(No Model.)

C. L. COOKSON.

VALVE MECHANISM FOR HYDRAULIC ELEVATORS.

No. 543,590. Patented July 30, 1895.

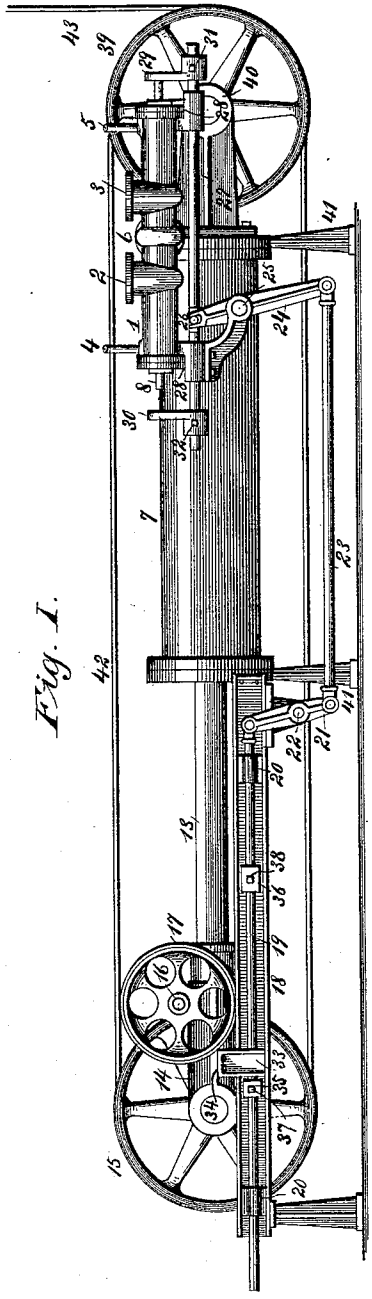


Fig. I.

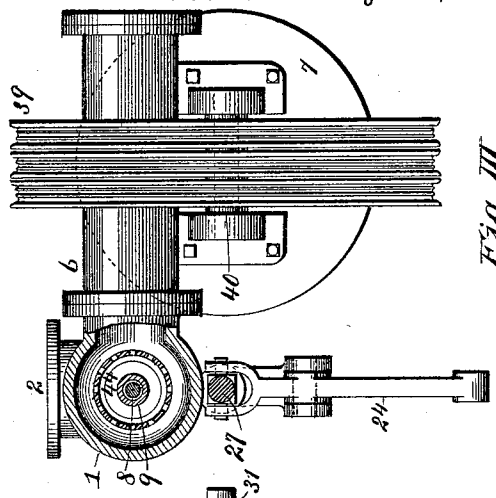


Fig. III.

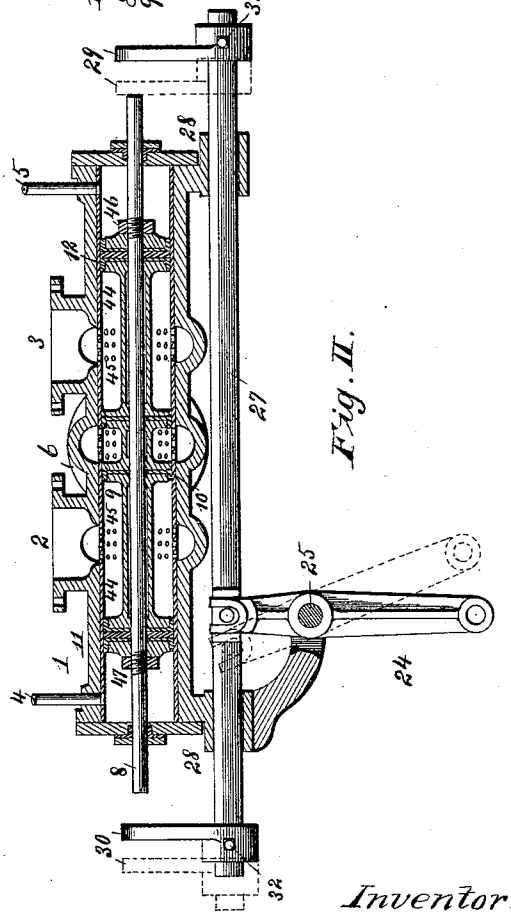


Fig. II.

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VALVE MECHANISM FOR HYDRAULIC ELEVATORS.

SPECIFICATION forming part of Letters Patent No. 543,590, dated July 30, 1895.

Application filed May 21, 1894. Serial No. 511,971. (No model.)

To all whom it may concern:

Be it known that I, CHARLES L. COOKSON, of Kansas City, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Valve Mechanism for Hydraulic Elevators, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to certain new and useful improvements in valve mechanism for hydraulic elevators; and my invention consists in certain features of novelty hereinafter described, and pointed out in the claims.

Figure I shows a side elevation of my improved valve mechanism. Fig. II shows a cross-section of the main valve and automatic stop. Fig. III represents a view, partly in cross-section and partly in elevation, showing a connecting-cylinder between the main valve and the main cylinder and the relation of the sheaves thereto.

Similar numerals refer to similar parts throughout the several views.

1 represents the main valve, provided with the induction-pipe 2 and the eduction-pipe 3.

4 and 5 represent pipes leading from the pilot-valve to the main valve.

6 represents the cylinder leading from the main valve to the main cylinder 7.

8 represents a piston-rod of the main valve, carrying the piston 9 at or near its center and the pistons 11 and 12 at or near its end.

13 represents a piston-rod of the main cylinder provided with the cross-head 14 having the sheaves 15 journaled therein. The cross-head is supported and mounted on the axle 16, which carries wheels 17, which are flanged and adapted to run on the track 18.

19 represents a rod or shaft mounted in the blocks 20.

21 represents a rocking arm mounted at 22 on the frame, its upper end having pivotal connection with the rod 19. To its lower end is pivoted the rod 23, pivoted also to the lower end of the rocking arm 24, mounted at 25 on an extension of the frame of the main valve. The upper end of the rocking arm 24 is bifurcated and engages the pin 26 on the shaft 27, mounted in bearings 28 upon the main-valve frame.

29 and 30 represent arms mounted on the shaft 27, being retained thereon by the set-screws 31 and 32.

33 represents an arm secured to the cross-head at 34.

35 and 36 represent buttons carried on the rod 19 and secured thereon by the set-screws 37 and 38.

39 represents sheaves journaled in the block 40, mounted on a head of the main cylinder.

41 represents the supports of the cylinder and carriage.

42 represents the cable passing over the sheaves, and at 43 passing up to the elevator.

44 represents the lining of the main valve, provided with a perforation 45 for the passage of the water.

46 and 47 represent nuts threaded on the piston-rod to retain the piston in position thereon.

In the operation of my improved valve mechanism, by placing the pistons 11 and 12 upon the same piston-rod with the main piston 10, so that they act therewith, I provide means in the main valve whereby, upon the admission of the water from the pilot-valve through the pipe 4 and the exhaust through pipe 5, the pressure thereof against the piston 11 moves the piston and carries the main piston 10 beyond the port of the connecting-cylinder and permits the water from the induction-pipe 2 to pass freely into the main cylinder and the elevator is carried up; when, to descend, by the admission of the water from the pilot-valve, through the pipe 5, into the main valve and the exhaust of water from the other end of the valve, through pipe 4, the pressure against the piston 12 carries the piston in the opposite direction until the main piston is beyond the port and the water from the main cylinder is discharged through the eduction-pipe 3. Upon any failure to operate the lever at the top floor, by the action of my improved automatic stop the port is closed and the elevator automatically stopped. This is accomplished by the action of the arm 33, carried on the cross-head, pressing against the button 35 on the rod 19, by which, through the action of the rocking-arms and the rod 23, the rod 27 is actuated and the arm 29 pressed against the piston-rod, carrying the main cup over the cylinder port, stopping the car; and by like action of the arm

33 upon the button 36, when the car reaches the bottom of the elevator-shaft the arm 30 is pressed against the piston-rod and the car stopped, by which construction a certain and perfectly-working automatic stop is formed.

The principal advantages I claim for my improvements are:

First. By providing the cups 11 and 12 upon a piston of the main valve and carrying the pipes from the pilot-valve into the cylinder of the main valve the auxiliary cylinder and its connections are dispensed with and a great saving in space is gained and a very great saving in cost of construction.

Second. A great advantage is gained in the accessibility of the parts. By the removal of one of the cylinder heads of the main valve the entire working parts may be removed, affording the greatest facility in repairing and packing.

Third. By mounting the piston-rod in both heads of the main-valve cylinder two points are gained of very great importance: (*a*) The piston-rod exterior to the pistons 11 and 12 may be constructed of any size desired. It may be thus made of such size as to reduce the water-space between the valves 11 and 12 and the cylinder-heads to a minimum for working purposes, the beneficial result of which is that the weight and amount of water to be displaced at either end when the water is turned into the other is reduced to a minimum and the pistons may be operated at much lower water-pressure. (*b*) The piston-rod being mounted in the cylinder-heads, the weight of the piston is carried on the piston-rod and not on the piston-packing, the beneficial result of which is to decrease the friction and save the wear of the piston-packing on the under side where the weight rests on the cylinder.

Having thus fully described my improvements, what I claim as my invention, and desire to secure by Letters Patent, is—

1. In a valve mechanism for hydraulic elevators the combination with the cylinder having inlet and outlet passages, the piston rod mounted in and extending beyond the cylinder heads and the main piston and auxiliary pistons carried on the piston rod, of arms independent of the piston rod adapted to contact with the ends thereof and means for actuating said arms as the car reaches the top or bottom of the elevator shaft to cause them to come in contact with the ends of the piston rod and move the pistons to stop the car, substantially as shown and described.

2. The combination with a main cylinder having a piston therein and a piston rod connected with the piston of a valve cylinder having a piston valve therein, a piston rod mounted in and extending beyond the heads of said valve cylinder, a piston carried on said piston rod, a rod mounted on the frame of said valve-cylinder, arms carried on the ends of said rod adapted to contact at certain times with said piston rod of the valve cylinder, a rocking arm mounted on the frame of the valve cylinder and connected with said rod, a rocking arm mounted on the frame of the main cylinder, a rod connecting said rocking arms, a rod mounted in blocks on the frame of the main cylinder, buttons secured by set screws upon said rod, and an arm secured to the cross-head of the piston rod of the main cylinder, said arm being adapted to press upon one of said buttons when the car reaches the top or bottom of the elevator shaft to move the arms carried on the rod mounted on the frame of the valve cylinder to actuate the piston rod of the valve cylinder to close the valve therein and stop the car substantially as shown and described.

3. The combination with a main cylinder having a piston therein and a piston rod connected with the piston, a valve cylinder having a piston valve and piston therein, and a piston rod mounted in and extending beyond the heads of said valve cylinder, of a cross-head carried on the piston rod of the main cylinder, an arm 33 secured to said cross-head, a rod 19 mounted in blocks 20 on the frame of the main cylinder and adapted to slide therein, buttons 35, 36, secured by set screws to said rod, a rocking arm 21 mounted on the frame of the main cylinder and having pivotal connection at one end with the rod 19, a rocking arm 24 mounted on the frame of the valve cylinder, a rod 23 connecting said rocking arms, a shaft 27 mounted in bearings on the frame of the valve cylinder and adapted to slide in its bearings said shaft being connected with the rocking arm 24 by a pin therein engaging the bifurcated end of said arm, arms 29 and 30 carried upon and secured to said shaft 27 and adapted to contact with the piston rod of the valve cylinder, said arms being actuated by the arm 33 pressing upon the buttons 35, 36, when the car reaches the top or bottom of the elevator shaft to operate the piston of the valve cylinder to close the valve and stop the car substantially as shown and described.

4. The combination with a main cylinder having a piston therein and a piston rod connected with the piston, a valve cylinder having a piston valve and piston therein, and a piston rod mounted in and extending beyond the heads of said valve cylinder, of arms independent of the piston rod of said valve cylinder adapted to contact with the ends thereof, and means in connection with the piston rod of the main cylinder for actuating said arms as the car reaches the top or bottom of the elevator shaft to cause them to come in contact with the ends of the piston rod of the valve cylinder and close the valve to stop the car, substantially as shown and described.

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