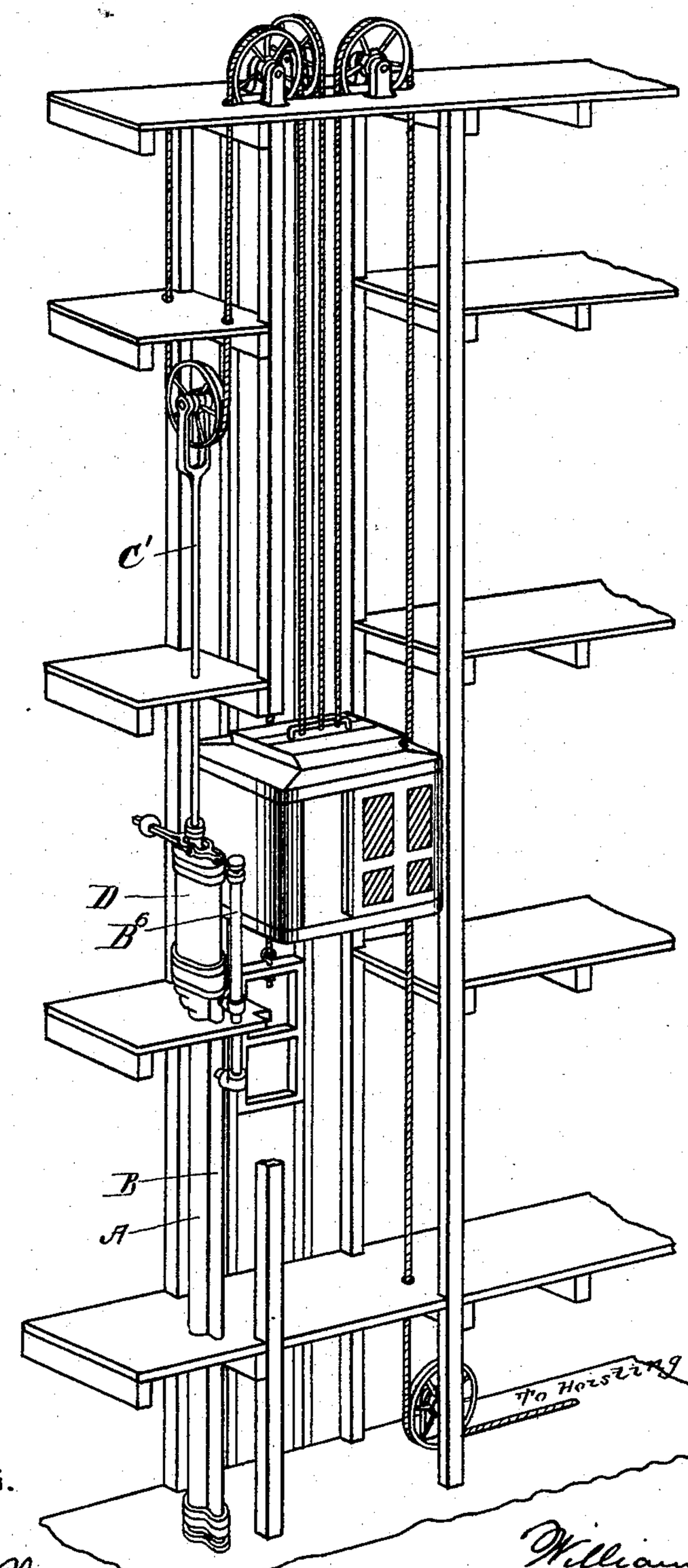
(No Model.) 2 Sheets—Sheet 1.

W. E. NICKERSON.

FLUID SPEED REGULATOR FOR ELEVATORS.

No. 407,677. Patented July 23, 1889.



WITNESSES.

Matthew M. Blunt.
Frankly. Parker

INVENTOR.

William E. Nickerson

Fig. 1.

(No Model.) 2 Sheets—Sheet 2.

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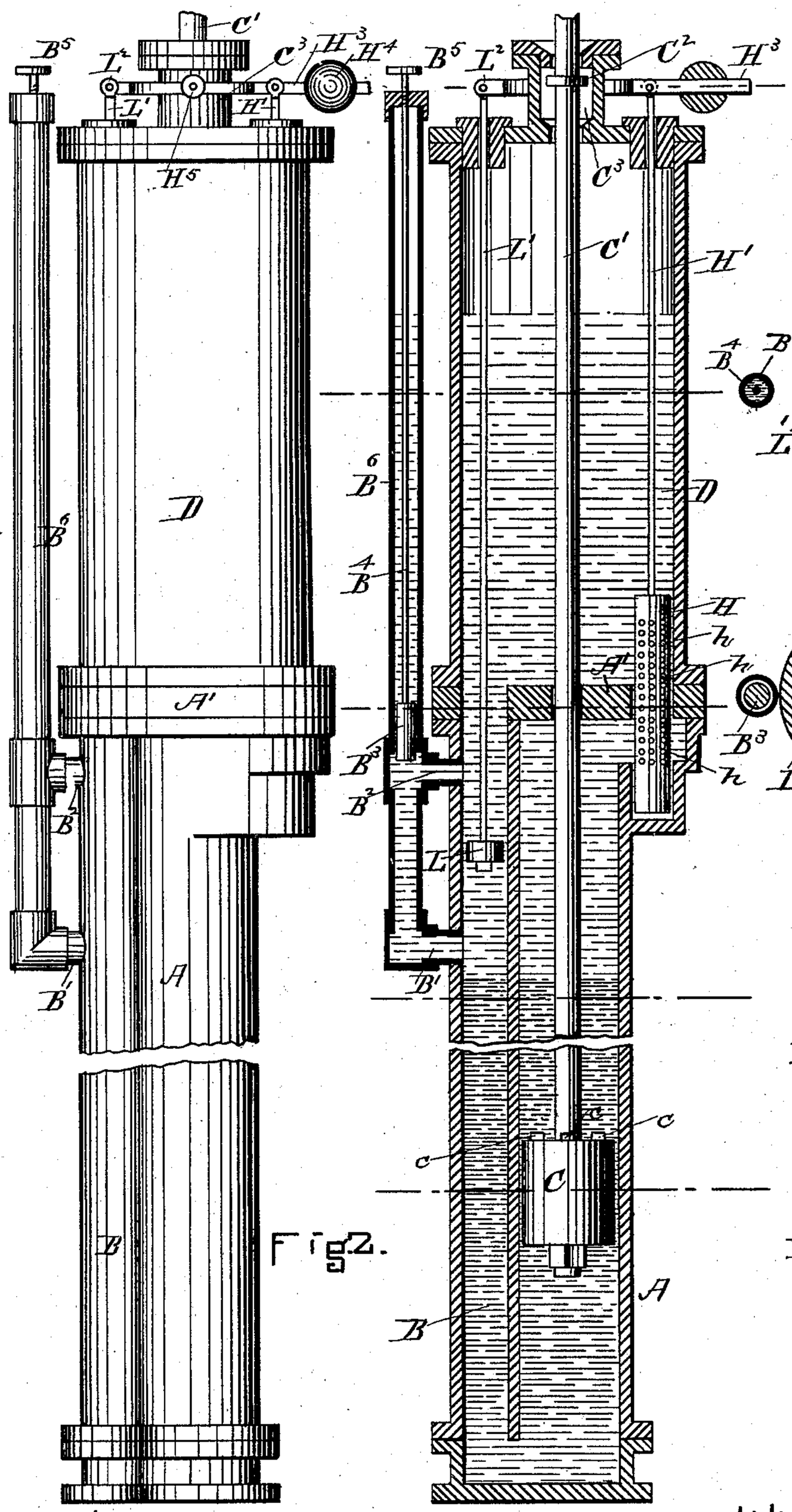

Fig. 2.

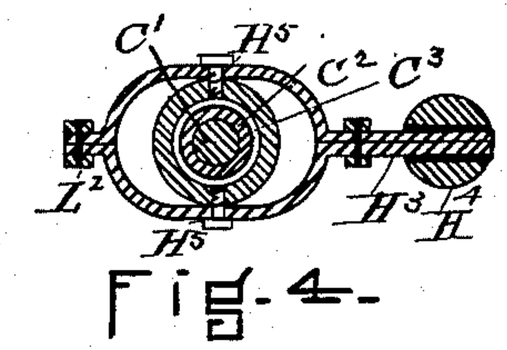

Fig. 4.

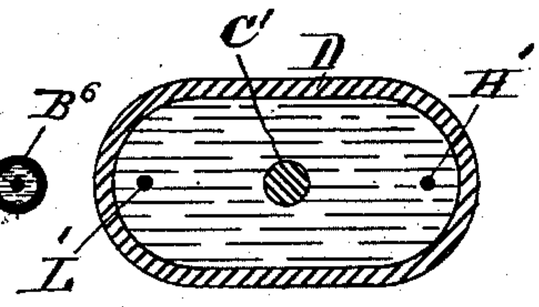

Fig. 5.

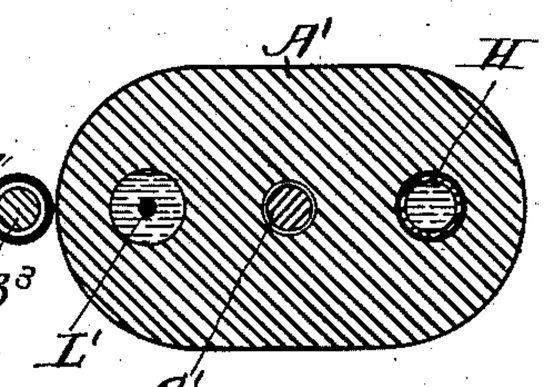

Fig. 6.

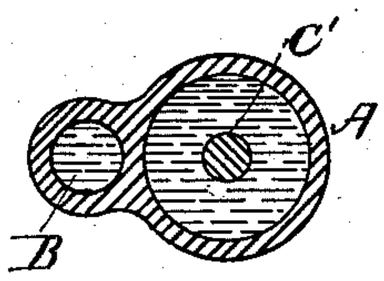

Fig. 7.

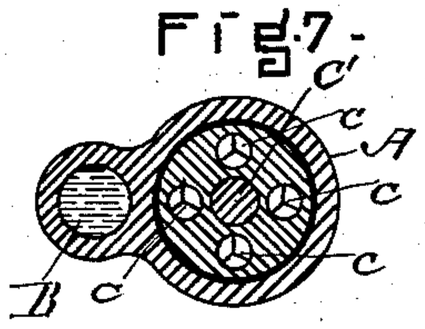

Fig. 8.

Fig. 3.

WITNESSES.

Frank A. Parker

Matthew M. Blunt.

INVENTOR.

William E. Nickerson

UNITED STATES PATENT OFFICE.

WILLIAM E. NICKERSON, OF CAMBRIDGE, MASSACHUSETTS.

FLUID SPEED-REGULATOR FOR ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 407,677, dated July 23, 1889.

Application filed April 22, 1889. Serial No. 308,060. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM EMERY NICKERSON, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Fluid Speed-Regulators for Elevators, &c., of which the following, taken in connection with the accompanying drawings, is a specification.

My invention relates to the class of hydraulic retarders or speed-governors employed in connection with elevators for buildings, in which a piston and cylinder are used, said piston resisting in one direction and from one side only, being followed on the passive side by a mass of fluid whose function is merely that of replacement.

The object of my invention is to prevent the velocity of the elevator-carriage from exceeding a fixed limit. This object I attain by the mechanism shown in the accompanying drawings, in which—

Figure 1 shows such parts of an elevator as are necessary to illustrate the application of my invention when embodied in a fluid-retarder. Fig. 2 is an enlarged view, in elevation, of the upper and lower portions of the retarder. Fig. 3 is a view, partly in elevation and partly in vertical section, corresponding to Fig. 2. Figs. 4, 5, 6, 7, and 8 are horizontal sections taken on the dotted lines by which they are severally connected to Fig. 2.

In the drawings, A represents the main cylinder of the regulator, C its piston, and C′ the piston-rod, which has at C^2 an annular ring or gasket, which is adapted to rub loosely on the piston-rod C′ and free it from any accumulated oil or other substance that may adhere to it, the said gasket being confined in its motion to the space within the box C^3 at the top of the reservoir-cylinder D. The piston C has a number of valves *c c c c* in it, as shown in Figs. 3 and 8. The valves open upward and serve to allow the piston C to descend freely.

My device for regulating the speed of the piston C in its upward or resisting stroke corresponding to the descent of the carriage may be described as follows:

B is a passage leading from the bottom of the cylinder A up into the reservoir D, directly past the disk L, and indirectly through the shunt-passage B′ B^2 around the disk L.

B^3, Figs. 3 and 6, is a plunger set near the passage B^2, Fig. 6, and so arranged that it can be raised or lowered to more or less check the flow of fluid through the passage B^2, and thereby increase or diminish the effect of the current on the disk L in the passage B.

B^4, Fig. 3, is a rod attached to the plunger B^3, and, passing upward through the tube B^6, has a screw-thread, and a handle B^5 at its top, by which it can be adjusted.

H, Fig. 3, is a balanced valve made tubular, as shown, and open at the lower end, which extends down into a recess, and having a number of perforations *h h*, through which fluid may flow in its passage from that part of the cylinder A that is above the piston C to the reservoir D, or back from the reservoir to the upper part of the cylinder.

A′, Fig. 3, is a division-plate which, in a general way, separates the reservoir D from the cylinder A. The balanced valve H has a valve-rod H′, which passes upward through the reservoir D and is connected to a weighted lever H^3, being pivoted at H^5, and having its opposite end attached at L^2 to the rod L′ of the disk L.

My device acts as follows: If we suppose that the piston C is moving upward and checking the too rapid descent of an elevator-carriage or other descending load, any increase in the rapidity of ascent of the piston beyond the fixed limit will cause increased flow of fluid downward through the passage B, and this increased flow will, acting on the disk L, cause it to move downward, and, acting through the rod L′ and lever H^3 and rod H′, lift up the balanced valve H, and by lessening the number of perforations *h h* below the division-plate A′ restrict the flow of fluid from the upper part of the cylinder A to the reservoir D. In case the piston C is moving too slowly, then the weight H^4 on the lever H^3, not being balanced by the pressure caused by the flow of fluid on the disk L, will force the rod H′ and the balanced valve H downward, thus presenting more of the openings *h h* below the division-plate A′ and admitting of a greater freedom of flow of fluid from the upper part of the cylinder A to the reservoir D.

Instead of weighting the lever H^3, the valve itself may be made sufficiently heavy to accomplish a like result.

The plunger B^3 can be set so as to restrict to the desired amount the flow of fluid through the shunt-passage $B' B^2$, so as to cause such a proportion of the fluid to pass directly by the disk L as may be required to effect the adjustment of the balanced valve H; but this adjustment may be omitted altogether, or the weight H^4 on the lever H^3 may be substituted for it and the whole adjustment be effected by the said weight. In fact, it is not essential to my invention that any adjusting device be used, as the mechanism may be adapted to its work and remain in fixed condition.

During the downward stroke of the piston C corresponding to the upward movement of the carriage the upwardly-opening valves *c c c c*, co-operating with the valve H, remove all restraint to its free descent.

From the above it may be seen that my invention consists of combining with an elevator a speed-regulator in which a balanced valve controlling the flow of fluid to and from the working side of its main piston is adjusted in its position (so as to regulate the flow of fluid through it to and from the working side of the said piston) by means of a disk located in the pipe that takes fluid to and from the passive side of the speed-governing piston, said disk being adapted to be moved by the combined effect of the flow of fluid in the pipe in which it is located and a weight, and being so connected to the balanced valve above referred to that its movement shall control the movement of the said balanced valve.

The gist of the invention consists in the combination, in a fluid-retarder, (of the kind referred to in the first paragraph of the specification,) of a balanced valve in the passage-way leading to the working side of the main piston with a disk in the passage-way leading to the passive side of the main piston, said disk thus operating said balanced valve (in opposition to a retractor) by the velocity of flow alone independent of the pressure on the working side of the main piston.

I claim—

1. In a fluid-retarder, the combination of a cylinder and piston with a balanced valve, a disk movable by the flow of the fluid, and connections between the disk and the valve whereby the undue velocity of the flow of the fluid operates the valve and restricts the movement of the piston, all substantially as described.

2. In a fluid speed-regulator, the cylinder A, piston C, piston-rod C′, balanced valve H, pipe B, having a disk L, and mechanism for connecting the disk L and balanced valve H, substantially as and for the purpose set forth.

3. In a fluid speed-regulator, the cylinder A, provided with a shunt-passage, piston C, piston-rod C′, balanced valve H, pipe B, disk L, and connecting mechanism between the disk L and valve H, and regulating-plunger B^3, substantially as and for the purpose set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, on this 20th day of April, A. D. 1889.

WILLIAM E. NICKERSON.

Witnesses:

FRANK G. PARKER,

MATTHEW M. BLUNT.