exhaust e , until the piston c' , as it approaches its middle position, covers the entrance to the port c^9 and prevents the further escape of fluid, when the pressure at each side of the piston will again be the same, and act to retain the piston in its middle position.

To lower the car, the auxiliary valve will be moved to the right, Fig. 2, so that the piston d^2 will uncover the port c^7 and permit the fluid, as fast as it enters that end of the cylinder, to escape through the passage e' to the exhaust e , to thus relieve the pressure at that side of the piston, while the pressure at the left of the piston remains the same, thus being in excess of the pressure at the right of the piston and moving the latter to the right, the excess of pressure at the left being retained by the piston d^3 covering the middle port c^9 , such movement of the piston c' mov-

ing the main valve b to the right and establishing communication between the inlet-port b^1 and the exhaust-port b^2 , to permit the piston a^6 to move to the right and lower the elevator.

From the above it will be seen that the inlets $c^3 c^4$ constitute constant sources of pressure at each side of the piston c' , and the pressure at each side of the piston being the same, the piston is normally held in an intermediate position, as shown; but by means of the auxiliary valve d the pressure at either side may be relieved for any length of time, so that an excess of pressure will be present at the opposite side of the piston, which will act to push the piston and valve before it, as described.

This invention is not limited to the exact form and construction of the parts shown, as it is obvious that they may be varied without departing from the scope of the invention.

I claim—

1. In an elevator apparatus, the combination of a cylinder containing a piston, supply pipes connected with the opposite ends of the said cylinder whereby a constant pressure is maintained upon each side of the piston, the outlet ports separate from the inlet or supply pipes and arranged at each side of the piston, valves which control the said outlet ports, and means for shifting the valves from the car or cage of the elevator, substantially as described.

2. A cylinder containing a piston, and the inlet pipes connected with the said cylinder near each end and through which a constant pressure is maintained upon each side of the piston, combined with the outlet ports for each end of the said cylinder, said ports being separate from the inlet ports or pipes, the valves which control the said outlet ports, and an outlet port intermediate of the said end outlet ports which is normally closed by the piston in the cylinder, substantially as described.

3. A cylinder containing a piston, and having the pressure supply pipes, one at each end thereof, and having also an outlet port near each end of the cylinder, and an intermediate outlet port which is closed by the piston within the cylinder when the latter is in its normal position, in combination with a valve device whereby the movement of the piston within the cylinder is controlled, the said valve device having valves for the several outlet ports or openings for the said cylinder, the relation of the said valves being such that the two end ports are covered and the intermediate port is uncovered when the valve device is in its intermediate position,—and when the valve device is moved in one direction from its intermediate position, one of the end ports is uncovered or opened and the intermediate port is covered or closed, and when the valve device is moved in the opposite direction from its intermediate position the other end port

is uncovered or opened, and the intermediate port is closed, substantially as described.

4. A cylinder containing a piston, and a pressure inlet at each end thereof, combined with two end outlet ports and an intermediate port, and a piston valve having a piston to normally close each of said end ports, and two intermediate pistons, one normally lying at each side of said intermediate port, substantially as described.

5. A cylinder containing a piston, and a pressure inlet at each end thereof and provided with the outlet openings or ports c^7 , c^8 near the ends of the cylinder, and the outlet opening or port c^9 near the middle of the cylinder, in combination with the bushing, d^x , provided with the openings 5, such openings registering with the said outlet ports c^7 , c^8 , c^9 from the cylinder, and there being other openings through the said bushing between the openings which communicate with the intermediate outlet port, and with the end outlet ports, the waste or outlet pipe e provided with

the branches e' , e^2 and the piston valve d' movable in the said bushing, and provided with the heads or pistons d^2 , d^3 near its ends, and d^4 , d^5 near its middle, substantially as set forth.

6. A cylinder containing a piston, separate inlet and exhaust ports near each end of the said cylinder, the inlet ports being without valves whereby there is a constant pressure upon each side of the piston, a valve device to control the said exhaust ports, a middle exhaust port which is closed by the piston within the cylinder when it is in its middle or normal position, and which is also controlled by the said valve device, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN H. CLARK.

Witnesses:

FREDERICK L. EMERY,
GEORGE F. RANDLETT.