(No Model.) 2 Sheets—Sheet 1.

A. M. HALEY.

VALVE FOR HYDRAULIC FREIGHT ELEVATORS, &c.

No. 553,404. Patented Jan. 21, 1896.

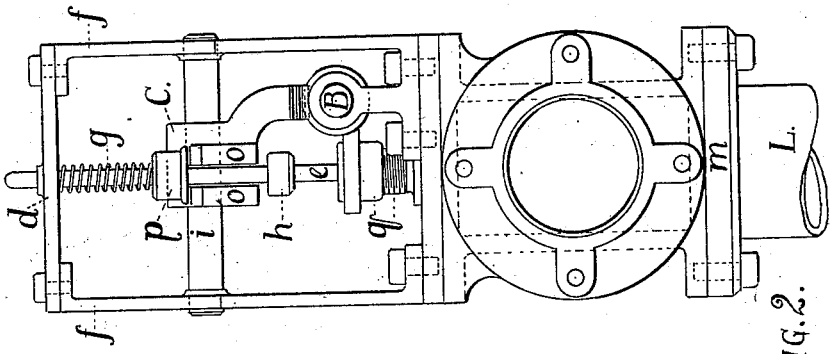

FIG. 2.

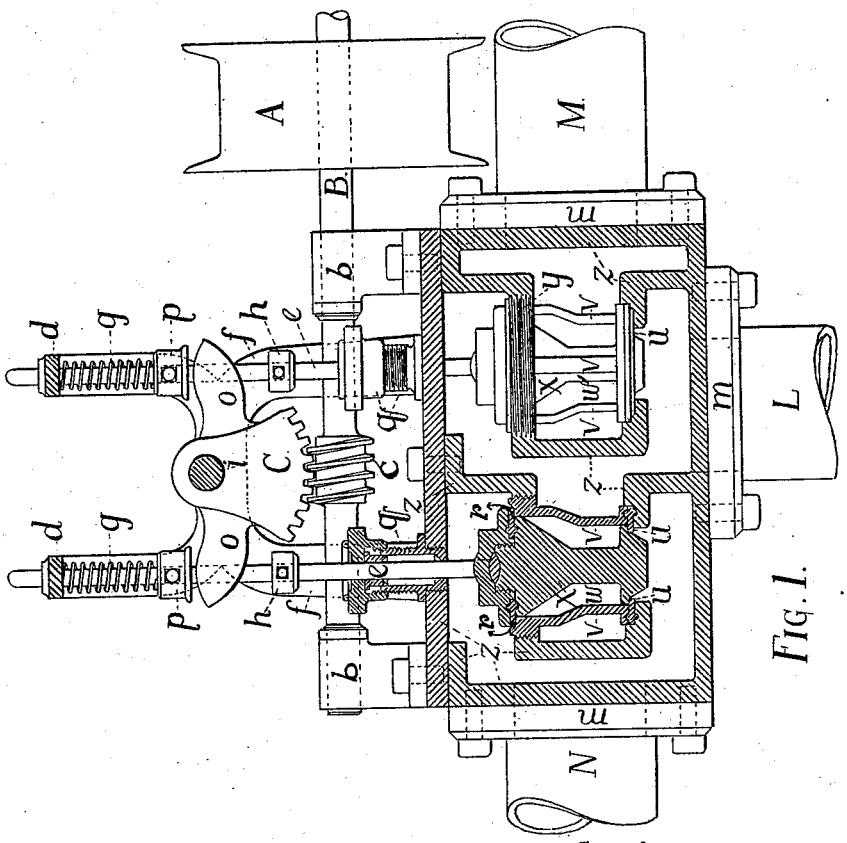

FIG. 1.

WITNESSES.

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(No Model.) 2 Sheets—Sheet 2.

A. M. HALEY.

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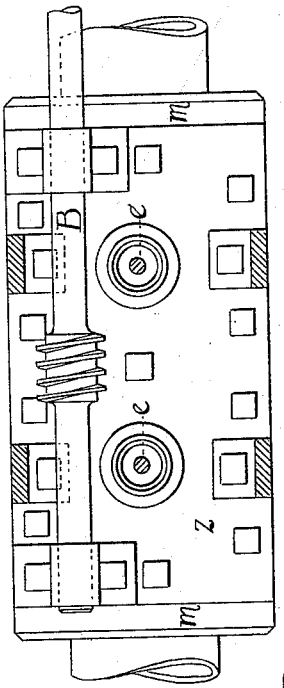

FIG. 5.

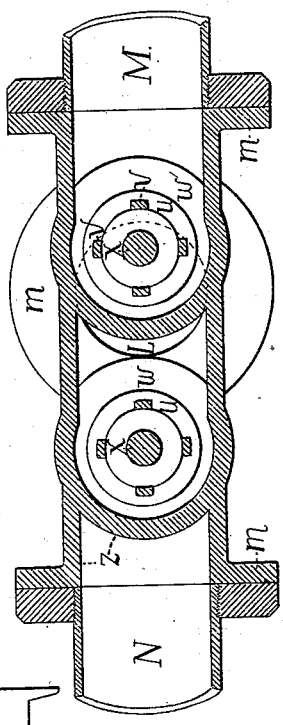

FIG. 4.

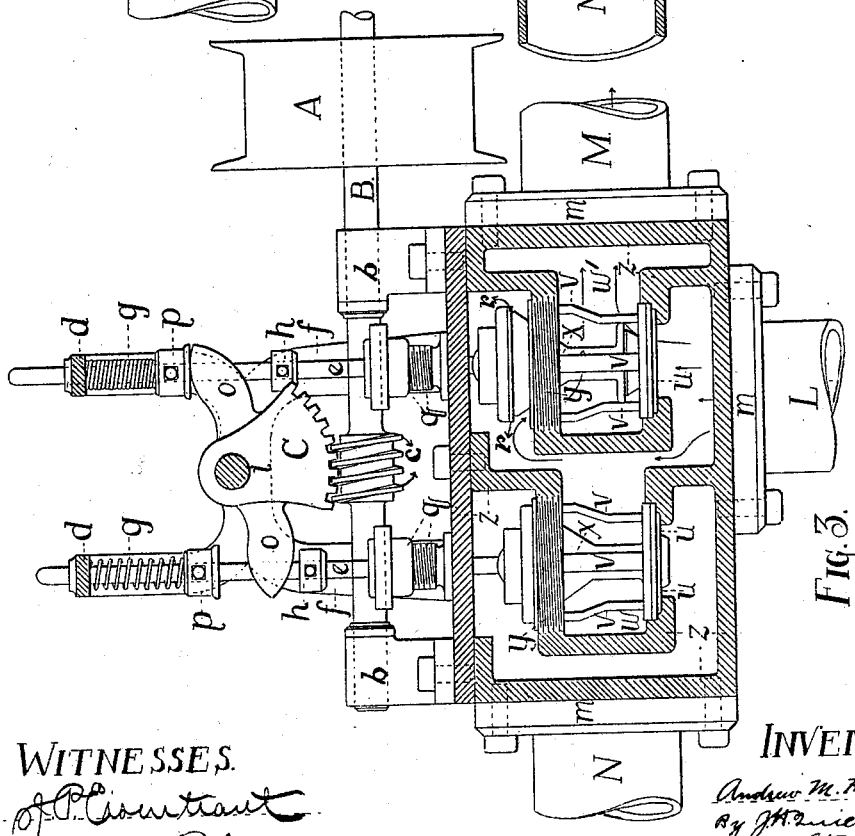

FIG. 3.

WITNESSES.

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UNITED STATES PATENT OFFICE.

ANDREW M. HALEY, OF SIOUX CITY, IOWA.

VALVE FOR HYDRAULIC FREIGHT-ELEVATORS, &c.

SPECIFICATION forming part of Letters Patent No. 553,404, dated January 21, 1896.

Application filed December 10, 1892. Serial No. 454,725. (No model.)

To all whom it may concern:

Be it known that I, ANDREW M. HALEY, a citizen of the United States, residing at Sioux City, in the county of Woodbury and State of Iowa, have invented a certain new and useful Valve for Hydraulic Passenger and Freight Elevators, of which the following is a specification.

My invention relates principally to improvements in valves for starting, stopping, and reversing those passenger and freight elevators which are propelled by water forced into a cylinder wherein a piston is forced in one direction propelling the elevator upward, while the weight of the elevator and its contents in descending causes the piston to return.

It consists of a water-chamber divided into two valve-compartments with upper and lower openings adapted to be opened and closed by doubly-conical valve-cores co-operating with flexible pads, the lower pad in each valve-compartment being ring-shaped with its outer edge confined and its inner edge forming a free flexible lip, a reciprocating journaled lifter driven by a perpetual screw and pipes for the ingress and egress of the water, and a suitable frame for retaining the parts in place. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical longitudinal section of water-chamber and one valve, showing other parts in elevation in position in which both valves are closed. Fig. 2 is an end elevation of entire device. Fig. 3 is a vertical longitudinal section of water-chamber, showing in elevation the right-hand valve open and the lifter in position opening it. Fig. 4 is a horizontal longitudinal section of water-chamber and valves. Fig. 5 is a top view of water-chamber with all superimposed mechanism removed except screw, shaft, and bearings, showing cross-section of valve-rods and frame-irons.

Similar letters refer to similar parts throughout the series of views.

The wheel A is rigidly fixed on the shaft B and is adapted to be turned in either direction by suitable appliances, as a wire rope or cable within the control of the person operating the elevator, in the usual manner. The shaft B is held firmly in place by its bearings *b*, in which it is adapted to turn. It is provided with the screw-thread *c* consisting of a sufficient number, as four, of turns of the thread adapted to engage the cogs of the lifter C, which are arranged on its lower edge in the segment of a circle. Lifter C is preferably composed of metal, and is journaled preferably at the center of its upper half, its journal *i* being adapted to turn in and held firmly in place by suitable bearings in the frame-iron *f*. The lifter C is provided with ears O O, and each of these ears is deeply grooved or split vertically, and thus adapted to straddle closely the valve-rods *e e*, as is clearly shown in Fig. 2. The horizontal frame-irons *d* are pierced for the passage of the valve-rods *e*, and coiled around said rods below *d* down to the stops *p* with which rods *e* are provided are the spiral springs *g g*. The valve-rods *e e* pass downward through the water-tight packing-boxes *q q* and terminate in valve-cores X X, each of which opens and closes the upper and lower openings of its valve-chamber W or W′.

The walls Z of the water-chamber and valve-chambers are preferably composed of iron or other metal, and are sufficiently strong to withstand the pressure of water forced into the chamber.

Through pipe N and valve-chamber W (when open) water is forced through pipe L to the cylinder, thus forcing the elevator up. Reversing the action, through pipe L, valve-chamber W′ and pipe M the water is allowed to waste when valve-chamber W′ is opened, thus allowing the elevator to fall.

The valve-chambers W and W′ are provided at the top and bottom with openings, preferably circular, adapted to be opened and closed by the valve-cores X. The upper orifice is encircled by the annular collar Y, which screws water-tight into the chamber-wall Z. The valve-cores X are at top and bottom approximately conical, so as to make gradually-widening openings when raised. The annular collar Y on its upper surface forms a seat for the ring *r*, of soft rubber or other springy substance, which forms a terrace around the valve-core X at the point where its sloping sides come in contact with the edge of the circular upper opening of the valve-chamber.

Ring r is held firmly in place by any suitable means, as by making the core of two pieces, as shown in the left-hand valve-core in Fig. 1, which are screwed together with the ring r interposed and firmly held between them.

Conical valves have been used hitherto for the reason that they fit any orifice of any size intermediate in area between their base and point, thus promoting accurate seating; but in my invention I use them for an additional and very different purpose. I place the seat near the base of the cone, and allow the body of the cone, in closing the valve, to pass through and occupy this orifice. By this means I secure a gradual instead of a sudden stoppage of the mechanism operated by the valve, which is very essential in such appliances as passenger and freight elevators.

The braces V extend from the collar Y downward to the bottom of the valve-chamber, where they hold firmly in place ring u, of soft rubber or other springy substance, (similar to ring r,) which encircles the lower orifice of the valve-chamber. The lower end of the valve-core X slopes, cone-like, downward, and at the point where its sloping sides come in contact with ring u, encircling the lower orifice of the chamber, is provided with a flange or terrace, which is adapted to press downward on ring u, as upon a seat, forming a water-tight closure of the lower orifice, at the same time that the upper orifice is closed by ring r pressing on collar Y, as aforesaid. Pipes L, M and N are joined to the walls of the water-chamber in such a way as to make a water-tight joint, as by screwing into suitably-made openings in the plates m, which are fastened water-tight to the walls Z of the water-chamber. The orifice of the elastic ring u is somewhat smaller in diameter than the opening which it encircles. By this construction a lip is left to be acted upon by the inrushing water and the closure of the lower orifice of the valve-chamber is rendered tighter by the pressure of the water.

The wheel A being turned in either direction by the operator, the shaft B rotates with it, and by the action of the screw-thread c the lifter C is turned on its journal, throwing one of its ears O up and the other down. This position is shown in Fig. 3. The right-hand ear is raised, and by pressing upward under the stop p raises its valve-rod e, compressing its spring g, and by lifting the valve-core X opens both orifices of the valve-chamber W', allowing the water to escape through pipes L and M to the waste-tank or sewer. At the same time the left-hand ear O is depressed, its valve-rod e by the combined action of the spring g and the pressure of the ear on the stop h is pressed down, forcing its valve-core X downward and bringing its elastic ring r firmly down upon its seat on the annular collar Y, and its lower terraced side firmly down upon its elastic ring u, thus closing both orifices of valve-chamber W. Bringing the reciprocating lifter C to a horizontal position, as in Fig. 1, closes both valve-chambers at once, and the elevator is stopped. The pressure of the water being equal upward and downward on the valves, it has no tendency of itself to start. A simple reversal of wheel A will throw open valve-chamber W leaving valve-chamber W' closed, and the elevator is forced upward.

It is obvious that the springs g are not essential to my invention, as weights on rods e or other appliances might be used for keeping the valves normally closed.

The terms "upward," "downward," &c., are used by me for convenience of description only, as it is clear the vertical or horizontal position of the mechanism is not material. It is also obvious that my invention is adapted to operate any mechanism in which the motive power is water or other liquid, gas or vapor and the machinery is driven reciprocally by the reversal of the current.

I am aware that prior to my said invention many elevator-valves have been invented. Therefore I do not claim such an invention broadly.

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

1. In elevator-valves a water-chamber constructed with strong walls as Z, and containing the two valve-chambers W and W', each having two orifices, the elastic ring or pad u and suitable means as the braces V for holding the same in place; the valve-cores X, shaped as shown, and each provided with the elastic collar or pad r; the valve-rods e firmly attached to said valve-cores and passing therefrom through suitable packed boxes, as q, out of the water-chamber and through openings in the frame-irons d; the stops h and p on said rods; the coiled springs g coiled about said rods and compressed between frame-irons d and stops p and adapted to force home the valve-core X, and normally close the orifices aforesaid; in combination with the lifter C, provided with cogs as shown; its journal i and its bifurcated ears O, the shaft B, with its screw-thread c adapted to engage the cogs of the lifter aforesaid, and suitable means as the wheel A, for turning said shaft either way, at will of operator; all substantially as set forth, and for the purposes specified.

2. In elevator-valves, a valve-chamber having upper and lower orifices for the ingress of water, the upper orifice being formed by a collar as Y, inserted water-tight in the upper wall of the chamber, a compressible elastic pad, as u at the bottom of the chamber, so shaped as to project inward and form the edge of the lower orifice, forming a flexible lip about said orifice; metallic braces passing downward from the annular collar, for holding said pad firmly in place, a valve-core adapted to move up and down in said chamber, and having those portions of its length which occupy the orifices, enlarged and tapering so as to close the orifices when the core

is pressed downward, a flange or terrace on that portion of the core which comes in contact with the edge of the lower orifice which forms a seat for said terrace, a groove or terrace around the core forming a recess for the upper edge of the annular collar when the core is pressed down closing the upper orifice, a soft, compressible and elastic pad, as *t* fixed to the core at its point of contact with the edge of the upper orifice and adapted to be pressed down upon the upper surface of the annular collar; suitable means as the rod *e* and spring *g* for keeping said orifice normally closed, and appropriate mechanism, as the lifter C, and its actuating device for opening them when desired; substantially as above set forth, and for the purposes specified.

3. In operating valves, a valve-chamber having two orifices for the admission of water in opposite sides of said chamber; a doubly-conical core, normally closing said orifices, but adapted to open them as said cones are withdrawn from the orifices; a soft and elastic pad fixed upon and encircling the upper cone, and adapted to close the upper orifice by co-operating with the outer surface of the chamber at the edge of said orifice; a ring-shaped soft and elastic pad having its outer edge firmly fixed about the orifice on the inner surface of the chamber and adapted to form a seat; a terrace on the lower cone normally pressed upon said seat; the inner edge of said ring-shaped pad, projecting inward and forming a free flexible lip about said orifice; substantially as above set forth, and for the purposes specified.

4. In operating valves, a water-chamber with strong walls, as Z, and containing two valve-chambers W and W′ each having two oppositely-placed orifices; around each lower orifice, an elastic ring or pad, as *u* having its outer edge held firmly in place by the braces V, and its inner edge free, forming a flexible lip, the doubly-conical valve-cores X, shaped as shown, adapted to, in process of seating, gradually close said orifices; the elastic collar or pad *r*; suitable means, as the rods *e* and the lifter C, with their actuating mechanism, for operating said valves; all substantially as above set forth, and for the purposes specified.

ANDREW M. HALEY.

Witnesses:
J. H. QUICK,
ALFRED PIZEY.