(No Model.)

J. McADAMS.

VALVE FOR HYDRAULIC ELEVATORS.

No. 467,705. Patented Jan. 26, 1892.

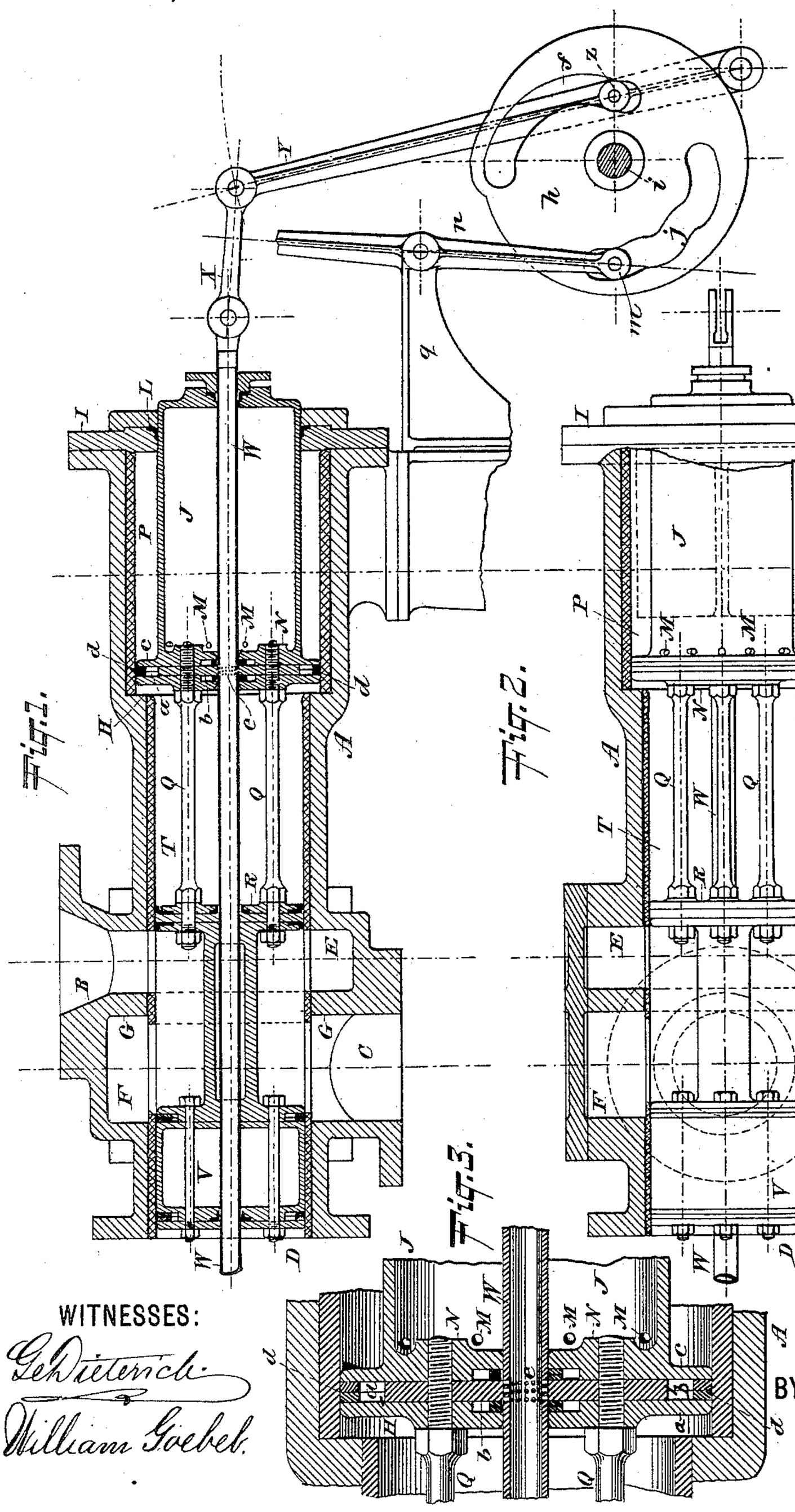

Fig. 1.

Fig. 2.

Fig. 3.

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VALVE FOR HYDRAULIC ELEVATORS.

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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 especially to valves for regulating the action of the motor-fluid in the main operating-cylinder, the object being to enable the attendant in the elevator-carriage with but slight effort to control the supply of water to the operating-cylinder or cut off said supply entirely, and thereby to conveniently and with certainty regulate the ascent or descent or the stoppage of the carriage at will. By means of my invention the motor-fluid is utilized to move the valve which controls the supply to the operating-cylinder and to arrest said valve at the will of the attendant in the elevator-carriage, the latter under the movement of said valve being caused to either ascend or descend or come to a stop.

My invention consists in the novel elements and combinations of parts hereinafter particularly described and claimed.

Referring to the accompanying drawings, Figure 1 is a central vertical longitudinal section of an apparatus embodying the elements of the invention; Fig. 2, a central transverse longitudinal section of same; and Fig. 3, an enlarged vertical section of a detached portion of the apparatus, as hereinafter referred to.

In the drawings, A designates a casing, which is substantially cylindrical in cross-section and provided at its left-hand end with the supply-inlet B for the water or motor-fluid, the outlet C for said fluid to the main operating-cylinder, (not shown,) and the discharge D, which is open to the atmosphere. An encircling belt E communicates with the supply-inlet B, and a like belt F is in communication with the outlet C, said belts being separated by the partition G, which is open at the center to permit a free passage for the water at the proper time and forms at its inner edges a section of the interior cylindrical walls of the left-hand end of the casing A. At the right-hand end of the casing A the diameter of its cylindrical interior thereof is increased, forming the shoulder H, which marks the division between the larger and smaller portions of the cylinder. The right-hand end of the casing A has a head I, which is open at its center to permit the due reciprocation of piston J, and is provided with the packing L to prevent leakage around said piston. The piston J consists of a hollow cylindrical casing closed, with the exception of the series of apertures M and provided at its inner end with the head N, which consists of the plates *a b c*, the plates *a c* extending outward beyond the plate *b* and said hollow casing and holding between their outer edges the packing *d* for said head. The movement of the piston-head N is confined between the shoulder H and head I, which form the ends of the cylinder P of increased area, as shown in Fig. 1. The piston-head N is connected by tie-rods Q with the auxiliary head R, adapted to travel in the smaller cylinder T between the belt E and shoulder H, and said head R is rigidly connected with the valve V, which is of sufficient width to wholly or partially close the outlet C, as may be desired.

Within the casing A, and extending centrally through the piston J, head R, and valve V, is the tube W, which is suitably packed to prevent leakage around it and is adapted to have a direct reciprocating movement, as hereinafter described, under the control of the attendant in the elevator-carriage. The tube W at its left-hand or discharge end is open to the atmosphere, and at a point adjacent to the piston J the said tube is provided with the series of apertures *e* (shown enlarged in Fig. 3) to admit the water into the tube, whence it is discharged. The right-hand end of the tube W is connected by a link X with the lever Y, which is pivotally held at its lower end and carries the roller Z within the slot *f* of the cam-wheel *h*, the latter being mounted on the shaft *i*, which at such times as may be desired may be rotated in either direction by the attendant in the elevator-carriage through the instrumentality of the usual rope or lever connections. (Not shown.) The cam-wheel *h* is provided, also, with the slot *j*, receiving the roller *m*, secured to the lower end of the lever *n*, which is pivoted to the bracket *q* and connected at its upper end

with the valve-rod *t*, the latter being thus rendered operable upon the rotation of the shaft *i* and wheel *h*. The rod *t* carries the valves *w x* within the pilot-valve chest A′, which is mounted on the side of the casing A and is provided with the belts *a′ b′ c′* in communication with the passages *d′ e′ f′*, formed in the casing A, as shown in Fig. 2. The passage *d′* communicates at its inner end with the cylinder P at the left-hand side of the head N, and the passage *f′* likewise communicates with said cylinder at its right-hand end, while the passage or cove *e′* leads to a source of the water-supply under the working pressure. The valves *w x* are seated and adapted to have a sliding movement within the tube B′, held within the valve-chest A′, said tube being perforated in line with the belts *a′ b′ c′* and passages *d′ e′ f′* to permit the free flow of the water and at the same time exclude all foreign matter from the valves *w x*. The movements of the valves *w x* and tube W are in unison, though in opposite directions, and are controlled by the attendant within the elevator-carriage through the medium of the cam-wheel *h*, according as it may be desired to cause the said carriage to ascend or descend or come to a stop.

When the parts are in the position shown in Fig. 1, the inlet B and outlet C are in full communication with the main operating-cylinder (not shown) and the elevator-carriage will ascend. Under this condition the valve *x* will be at the extreme right-hand end of the tube B′ and the valve *w* over the passage *d′*. The water will have passed from the cove *e′* through the tube B′, belt *c′*, and passage *f′* into the cylinder P, and thence through the aperture M into the interior of the piston J, completely filling said cylinder and piston and exerting its pressure against the right-hand side of the head N. Should it be desired to bring the carriage to a stop, the wheel *h* will be turned (through the medium of the usual rope or lever or other device within the carriage) from the one extreme position shown in Fig. 1 a distance sufficient to bring the roller Z of the lever Y and the roller *m* of the lever *n* to an intermediate position in the slots *f j*, and the tube W thereby drawn outward to the right to an intermediate position, its apertures *e* appearing within the piston J. At the same time the movement of the wheel *h* causes the rod *t* to move inward, carrying the valve *x* over the passage *f′* and the valve *w* from the passage *d′* to the extreme left-hand end of the tube B′, thus establishing a communication from the passage *e′* to the left-hand side of the head N, as shown in Fig. 2. The tube W and valves *w x* having been brought to the position last above specified, the supply of water to the cylinder P is cut off, the water from the passage *e′* and belt *b′* passes to the cylinder T at the left-hand side of the head N, and the water within the piston J discharges through the apertures *e* into the tube W, which opens to the atmosphere. Thus the pressure on the right-hand side of the head N is relieved and pressure created against the left-hand side thereof, the effect being that the piston will be moved outward to the right until the head N again closes over the apertures *e* of the tube W, (stopping the discharge of water,) and the valve V passes over the outlet C, at which time the carriage will cease moving. To resume the movement of the carriage, the wheel *h* is turned in a direction opposite to its former rotation, and the tube W thus moved to its position, (shown in Fig. 1,) while the valve *w* closes the passage *d′* and the valve *x* opens the passage *f′*. Under this condition the water in the cylinder T enters the tube W through the apertures *e* and is discharged, and the water from the supply-passage *e′* enters the cylinder P at the right-hand side of the head N, and filling the piston J moves the head N to the left again until it closes over the apertures *e*, as shown in Fig. 1, and has forced the valve V from over the outlet C, whereby is again established a free passage of the water from the supply B to the outlet C and operating-cylinder, while the pressure of the water within the cylinder P holds the piston J in place.

When it is desired to have the elevator-carriage descend, the cam-wheel *h* is turned until the rollers Z *m* of the levers Y *n* are in the ends of the slots *f j* opposite to the ends thereof they occupy in Fig. 1, and thereby the tube W is drawn outward to the right a greater degree than when it is desired to move the valve V to a central position and until its apertures *e* are at the right-hand end of the piston J, while at the same time the passage *d′* is opened and the passage *f′* closed, whereupon the water from the passage *e′* will pass into the cylinder T, and the water within the piston J and cylinder P will gradually discharge through the apertures *e* and tube W, while the pressure in the cylinder T moves the head N to the right until it again closes over the apertures *e*, the piston J at this time extending outward through the head I and the valve V closing the inlet B and permitting the water from the operating-cylinder to discharge through the belt F and outlet D. The elevator-carriage will thus descend until it is again stopped by moving the apertures *e* of the tube W to an intermediate position within the cylinder P, so as to close the valve V over the outlet C, and thereafter the carriage may be caused to ascend again by moving the tube W until its apertures *e* are at the left-hand end of the cylinder P and the valve V moved to the left of the outlet C, as shown in Fig. 1, the passage *d′* under this last condition being closed by the valve *w* and the passage *f′* opened by the valve *x* to admit the water from the passage *e′* to the right-hand end of the cylinder P. It will be observed that the movement of the main valve V is wholly within the control of the attendant in the elevator-carriage, and that this valve may be moved

with but slight effort either to effect the stopping of the carriage or to cause its movement in either direction by the simple sliding of the tube W and valve-rod *t* through the medium of the cam-wheel *h* and its connections; and it will be further observed that I utilize the motor-fluid to move the valve V and to arrest said valve in a very convenient, expeditious, and certain manner without undue waste of water and with but little exertion on the part of the attendant in the carriage.

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

1. The casing having the inlet, the outlet to the operating-cylinder, and the discharge and forming cylinders differing in area, combined with the connected piston, auxiliary head, and valve, the longitudinal sliding tube having apertures adjacent to said piston, and passages for admitting the fluid to the opposite sides of said piston, substantially as set forth.

2. The casing having the inlet, the outlet to the operating-cylinder, and the discharge and forming the cylinders P T, combined with the connected piston and valve, the tube extending through said piston and valve and having inlet-apertures adjacent to said piston, mechanism, substantially as described, for reciprocating said tube, and means, substantially as described, for admitting the fluid to the opposite sides of said piston, substantially as set forth.

3. The casing having the inlet, outlet, and discharge and forming cylinders P T, combined with the hollow piston having a head and side apertures, the auxiliary head and valve connected with said piston, the longitudinal reciprocating discharge-tube extending through said valve and piston and having inlet-apertures adjacent to the latter, and passages for admitting the fluid to the opposite side of the head of said hollow piston, substantially as set forth.

4. The casing having the inlet, outlet, and discharge and forming cylinders P T, combined with the hollow piston having a head and side apertures, the auxiliary head and valve connected with said piston, the longitudinal reciprocating discharge-tube having inlet-apertures adjacent to said hollow piston, passages for admitting the fluid to the opposite sides of the head of said hollow piston, valves for controlling the opening and closing of said passages, and mechanism, substantially as described, for operating said valves and discharge-tube in unison from the elevator-carriage, substantially as set forth.

5. The casing provided with suitable working ports and forming cylinders P T, combined with the connected piston, auxiliary head, and valve within said casing, the discharge-tube having apertures adjacent to said piston, the valves for controlling the admission of the fluid to the opposite sides of said piston, and the cam and levers for actuating said discharge-tube and last-mentioned valves in unison, substantially as set forth.

6. The casing provided with suitable working ports and forming cylinders P T, combined with the connected piston, auxiliary head, and valve within said casing, the reciprocating discharge-tube extending through the same and having inlets adjacent to said piston, the passages *d' e' f'* in said casing, the belts *a' b' c'* in the pilot-valve chest, the tube B' within said chest, and the connected valves *w x* within said tube B', substantially as set forth.

7. The casing having suitable working ports, combined with the hollow perforated piston J within the same and connected with the main valve, the discharge-tube W, extending through said hollow piston and having perforations *e*, passages for admitting the fluid to opposite sides of said piston, and valves controlling said passages, substantially as set forth.

8. The casing having the inlet, outlet, and discharge at one end and the open head at the other end, combined with the connected hollow piston, auxiliary head, and valves, the discharge-tube extending through the same and having apertures adjacent to said piston, the passages for admitting the fluid to opposite sides of the head of said hollow piston, and valves for said passages, substantially as set forth.

Signed at New York, in the county of New York and State of New York, this 10th day of October, A. D. 1890.

JOHN McADAMS.

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