(No Model.) 3 Sheets—Sheet 1.

W. P. GIBSON.

VALVE MECHANISM FOR ELEVATORS.

No. 418,405. Patented Dec. 31, 1889.

Fig. 1.

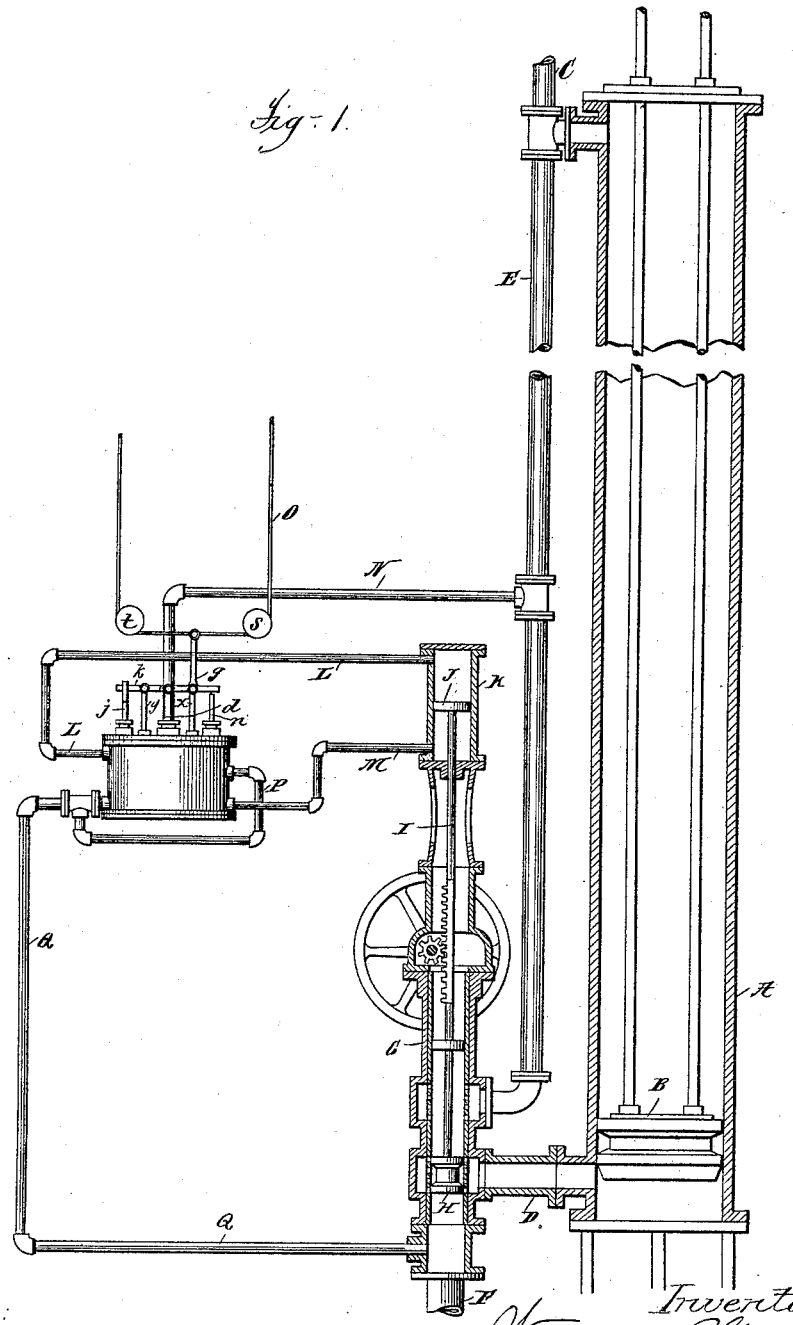

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Fig. 2.

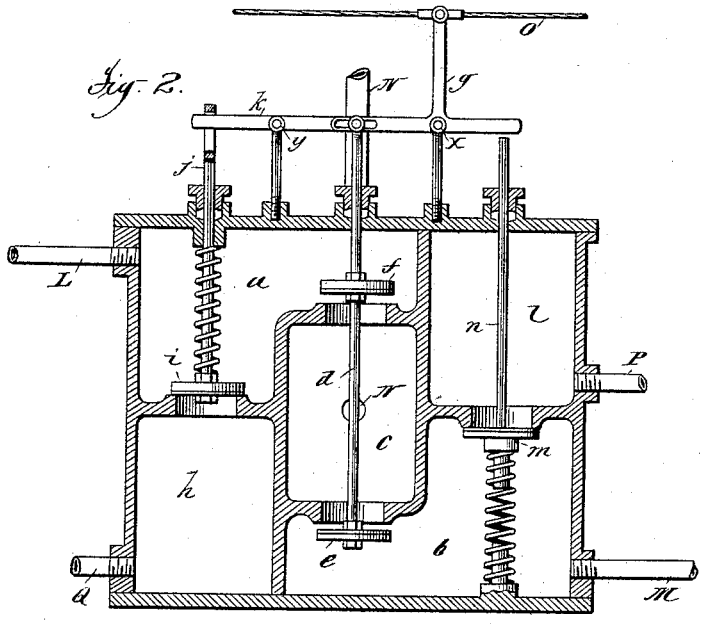
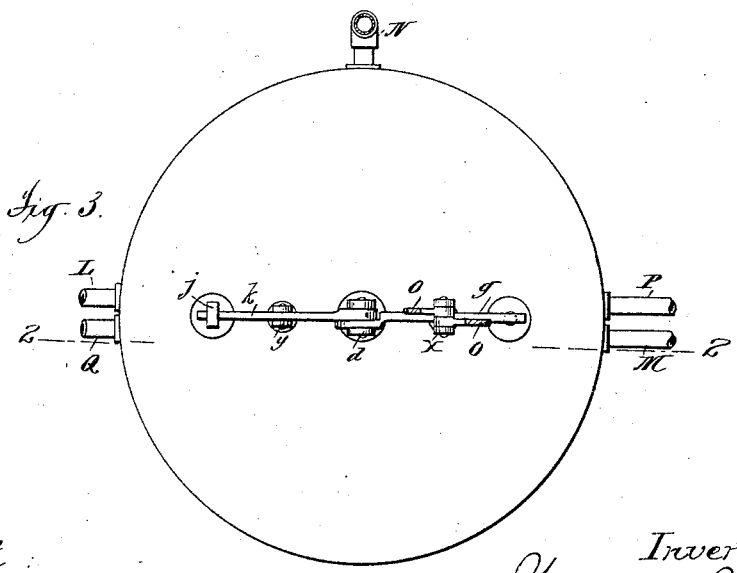


Fig. 3.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

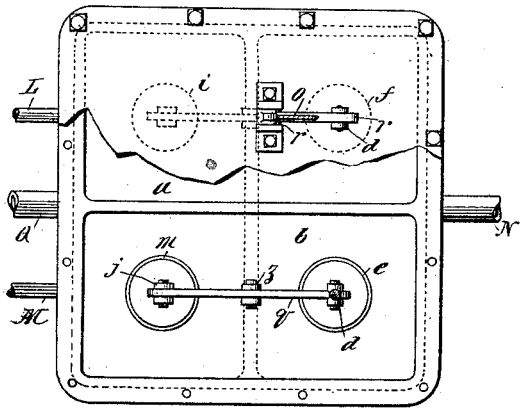


Fig. 5.

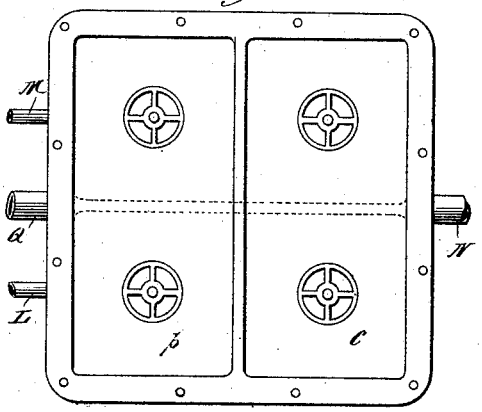
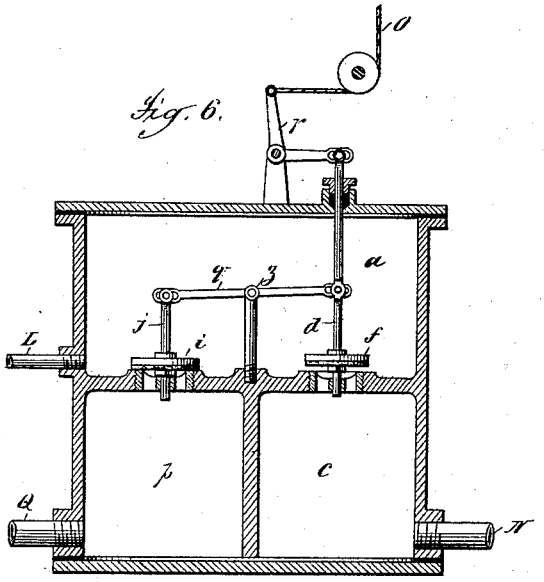


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM P. GIBSON, OF NEW YORK, N. Y.

VALVE MECHANISM FOR HYDRAULIC ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 418,405, dated December 31, 1889.

Application filed December 31, 1888. Serial No. 294,996. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM P. GIBSON, a citizen of the United States, residing at New York, county of New York, and State of New York, have invented certain new and useful Improvements in Valve Mechanism for Elevators, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to improvements in auxiliary-valve mechanisms for controlling the movements of the main valve of an elevator mechanism.

The cylinder of the elevator mechanism, with which the improvements of the present invention may be combined, may be of either the vertical, as shown, or the horizontal type.

In the accompanying drawings, Figure 1 is a vertical sectional elevation of an elevator mechanism equipped with my auxiliary-valve mechanism. Fig. 2 is a vertical section upon the line 2 of Fig. 3, illustrating the construction of the auxiliary-valve mechanism and its operating-connections. Fig. 3 is a plan view of the same. Fig. 4 is a plan view, partly in section; Fig. 5, a bottom view with the bottom plate removed, illustrating a modified form of auxiliary-valve mechanism hereinafter described; and Fig. 6 is an irregular vertical section of the same.

In said drawings it will be understood that the elevator therein illustrated, which is of the type known as a "hydraulic elevator," has the usual power-cylinder A and power-piston B, provided with the usual supply, discharge, and circulating pipes C D E, the discharge-pipe D communicating with a discharge-outlet F in the lower end of a valve-casing G, containing the main valve H and valve-rod I, the upper end of which rod carries a piston J, working in a small cylinder K, mounted upon the valve-casing G, the several parts of the elevator mechanism thus briefly referred to being constructed and arranged in the usual manner.

The upper end of the cylinder K communicates by means of a pipe L with a chamber *a*, formed in a casing inclosing the auxiliary-valve mechanism. The lower end of said cylinder also communicates through a pipe M with a second chamber *b* within said casing. The chambers *a b* are both normally in communication with a supply-chamber *c*, receiving its water-supply from a supply-pipe N, connected directly or through the medium of the circulating-pipe E with the supply-pipe C. The chamber *c* has passing through it a valve-rod *d*, carrying at its lower end a valve *e*, controlling communication between the supply-chamber *c* and the chamber *b*, and also carries a second valve *f*, controlling communication between said supply-chamber and the chamber *a*. Communication between the chamber *a* and an exhaust-chamber *h*, located below it, is controlled by a valve *i*, the rod *j* of which is slotted and receives the end of a lever *k*, which is fulcrumed at *y* and has its opposite end slotted and connected loosely to the valve-rod *d*, as shown best in Fig. 2. Communication between the chamber *b* and a discharge-chamber *l*, located above it, is controlled by a valve *m*, the rod *n* of which passes to the outer side of the valve-casing directly under the free end of a T-lever *g* fulcrumed at *x*, by which lever said valve-rod and valve are depressed to open communication between the chamber *b* and its discharge-chamber *l*. The other or slotted end of said lever is also loosely connected to the valve-rod *d*. The pressure of the water will always tend to close the valves *i m*, and this may be aided by springs, as shown, if preferred. The discharge chamber *l* is provided with a discharge-pipe P, coupled to a discharge-pipe Q, leading from the discharge-chamber *h* to the discharge-outlet F. The valves *i m* will normally close communication between the chambers *a b*, respectively, and their discharge-chambers. The valves *f e* will normally be in such position as to permit communication between the supply-chamber *c* and the chambers *a b*, respectively. The supply-valves are so arranged relatively to each other that the depression of the discharge-valve *m* to open the chamber *b* to the discharge also operates to raise the valve *e* to cut off communication between the supply-chamber *c* and the chamber *b*. When the discharge-valve *i* is raised the chamber *a* will be opened to the discharge-outlet *h* and the supply-chamber *c* cut off from communication with the chamber *a*. The lever *k* and

T-lever g are so connected to the valve-rod d that the rocking of the latter to depress the rod d will at the same time rock the lever k, and through the rod j raise the valve i to open communication between the chamber a and the discharge-chamber h, the connected ends of the levers k and g being slotted to permit a slight amount of lost motion between them.

The operation of the auxiliary-valve mechanism when thus organized is as follows: Let it be assumed that the parts are in the positions in which they are shown in the drawings—*i. e.*, in their several normal positions—and that the piston B is at its lower limit of movement, with the main valve H in its central position. To cause the proper movement downward of the main valve H to permit the circulation of water from the upper to the lower end of the cylinder, the conductor from the car will draw the hand-rope O upward around the pulley s, and thereby rock the lever g, and cause its free end to depress the valve-rod n and its valve m, and thus open communication between the chamber b and the discharge-outlet, and at the same time raise the valve e to shut off communication between the chamber b and the supply-chamber c. The water then entering the chamber a will pass therefrom through the pipe L to the upper side of the piston J, which it will then force downward, the water upon the under side of the piston being expelled from the cylinder K, through the pipe M, to the chamber b, and thence to the discharge-chamber l and discharge-pipe P. This downward movement of the piston J will be continued until the valve H has been moved downward a sufficient distance to open communication between the upper and lower end of the cylinder A, and thus permit the circulation of the water from the upper to the lower side of the piston B. When it is desired to stop the movement of the piston B, the operator will draw upon the hand-rope O in the reverse dition—that is, upward around the pulley t—and thus raise the discharge-valve i and lower the supply-valve f, and open communication between the chamber a and the discharge, and also open communication between the chamber b and the supply-chamber c, and at the same time shut off communication between the chamber a and the source of supply, the valve m, when relieved from the pressure of the lever g, rising and shutting off communication between the chamber b and the discharge. The operation will then be reversed, water entering the lower end of the cylinder K, and forcing the piston J upward and expelling the water from the upper side of said piston through the pipe L to the chamber a, and thence through the discharge-chamber h to the discharge-pipe Q. This upward movement of the piston J will be continued until the valve H has been raised to its central position, when the circulation of the water from the upper to the under side of the piston B being prevented, the piston will be brought to rest. To cause the piston to ascend, the upward movement of the piston J will be continued until the valve H has been raised sufficiently to open communication between the discharge-pipe D and the discharge-outlet F, when the piston will descend.

To stop the piston J and main valve H in any position it is only necessary to release the hand-rope. The pressure of the water will then cause the valves i m to resume their normal positions and move the valve-rod d to its mid-position, so as to open both valves e f. The exhaust from both sides of the piston J will then be closed and the induction to both sides of said piston will be open, thus holding the piston J in equilibrium.

Referring now to Figs. 4, 5, and 6, the construction therein illustrated will be described. As shown therein, the lower half of the valve-casing contains a supply-chamber c and a discharge-chamber p, said supply and discharge chambers communicating with chambers a b, arranged transversely thereof in the upper half of the valve-casing and corresponding to the chambers a b, heretofore described. The chambers a b, like those of the previous construction, are provided with pipes L M, respectively, which communicate with the upper and lower end of the cylinder K, respectively. The supply-chamber c is provided with a supply-pipe N, and the discharge-chamber with a discharge-pipe Q. As in the former construction the supply-chamber c is normally in communication with the chambers a b and the discharge-chamber p out of communication therewith. In this instance the two chambers a b have a common discharge-chamber p. Communication between the supply-chamber c and the chambers a b is controlled by means of valves f e, respectively, corresponding as to function to the valves f e of the previously-described organization, and communication between the chambers a b and the discharge-chamber p is controlled by means of valves i m, respectively, corresponding to the valves i m, heretofore described. The supply and discharge valves of each of the chambers a b are loosely connected to the slotted ends of a lever q, which is the equivalent of the lever k, and is fulcrumed at z, and the rod d of each of the supply-valves f e is extended, and upon the exterior of the casing is loosely connected to the slotted end of a bell-crank lever r, which is the equivalent of the lever q, and to the other end of which is connected the hand-rope O of the elevator. The valves f e are held in their raised or normal position by the pressure of the water confined within the chambers a b, respectively.

The operation of the organization is substantially the same as that just described. When it is desired to raise the piston B, the conductor will, through the hand-rope O, rock the bell-crank lever r of the valves e m, so as to shut off communication between the supply-chamber c and the chamber b and open

communication between the latter and the discharge-chamber *p*. The pressure of the water upon the under side of the piston J of the cylinder K being thus relaxed the pressure of the water upon its opposite side will force it downward, expelling the water from its under side through the pipe M to the chamber *b* and thence to the discharge-chamber *p* and pipe Q. To move the piston J in the opposite direction the operation will be reversed, the chamber *a* being opened to the discharge and closed to the supply chamber and the chamber *b* closed to the discharge and opened to the supply chamber.

The auxiliary-valve mechanisms of the present invention are capable of use in connection with apparatus other than that described and are also capable of performing other functions.

It is also to be remarked that the auxiliary-valve mechanisms described may be used in connection with elevators operated by appliances other than those described—as, for example, by electro-magnets.

What I claim is—

The combination, with the cylinder K and piston J, of the valves *f e*, controlling the flow of water to the opposite ends of said cylinder and normally in position to open the supply to both ends of said cylinder, and the discharge-valves *i m*, normally maintained in position to close the discharge from both ends of said cylinder, and the levers *k g*, connected to each other and to the valves *e f*, and also acting upon the rods of the valves *i m* to control all of said valves, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

WM. P. GIBSON.

Witnesses:
J. J. KENNEDY,
EDWARD WOOD.