(No Model.) 3 Sheets—Sheet 1.

J. McADAMS.

VALVE FOR HYDRAULIC ELEVATORS.

No. 476,023. Patented May 31, 1892.

Fig. 1.

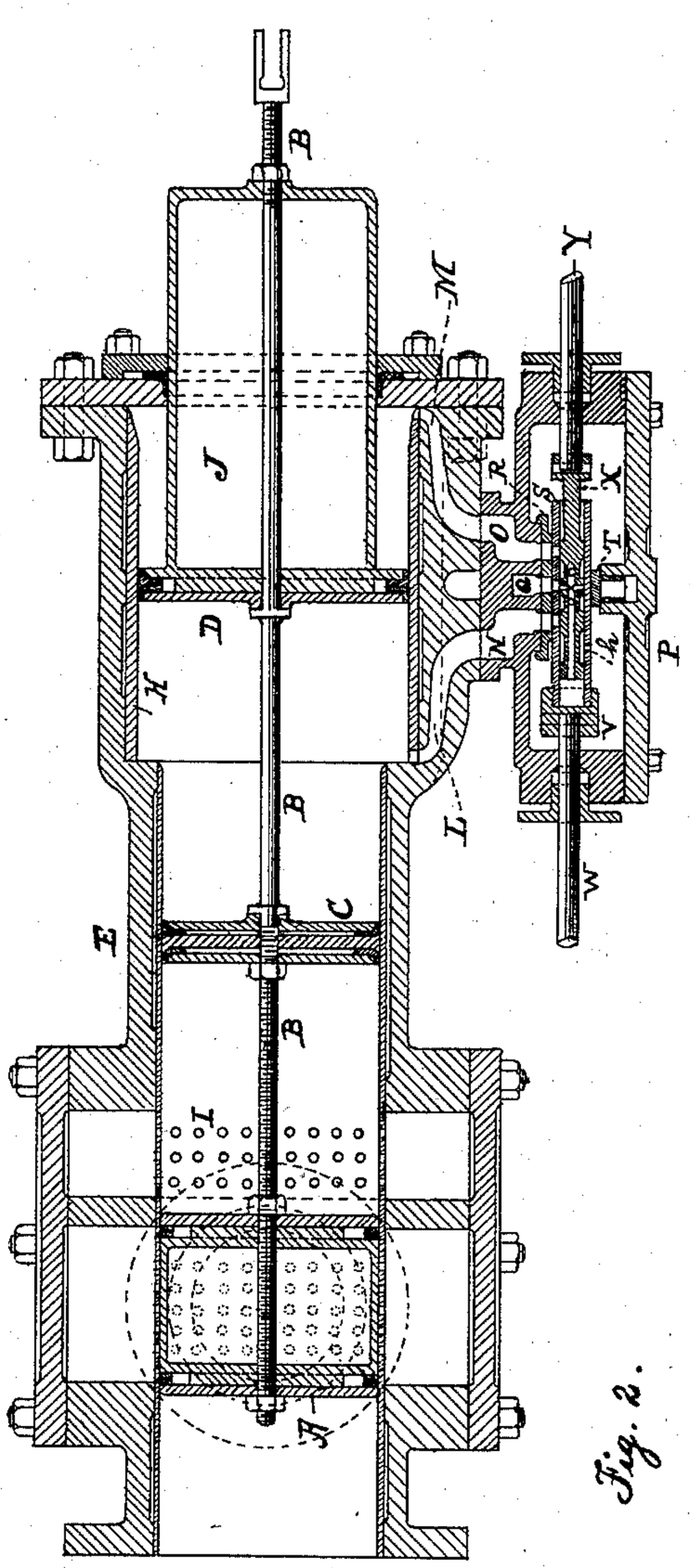


Fig. 3.

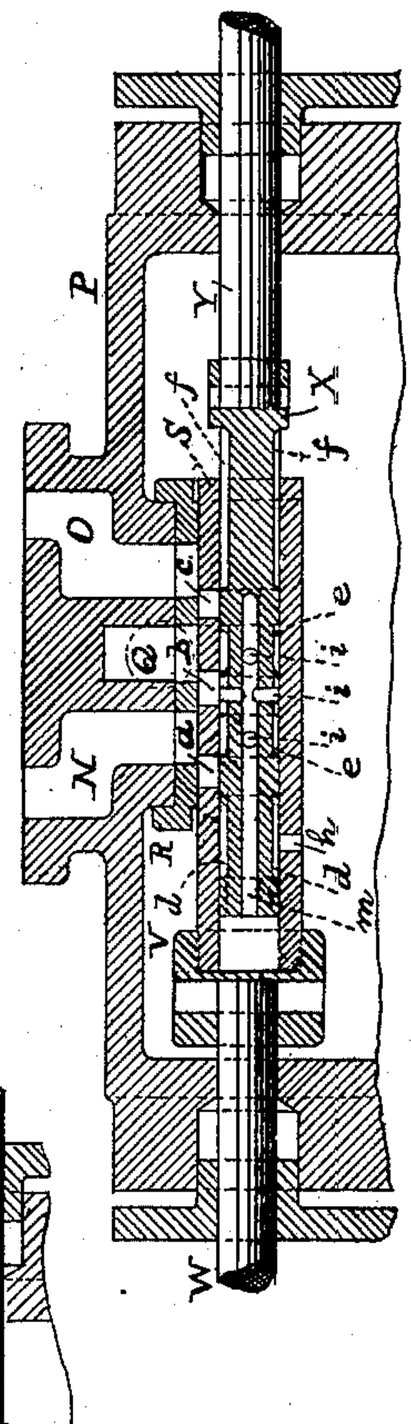


Fig. 2.

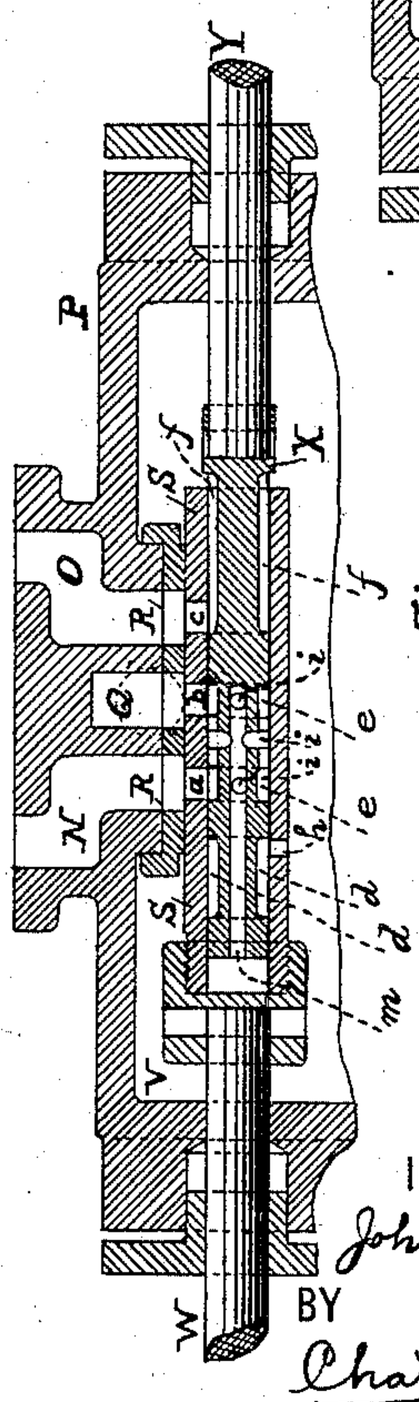
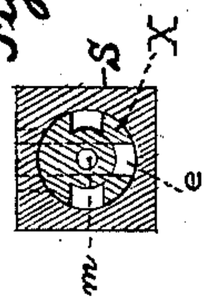


Fig. 4.



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(No Model.) 3 Sheets—Sheet 2.

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VALVE FOR HYDRAULIC ELEVATORS.

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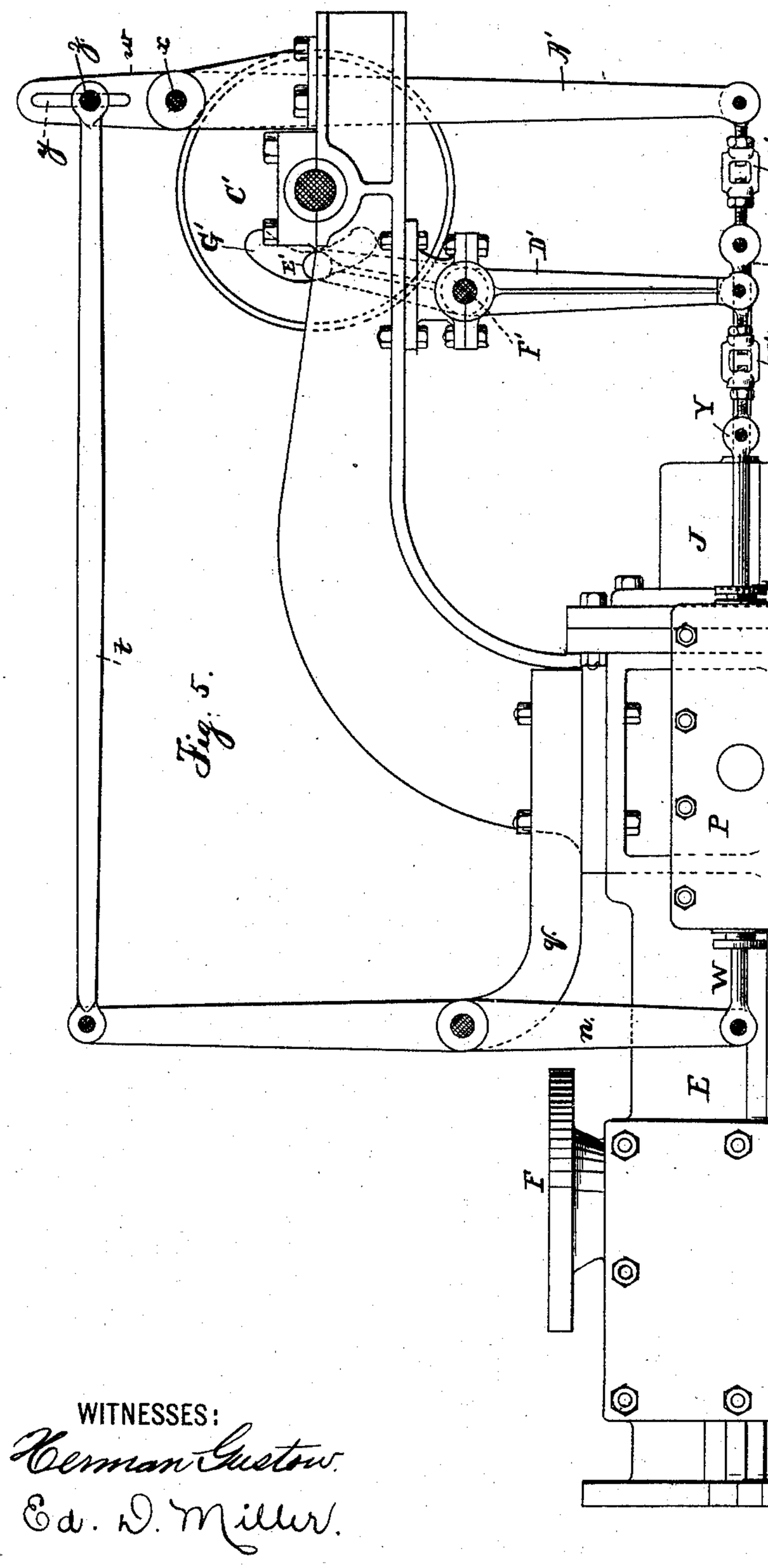

Fig. 5.

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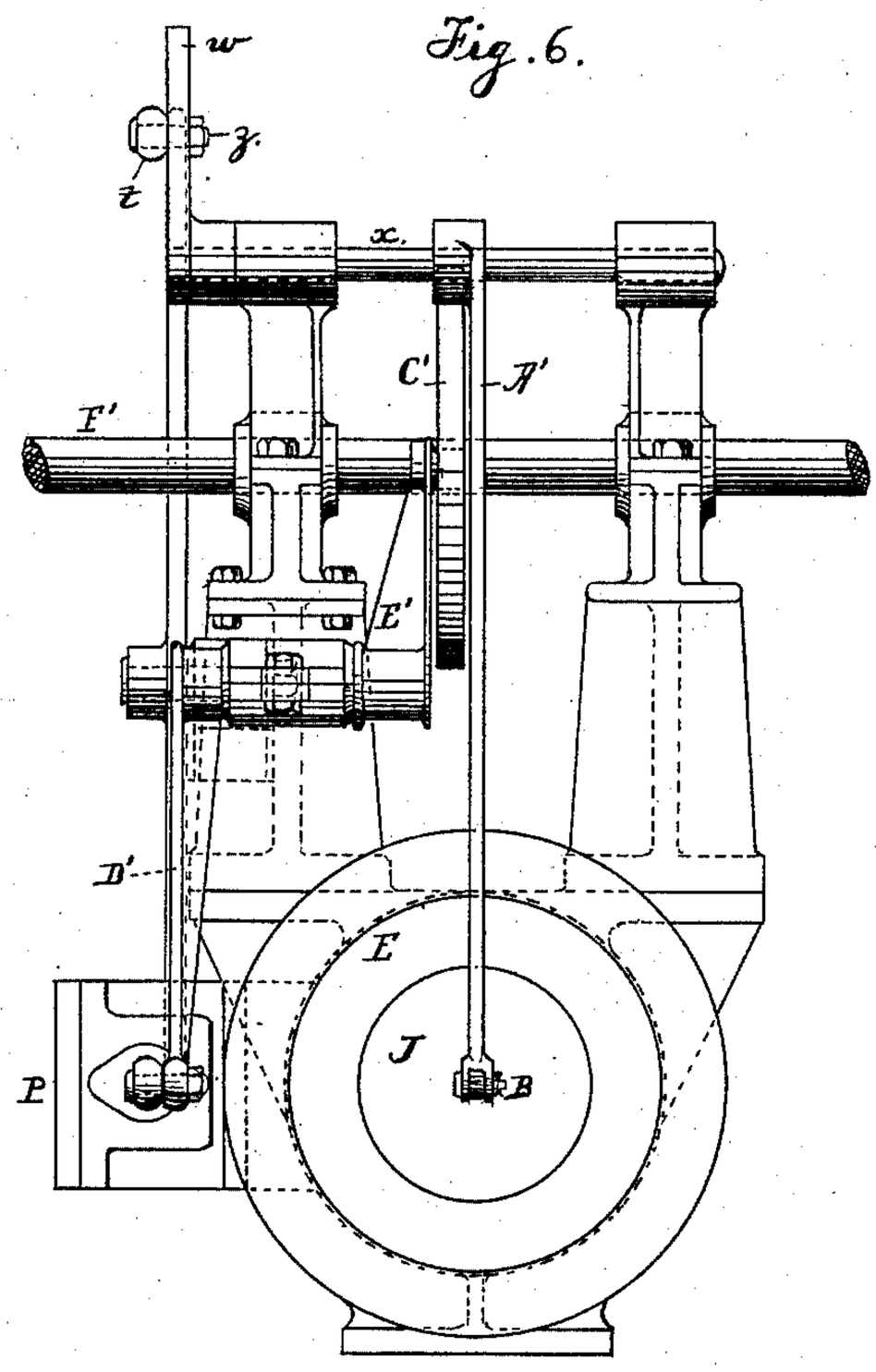
Fig. 6.



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UNITED STATES PATENT OFFICE.

JOHN McADAMS, OF NEW YORK, N. Y.

VALVE FOR HYDRAULIC ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 476,023, dated May 31, 1892.

Application filed June 13, 1891. Serial No. 396,064. (No model.)

To all whom it may concern:

Be it known that I, JOHN MCADAMS, a subject of Her Majesty the Queen of Great Britain, and a resident of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Valves for Hydraulic Elevators, of which the following is a specification.

The invention relates to improvements in valves for hydraulic elevators; and it consists in the pilot-valve, with connecting mechanism, hereinafter described and claimed, whereby the main operating-valve controlling the flow of water is governed.

Referring to the accompanying drawings, forming a part of this specification, Figure 1 is a central longitudinal section of the main operating-valve, with its cylinder and interior connections, and the pilot-valve, with its chest and interior mechanism, constructed in accordance with the invention. Fig. 2 is an enlarged detached like section of a portion of the valve-chest with the parts of the pilot-valve shown in a different position from that represented in Fig. 1. Fig. 3 is a like view of same with the parts of the pilot-valve shown in a further different position from that illustrated in Fig. 1. Fig. 4 is a detached vertical section of the pilot-valve, taken on a line between the ports therein. Fig. 5 is a side elevation of the main operating-valve cylinder, showing the location of the pilot-valve chest and the exterior mechanism connected with said valves; and Fig. 6 is an end view of same.

In the drawings, A designates the main valve, which controls the flow of water and is adapted to have a reciprocating movement with the rod B and piston-heads C D, the whole being arranged within the cylinder E, which is provided with the usual ports F G and the linings H I, the latter being perforated adjacent to the valve A, as shown, to permit the free passage of the water. The left-hand end of the cylinder E is connected with the customary discharge-pipe for water passing from cylinder. The piston-head D moves in a portion of the cylinder E which is of greater diameter than that portion thereof in which the head C has its movement, and said head D is provided with the hollow extension J, passing through the right-hand end of the cylinder, and hence being open to the atmosphere. The rod B, as shown in Fig. 1, connects the valve A and heads C D, and hence said parts have a simultaneous movement under the pressure of the water passing into the cylinder E and acting against the head D.

The right-hand end of the cylinder E at one side is provided with the ports L M, which connect with the ports N O, formed in the pilot-valve chest P, wherein adjacent to the ports N O and exhaust-port Q is provided the valve-seat R, through which said ports extend and against which the cylinder-valve S has a sliding movement, said valve being retained in contact with the face of said seat by means of the support T, which may be of any suitable form or construction.

The cylinder-valve S is hollow, and at one end is provided with the head V and rod W, while its other end is entirely open and receives the inclosed piston-valve X, which coacts with the cylinder-valve S to constitute the pilot-valve, whereby the passage of water under pressure to the opposite sides of the head D is controlled. The rod W of the cylinder-valve S projects through the left-hand end of the valve-chest P, and the rod Y of the piston-valve X extends through the right-hand end of said chest. The cylinder-valve S is provided with the ports *a b c*, corresponding and coacting with the ports N O Q, but preferably less than one-half the diameter of said ports N O Q, the purpose being that the ports N O Q shall never be entirely closed by the cylinder-valve S. The piston-valve X is hollow and entirely open at its left-hand end and is provided in its surface with the coves *d e f*, coacting with the ports *a b c* in the cylinder-valve S. The coves *d* also coact with the port *h*, formed in the cylinder-valve S, as indicated more clearly in Figs. 2 and 3. The piston-valve X is provided with the apertures or ports *i*, leading from the exterior coves *e* to the hollow interior *m* of said valve and to the exhaust-ports *b* Q.

The rod W of the cylinder-valve S is pivotally connected at its outer end with the lower end of the rocking lever *n*, which is supported on the arm *q* and connected at its upper end by the rod *t* with the lever *w*, keyed upon the transverse rock-shaft *x*. The con-

nection of the rod t with the lever w is by means of the slot y and set-screw z, and hence is adjustable, whereby, as hereinafter set forth, the throw of the rod t, lever n, rod W, and valve S may be regulated at will. The transverse rock-shaft x has rigidly secured to it the upper end of the lever A′, the lower end of which is pivotally secured to the outer end of the rod B. There is thus a direct line of connection between the rod W of the valve S and the rod B, carrying the heads C D and valve A, and hence when said rod B, under the action of the heads C D, is moved the intermediate connections above described will communicate the motion to the cylinder-valve S, the latter moving inward upon the valve X when the rod B is moved outward toward the right and moving outward to the left from the valve X when said rod B is moved inward toward the left. The extent of the throw imparted to the valve S by the rod B may be regulated by the slot y and set-screw z, the nearer the rod t is secured to the inner end of the lever w the shorter being the throw imparted to the valve S and the nearer the rod t is secured to the outer end of the lever w the greater being the throw imparted to the valve S. The lower end of the lever A′ preferably carries a link-coupling B′, as shown in Fig. 5, of any well-known form, which is adjustable and is intermediate the said end of the lever and the end of the rod B.

The piston-valve X receives its motion from the attendant in the elevator-carriage by means of the usual hand operating-cable (not shown) acting through the intermediate cam C′ and rocking levers D′ E′, keyed on the rock-shaft F′, the lever E′ at its upper end engaging the slot G′ of said cam C′ and the lever D′ being connected through the intermediate adjustable coupling H′ with the rod Y of the piston-valve X.

In the use of the invention the attendant in the elevator-carriage will draw on the usual operating-cable in the customary way to turn the cam C′ in one direction or the other or hold it at an intermediate position with reference to the lever E′. The movement of the cam C′ actuates the rocking levers D′ E′ and through them reciprocates the piston-valve X, and the movement of the valve X controls the passage of water under pressure from the pilot-valve chest into the cylinder E for the purpose of moving the valve A. It will thus be seen that the entire mechanism is under the absolute control of the attendant in the elevator-carriage, and that said attendant may thus move the valve A to cause the elevator-carriage to ascend or descend or come to a stop. For example, when the attendant in the carriage, through the usual cable, the cam C′, and levers D′ E′, moves the piston-valve X inward from the position shown in Fig. 1 (which represents the position of the parts when the carriage is at rest) to that shown in Fig. 2 the water under pressure will pass through the coves f, port c, port O, and port M into the cylinder E at the right-hand side of the head D and will move said head with the rod B, head C, and valve A to the left, thus permitting the carriage to ascend, while at the same time the water between the heads C D exhausts through the ports L N a, coves e, apertures i, and ports b Q. As above stated, the entrance of the water under pressure to the right-hand side of the head D effects the movement of said head with the rod B to the left, and hence while the head D is moving to the left the rod B draws with it toward the left the lower end of the lever A′ and throws the lever w, rod t, and upper end of the lever n toward the right, thereby through the rod W drawing the cylinder-valve S toward the left from the position shown in Fig. 2 to that represented in Fig. 3, in which it will be seen that the ports a c are closed from communication with the water under pressure in the pivot-valve chest. This last movement of the cylinder-valve S, cutting off the entrance of water through the ports c O M and closing the port a, leaves the heads C D, valve A, and rod B stationary in the position they had reached at the time said valve S completed its movement toward the left, and hence the carriage will ascend at a regular speed, the latter being governed, of course, by the degree the valve A is opened. To arrest the movement of the carriage, the attendant therein, by drawing on the usual operating-cable, will bring the cam C′ to an intermediate position, as shown in Fig. 5, and thereby draw the valve X outward to the position shown in Fig. 1, under which condition the water at the right-hand side of the head D will exhaust through the ports M O c, coves e, apertures i, and ports b Q, and the water under pressure will pass to the left-hand side of said head D through the port h, coves d, and ports a N L, thereby moving the heads C D, valve A, and rod B back to their initial position, being that shown in Fig. 1. This movement of the rod B to the right toward its initial position actuates the levers A′ w, rod t, and lever n to move the cylinder-valve S inward upon the valve X from the position shown in Fig. 3 to that illustrated in Fig. 1, thereby cutting off the passage of water through the ports a c and holding the piston D and valve A stationary in their initial position, as shown in Fig. 1, the carriage at such time coming to a full stop.

In order to cause the descent of the elevator-carriage, the attendant through the usual cable will turn the cam C′ to draw the piston-valve X′ to its extreme outward position toward the right in order that the water at the right-hand side of the head D may exhaust through the ports M O c, coves e, and apertures i and ports b Q and the water under pressure in the valve-chest pass between the heads C D through the port h, coves d, and ports a N L and move said head D with the rod B and valve A to their extreme position toward the right. During this movement to-

ward the right of the head D, rod B, and valve A the said rod, through the levers A′ *w*, rod *t*, and lever *n*, moves the cylinder-valve S inward and closes the ports *a c*, thus holding the head D and valve A in the position gained by them until during the descent of the carriage the attendant sees fit to arrest its movement in the manner above described.

The valve X is moved in one direction or the other to effect the movement of the heads C D, rod B, and valve A a definite distance, and the rod B through the intermediate mechanism then causes the valve S to cut off the supply of water at the given point at which it is desired to arrest the valve A and heads C D. The point at which the valve A and heads C D are arrested may be governed by the extent of the movement of the valve S. If it is made more short by adjusting the rod *t* downward in the slot *y*, the supply of water will be less quickly cut off, and hence a longer movement will be allowed in the valve A and heads C D and the speed of the elevator-carriage will be increased. By allowing the valve S a longer movement the supply of water will be more quickly cut off, and the valve A will not be so fully opened before its movement is arrested, with the result of diminishing the speed of the carriage.

The entire valve mechanism is under the control of the attendant in the carriage, and hence the movement and the stopping and starting of the latter may be regulated at will.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The valve-chest having the ports N O Q, combined with the cylinder-valve S, having ports *a b c h* and being open at one end and connected with the operating-rod W at the other, the inclosed piston-valve X, having coves *d e f*, exhaust-apertures and open interior *m* and being connected with the rod Y, the main valve A, heads C D, rod B, cylinder E, ports L M, and mechanism connecting the rod B with the valve S and the rod Y with the usual operating-cable, substantially as set forth.

2. The valve-chest having ports N O Q, combined with the hollow valve S, having ports *a b c* less in length than said ports N O Q, the port *h* in said valve S, the inclosed piston-valve having ports and coves and the hollow interior *m* leading to the exhaust-ports, the cylinder E, the main valve, pistons, ports, and rod therein, the lever connections between said rod and said valve S, and intermediate mechanism between the said piston-valve and the usual operating-cable, substantially as and for the purposes set forth.

3. The valve-chest having ports, combined with the cylinder-valve having ports less in length than the first-mentioned ports, the inclosed piston-valve having ports, the cylinder E, the main valve, pistons, ports, and rod B therein, the levers A′ *w n*, and rod *t*, connecting the lever B with said cylinder-valve, and mechanism intermediate the said piston-valve and the hand operating-cable, substantially as and for the purposes set forth.

4. The valve-chest having ports, combined with the cylinder-valve having ports, the inclosed piston-valve having ports, the cylinder E, the main valve, pistons, ports, and rod B therein, mechanism, substantially as described, for operating said piston-valve, and the levers A′ *w n*, and rod *t*, connecting the rod B with said cylinder-valve, the said rod *t* being adjustably secured to the lever *w*, so as to regulate the throw of the cylinder-valve, substantially as and for the purposes set forth.

5. The valve-chest having the ports N O Q, combined with the hollow valve S, open at one end and connected with the rod W at the other end, ports *a*, *b*, *c*, and *h* in said valve S, the inclosed piston-valve X, connected with the rod Y at one end and having ports and coves and its hollow interior *m* open at the other end within said valve S to the exhaust-ports, the cylinder E, the main valve, pistons, ports, and rod therein, lever connections between said latter rod and the rod W, and intermediate mechanism between the said piston-valve and the usual operating-cable, substantially as and for the purposes set forth.

Signed at New York, in the county of New York and State of New York, this 11th day of June, A. D. 1891.

JOHN McADAMS.

Witnesses:
CHAS. C. GILL,
ED. D. MILLER.