No. 753,570. PATENTED MAR. 1, 1904.

C. P. HALL.

AUTOMATIC ELEVATOR RETARDING DEVICE.

APPLICATION FILED APR. 3, 1903.

NO MODEL.

Fig. 2.

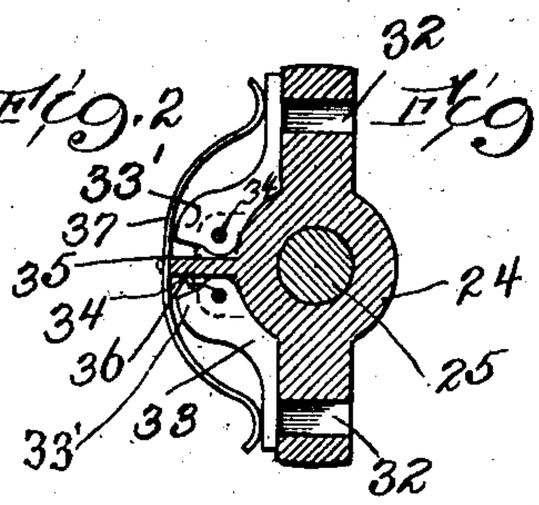

Fig. 1.

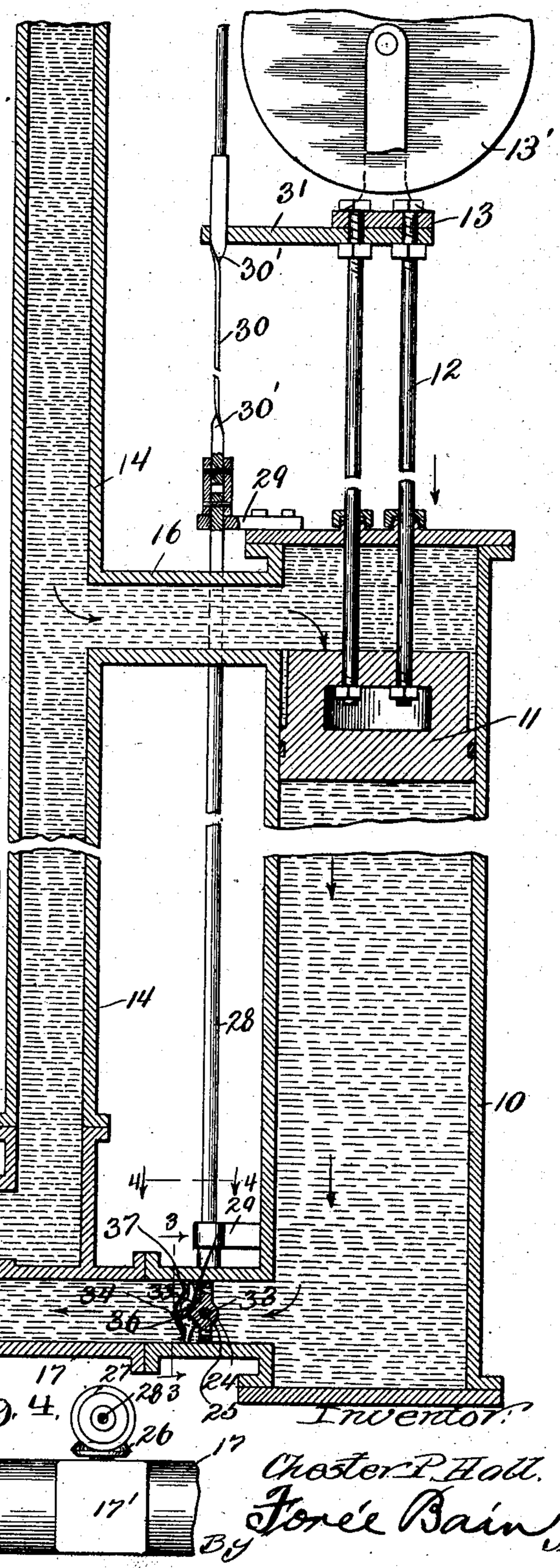

Fig. 3.

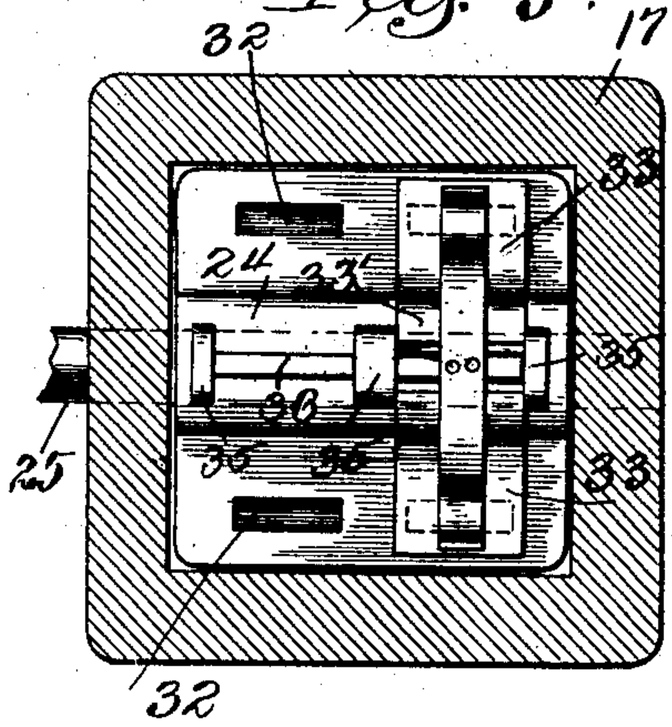

Fig. 4.

Witnesses:
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Ray White.

Inventor:
Chester P. Hall.
By Foree Bain Atty.

No. 753,570. Patented March 1, 1904.

UNITED STATES PATENT OFFICE.

CHESTER P. HALL, OF CHICAGO, ILLINOIS.

AUTOMATIC ELEVATOR-RETARDING DEVICE.

SPECIFICATION forming part of Letters Patent No. 753,570, dated March 1, 1904.

Application filed April 3, 1903. Serial No. 150,904. (No model.)

To all whom it may concern:

Be it known that I, CHESTER P. HALL, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Automatic Elevator-Retarding Devices; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

The object of my invention is to provide an automatic elevator-retarding device adapted to be set into operation by the movement of devices employed in raising and lowering the elevator-car in its shaft so related to the motor devices employed in actuating the car that its automatic operation serves to check or retard the movement of the car at a time just prior to its reaching the limit of its excursion in either direction, but to permit the car to be started upon its excursion from either its uppermost or lowermost point of travel at any desired speed within its capacity.

A further object of my invention is to provide a specific valve structure capable of and adapted for coöperation with the auxiliary parts of an automatic elevator-retarding device of the type illustrated and described in my pending application filed January 24, 1903, and serially numbered 140,441, to accomplish the result above set forth.

With a view to attaining these and other objects which will become apparent to those skilled in the art from the following description, my invention consists in the features of construction and arrangement of parts hereinafter more fully described, and specified in the claims.

In the drawings wherein I have illustrated an operative embodiment of my invention, Figure 1 is a sectional elevation of an elevator-cylinder and its associated parts, showing my invention applied thereto. Fig. 2 is a sectional elevation, enlarged, of the valve. Fig. 3 is a transverse vertical section on line 3 3 of Fig. 1. Fig. 4 is a sectional plan view taken on line 4 4 of Fig. 1.

Throughout the drawings like numerals of reference refer to like parts.

10 is an elevator-cylinder; 11, a piston arranged for reciprocation therein; 12, the piston-rods extending through one end of the cylinder to a suitable head 13, which carries a sheave 13′, about which the hoisting-cable runs in the usual manner.

14 is a vertical water-supply pipe communicating at its lower end with a valve-casing 15. 16 is a pipe connection between said supply-pipe and the upper end of the cylinder. 17 is a pipe connection between the lower end of the said cylinder and the valve-casing 15. 18 is a waste-pipe communicating with said valve-casing 15 and adapted to empty the lower end of the cylinder 10 under proper conditions.

19 indicates a controller-valve of a well-known type adapted and arranged to control the operative communication of the pipe connection 17 with the inlet-pipe 14 or the waste-pipe 18 to establish the equalization or variation of pressure on opposite sides of the piston 11, which results in the upward or downward movement of the said piston and the consequent movement of the elevator-car.

20 indicates a rack forming a part of the spindle of the valve 19, with which meshes a pinion 21, operatively connected with an exterior sheave 22, around which the valve-controlling rope 23 passes.

The parts heretofore described are all of well-known construction, and their operation will be apparent to those skilled in the art.

In the pipe 17, for instance, within a rectangular enlargement 17′ thereof, is arranged a rectangular butterfly-valve 24, disposed to choke and nearly close the pipe when in upright position.

25 is the valve-carrying shaft, one end of which extends through the side of the enlargement 17′ and is provided at its extremity with a beveled gear 26.

27 is an intermeshing gear secured to a vertical rod 28, which extends upward through suitable brackets 29 to the top of the cylinder 10.

30 indicates a flat cam-rod having at a point adjacent to each end thereof a quarter-turn, as indicated at 30′, both of said turns being in the same direction.

31 indicates an arm slotted at its free end

for engagement with the cam 30 and secured to the head 13 of the piston-rod 12 to move therewith. These parts are preferably generally arranged and constructed in accordance with my copending application, heretofore referred to.

Referring now particularly to the construction of the butterfly-valve 24, this valve, as fully described in my pending application aforesaid, forms a choke to retard the ingress or egress of water to the lower part of the cylinder 10 when the piston 11 is approaching its limit of movement in either direction; but it is desirable that it should offer little resistance to the movement of the piston in the opposite direction, so that said piston may start upon its travel in either direction at almost full speed. The valve herein illustrated is adapted to coöperate with the parts heretofore described to accomplish this result.

32 32 indicate ports formed in the valve 24 in any preferred manner, preferably on opposite sides of the pivot-point thereof.

33 33 indicate auxiliary flap-valves pivoted at 34 in bearings 35 to be capable of movement away from the contiguous face of the valve 24.

36 indicates a rib extending longitudinally of the valve intermediate the bearings 35 and projecting beyond the flap-valves 33 to afford a bearing for a suitable leaf-spring 37 affixed thereto. One of the spring-arms 37 is arranged to bear against the rear face of each of the auxiliary valves 33, so as to tend to hold the same in position against the face of the valve 24 to close one of the ports 32. A limitation-stop is preferably provided to limit the outward swing of each of the auxiliary valves, such stop in the present illustration comprising an extension 33′ from the valve 33, adapted to strike against rib 36 when the valve is turned upon its pivot 34 a definite distance. The springs 33 may be omitted when a limitation-stop is provided or the stop may be omitted when the springs are employed without effecting the operation of my improved valve.

The operation of my improved valve is as follows: The parts being in the condition illustrated in Fig. 1—that is to say, with the controller-valve 19 so positioned that communication is established between the pipe 17 and the waste-pipe 18 and cut-off between the supply-pipe 14 and the pipe 17—an unbalanced pressure is generated by the water upon the top of the piston 11, which causes the piston to descend in a manner that will be understood by those skilled in the art. During the first part of this descent the water within the lower part of the cylinder 10 seeks to pass the choke-valve 24, forces it way through the ports 32, overbalancing the tension of springs 37, when such springs are employed, and forcing the auxiliary flap-valves back to their limit of rearward movement, substantially as illustrated in Fig. 1. The tension of the springs 37 being preferably very light, but little resistance is encountered by the moving water, and so the piston is enabled to start on its descent at practically full speed. As soon as the arm 31, carried by the piston-rod, reaches the upper quarter-turn 30′ the cam-rod 30 and the rod 28 are given a quarter-turn, which is communicated through the intermeshing miter-gears to the choke-valve 24, which thereupon assumes a horizontal position. In this position the minimum working resistance is offered to the flow of water in either direction, and the elevator is therefore fully under the control of the operator, the automatic device being then in inoperative position. When now the piston approaches its lower limit of movement, the lower quarter-turn 30′ is encountered by the arm 31, and the cam-rod and rod 28 accordingly given another quarter-turn in the same direction as the first movement. This movement being communicated through the gears to the choke-valve 24, causing the said valve to assume upright position again, but said valve having made a half-turn, the auxiliary flap-valves are now on the side thereof adjacent the cylinder 10. Consequently the pressure of water within the cylinder 10 is exerted upon the rear side of said flap-valves, tending to hold them in position upon the face of the choke-valve 24 and so maintaining the orifices 32 closed. Accordingly the water remaining in the cylinder 10 can only escape through the relatively small space between the edges of the valve 24 and the inner surface of the pipe 17, so that the velocity of the piston 11 is reduced and the car caused to move slowly irrespective of the actions of the car operator. When the direction of movement of the car is reversed, the operation of the choke-valve is correspondingly reversed, the flap-valves at the start offering but slight resistance to the ingress of the water through the pipes 17 when the controller-valve 19 is properly moved to admit the same thereto, but when the piston approaches its upper limit of movement resuming the position illustrated in Fig. 1, and so preventing further ingress of water through the orifices 32 to the lower portion of the cylinder 10.

For purposes of illustration of full disclosure I have herein shown and described a specific embodiment of my invention which is found advantageous; but I do not desire to be understood as limiting it in its application to the exact mechanism herein shown or its construction to the details illustrated.

Having described my invention, what I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an elevator-retarding device, the combination with a hydraulic motor having a variable-pressure liquid-conducting pipe, of a rotary, balanced choke-valve in said pipe,

provided with relief-ports, auxiliary check-valves carried by said choke-valve on one side thereof to close the ports and operable to unclose the ports by pressure from the opposite side, and means operatively associated with a moving element of the elevator system for rotating said choke-valve from a position wherein the check-valves are operable by the liquid-pressure in one direction to a position wherein the said check-valves are operable by the liquid-pressure in the opposite direction.

2. In an elevator-retarding device, the combination with a hydraulic motor having a variable-pressure liquid-conducting pipe, a butterfly choke-valve mounted for rotation in said pipe, and provided with ports, auxiliary pressure-operable flap-valves pivoted on one side of the choke-valve and adapted to close the ports, and means operatively connected with a moving element of the elevator system, adapted and arranged to impart to the choke-valve a half-rotation during the movement of the elevator mechanism to make its flap-valves operable by pressure first from one direction and then from the opposite direction.

3. A choke-valve structure for hydraulic elevator-retarding devices comprising a casing, a choke-valve pivoted therein comprising a generally flat body provided with ports, and auxiliary check-valves carried by said body adapted and arranged to close said ports under pressure in one direction and to open said ports under pressure in the opposite direction.

4. A choke-valve structure for hydraulic elevator-retarding devices comprising a casing, a butterfly choke-valve pivoted therein comprising a generally flat body provided with ports, auxiliary check-valves pivoted to the choke-valve body, and means for limiting the movement of said auxiliary valves.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

CHESTER P. HALL.

In presence of—
GEO. T. MAY, Jr.,
MARY F. ALLEN.