

(No Model.)

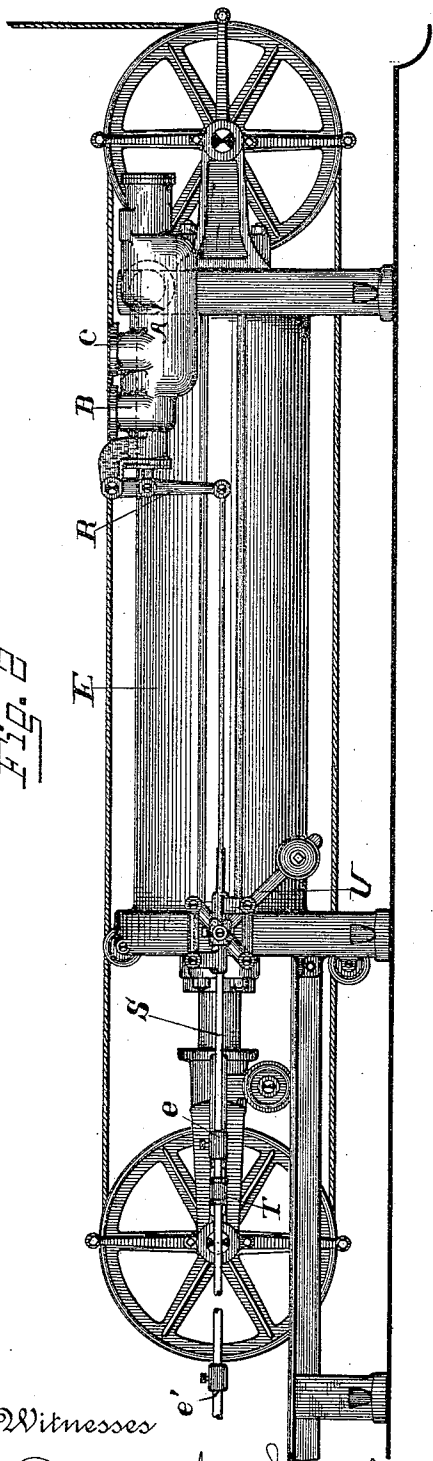
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H. W. FORSLUND & W. H. WELLS, Jr.
AUTOMATIC STOP VALVE.

No. 461,427.

Patented Oct. 20, 1891.

Fig. 2

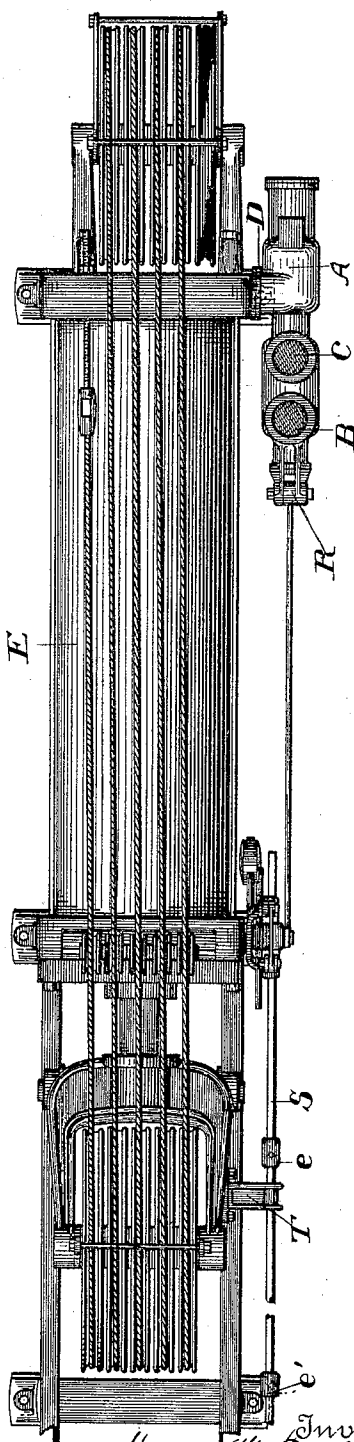


Witnesses

Amos L. Smith

Julian M. Ramsey

Fig. 1



Inventors

Hugh W. Forslund

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(No Model.)

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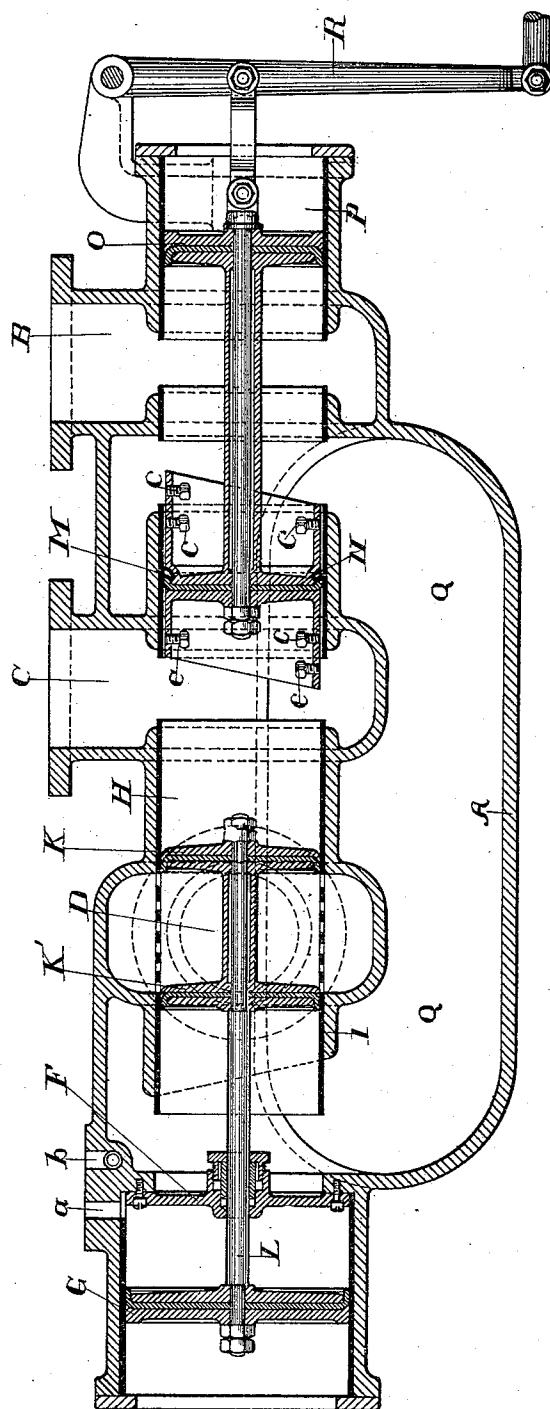
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AUTOMATIC STOP VALVE.

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Fig. 3



Witnesses

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UNITED STATES PATENT OFFICE.

HUGO W. FORSLUND AND WILLIAM H. WELLS, JR., OF CHICAGO, ILLINOIS,
ASSIGNORS TO THE STANDARD ELEVATOR COMPANY, OF SAME PLACE.

AUTOMATIC STOP-VALVE.

SPECIFICATION forming part of Letters Patent No. 461,427, dated October 20, 1891.

Application filed April 25, 1891. Serial No. 390,494. (No model.)

To all whom it may concern:

Be it known that we, HUGO W. FORSLUND and WILLIAM H. WELLS, Jr., citizens of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Automatic Stop-Valves, of which the following is a specification.

This invention relates to automatic stop-valves for hydraulic elevators and similar purposes.

The object of the invention is to automatically stop the elevator at the top and bottom of the well independently of the position of the valves which control the flow of fluid to the motor; and it consists in the construction and arrangement substantially as hereinafter described, and pointed out in the claims.

Like letters refer to the same parts in the several figures of the drawings, in which—

Figure 1 is a plan view of the main cylinder, piston, and cables, the main valve, and the automatic stop-valve, together with the appliances for operating the latter. Fig. 2 is a side elevation of the same, and Fig. 3 is a longitudinal vertical section of the main valve and automatic stop-valve and their proper parts and pistons.

The present invention is intended as an improvement on the automatic stop-valve described in application Serial No. 362,364, filed August 18, 1890, by H. W. Forslund, and may be conveniently used in connection with such an auxiliary or supplemental valve as is shown and described in such application, although it may be used with other forms of valves.

Preferably a cylinder A is employed, with proper inlet and exhaust ports B and C and suitably-bored portions for the said valves and pistons. This valve-cylinder A is suitably connected by an opening D with the main cylinder E, and is further connected by small passages *a* and *b* with the auxiliary or supplemental valve. (Not shown.) These passages just referred to are on opposite sides of a diaphragm F, which latter is arranged near the inner end of the bored extension of the valve-cylinder, in which plays the piston G, as is fully set forth in the former application above referred to. Within this valve-

cylinder, near the side of the diaphragm opposite the piston G, is a barrel of such a diameter as fits the main valve I. This barrel for the main valve may be provided with the usual lining and the perforated central portion to provide a proper channel for the entrance and exit of the fluid, and the lining is perforated at a point opposite this channel. The main valve I is preferably constructed of two pistons or heads K K', which may be suitably packed, and normally these pistons are arranged apart about the width of the channel just referred to. These pistons are carried upon a rod or shaft L, which at its outer end also carries the driving-piston G, before referred to. The exhaust port and channel C is in communication with the barrel H; but its communication with the cylinder of the elevator is opened or closed by the main valve. In the position shown in the drawings, the main valve has closed this communication. At the side of the exhaust-channel C opposite the main barrel H is a shorter barrel M, which may be suitably bored and lined. Back and forth in this shorter barrel plays a double valve N, which is mounted upon a suitable rod or shaft, the outer end of which carries a balancing-piston O, which plays in a barrel P. The double valve N is the stop-valve, and it is preferably made of a somewhat smaller diameter than the barrel in which it plays, so as to provide a space between such valve and barrel for a purpose which will be hereinafter stated a packing being arranged between the two parts of the double valve of such a diameter as to tightly fit the barrel.

The stop-valve is further provided with a series of openings normally closed by stop-screws *c*, and it is manifest that if one or more of these screws are removed the leakage through the valve will be correspondingly increased. The passage-way Q affords communication between the inlet-channel and the barrel in which plays the main valve, except when such communication is closed by the stop-valve or the main valve. Secured to the outer end of the piston-rod which carries the stop-valve is a connecting-ring, which is pivoted to a lever R, which latter is connected to a sliding rod S. The sliding rod S

has two adjustable collars *ee'* secured thereon by set-screws and at a distance apart corresponding to the throw of the lift of the plunger in the main cylinder or the elevator. Secured to the upper or outer end of the plunger just referred to is an arm T, which in its movement plays between the two adjustable collars *ee'* and throws the rods to which these stops are secured in one direction or the other, as the case may be. The rod S is always returned to its normal position as soon as the pressure of the arm T upon either of the collars is removed, and for this purpose the preferable arrangement employed is that shown and described in the former application, illustrated in Figs. 1 and 2 of the present drawings, and designated by the letter U.

The operation of this device is as follows: In the position shown in Fig. 3 of the drawings the elevator is at rest at some intermediate point. Now if the auxiliary valve is so manipulated that its exhaust-port is in communication with the space between the piston G and the diaphragm the fluid will flow into the valve-cylinder through the inlet-port B and will press upon one side K' of the main valve and force such valve to the right until the opening to the main cylinder is uncovered, and then the fluid which has done this will enter the main cylinder and, operating the motor, force the elevator upward. Of course, if the position of the auxiliary valve is not changed during this operation, the elevator will continue to ascend until it finally violently strikes the top of the elevator well or shaft unless some provision is made to prevent this. According to the present arrangement just before the elevator reaches the top of the well or shaft the arm T will strike the collar *e'*, and thus the rod upon which such collar is placed will cause a pull upon the lever R and draw the stop-valve N over until it closes the inlet-port, which will cut off the pressure of fluid, and thus arrest the movement of the elevator. The action of this stop-valve is entirely independent of the position of the main valve, for it is controlled by the arm secured to the plunger of the elevator, and consequently even if the operator omits to close the valve in time the stop-valve being actuated will arrest the movement. As soon as the elevator starts downward the stop-valve is drawn back to its normal position by the action of a weight which was lifted when the stop-valve was thrown over to close the inlet-opening. When the elevator approaches the bottom of the well, the arm T will strike the collar *e* and throw the stop-valve across the exhaust-passage, and hence arrest the downward movement of the elevator.

Some sort of leakage should be provided for the stop-valve, so as to make the stoppage of the elevator gradual and permit the main valve to be operated in either direction. If the stop-valve were in a position which closed the inlet-port and no leakage were provided, the main valve could not be shifted to open

the exhaust-port, because there would be a solid column of water between the piston K' of the main valve and the body of the stop-valve; but by providing a leakage around the stop-valve or through its sides the main valve, when operated, will force the fluid against its head into the inlet-passage. In a similar manner the fluid can be forced around the stop-valve into the exhaust-passage when the exhaust has been cut off by the stop-valve.

It is obvious that the amount of leakage through the stop-valve may be regulated by taking out the screws and making more openings. It is also manifest that the amount of leakage around or through that portion of the stop-valve which closes the inlet-passage may be regulated and set definitely and the leakage around or through that portion which will close the exhaust-passage may be regulated or set differently, so that the leakage on the opposite sides of the double stop-valve may be regulated to be unequal, and the operation of the stop-valve at the top and bottom of the well consequently varied to suit the circumstances of each situation. In the present arrangement the stop-valve and the main valve are in the same cylinder, and the latter valve is placed between the inlet and the exhaust ports, so that it may be operated to close either of them. It is manifest that the devices for effecting this leakage through the stop-valve may be widely varied and that the construction of the other parts of this apparatus may be changed by a skilled mechanic without departing from the spirit of the invention.

We hereby disclaim the following as of our invention: the combination, in a fluid-controlling valve, of a cylinder within said valve provided with ports, a reciprocating piston within the cylinder, and a safety-stop within said valve adapted to close ports of said cylinder when the piston of the main motor reaches its limit of stroke, the said invention not being our joint invention, but the sole invention of H. W. Forslund, and it only being described in the present application to show one form of valve to which our present invention may be applied.

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

1. The combination, with a hydraulic motor, of a valve-cylinder provided with inlet and exhaust passages and an opening to the main cylinder or motor, a main valve controlling the inlet and exit of fluid to the motor-cylinder, and a stop-valve in the same cylinder with the main valve and placed between the inlet and exhaust passages, such stop-valve being provided with a leak, substantially as and for the purpose set forth.

2. The combination, with a hydraulic motor, of a cylinder provided with inlet and exhaust passages and an opening to the main cylinder of the motor, a main valve, and automatic stop-valves for both the inlet and ex-

haust, provided, respectively, with independently-adjustable leaks, whereby the leakage for the inlet and exhaust passages may be differently regulated or set, substantially as
5 and for the purpose set forth.

3. The combination, with a hydraulic motor, of a valve-cylinder provided with inlet and exhaust passages and an opening to the motor-cylinder, a main valve, and a stop-valve
10 provided with a series of openings there-

through and removable plugs therefor, whereby the amount of leak through such stop-valve may be regulated, substantially as and for the purpose set forth.

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