No. 679,421. Patented July 30, 1901.

W. S. HALSEY.

PNEUMATIC HOIST.

(Application filed May 28, 1901.)

(No Model.) 2 Sheets—Sheet 1.

FIG. 1.

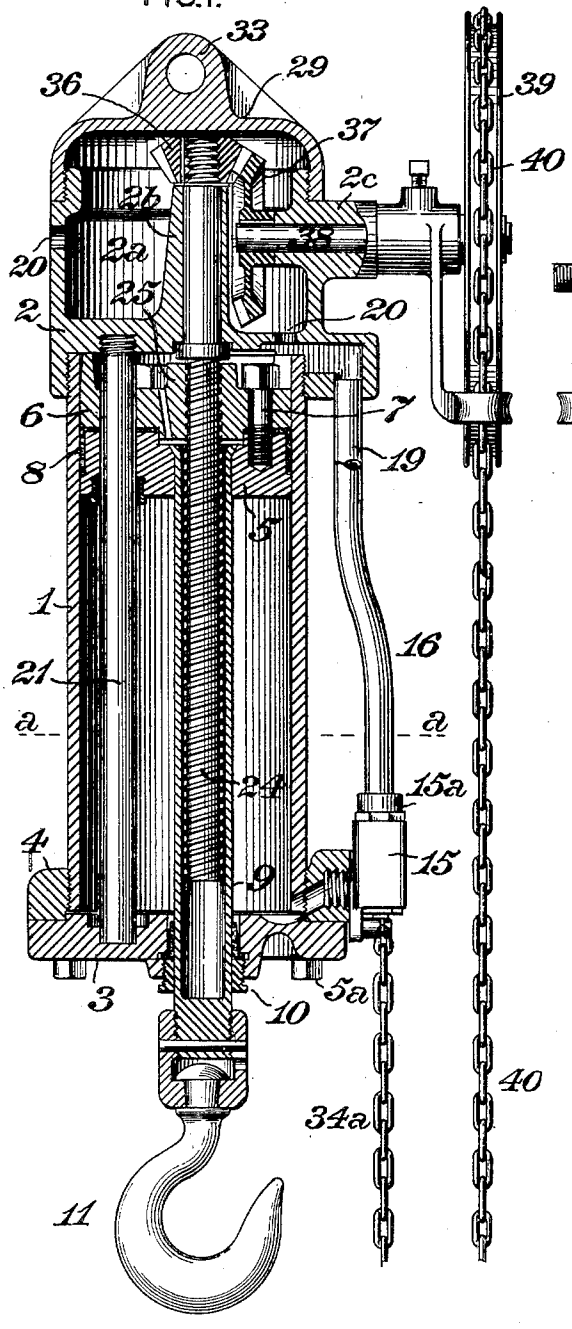
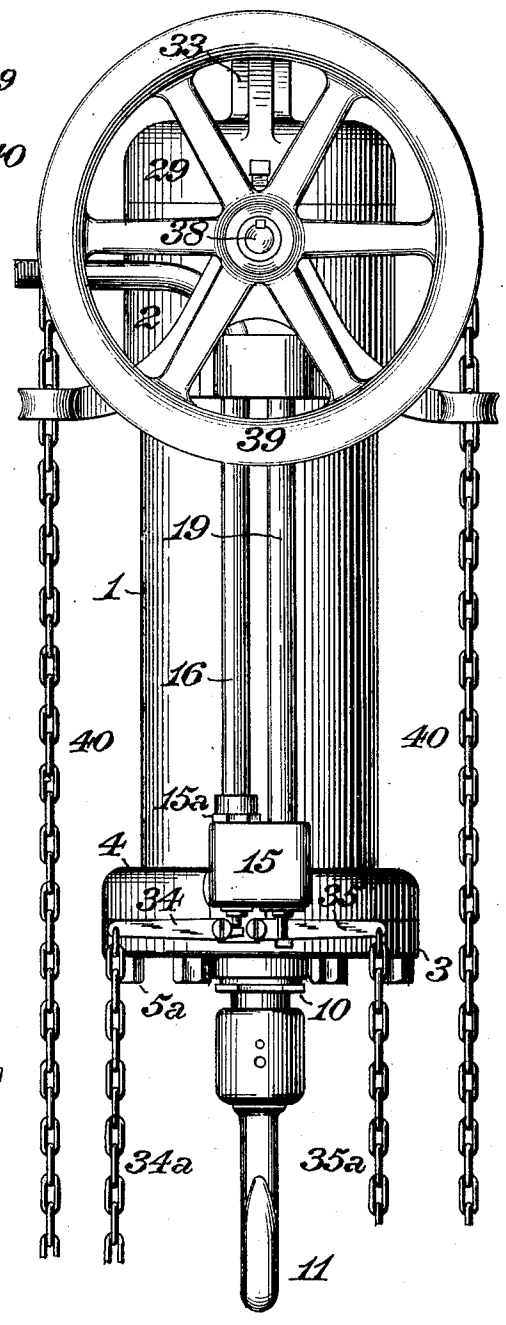


FIG. 2.



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FIG. 3.

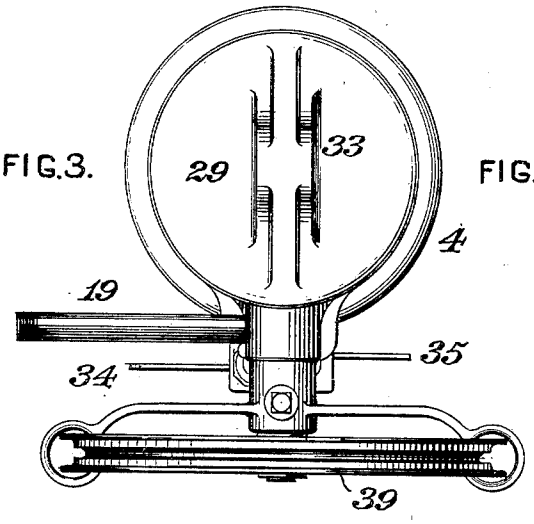


FIG. 4.

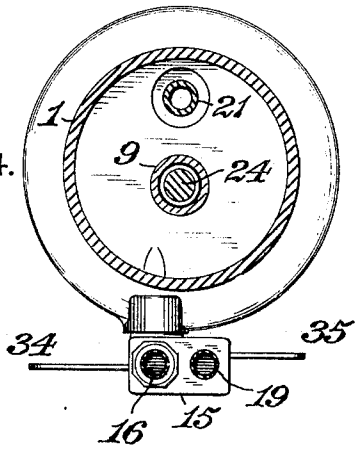


FIG. 5.

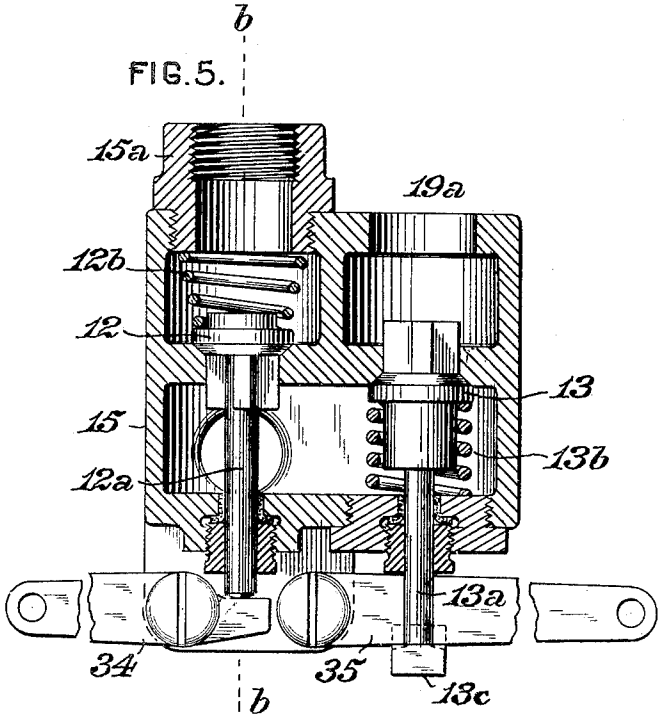
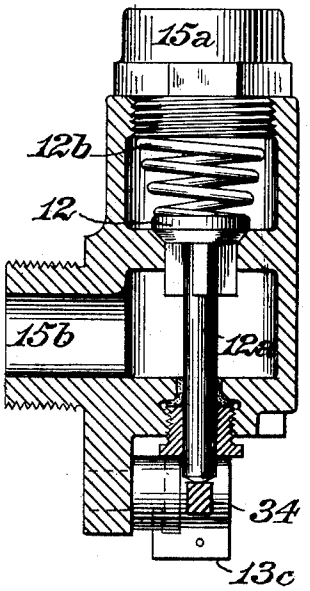


FIG. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM S. HALSEY, OF PITTSBURG, PENNSYLVANIA.

PNEUMATIC HOIST.

SPECIFICATION forming part of Letters Patent No. 679,421, dated July 30, 1901.

Application filed May 28, 1901. Serial No. 62,295. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM S. HALSEY, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a certain new and useful Improvement in Pneumatic Hoists, of which improvement the following is a specification.

My invention relates to direct-acting hoists the pistons of which are actuated by fluid under pressure; and its object is to provide simple, effective, and reliable means whereby the sudden and unsteady movements of the piston, which have been a substantial objection in prior constructions, may be prevented and quick action of the hoist be attained with an economical utilization of fluid, as well as to prevent any sudden movement of the load and hold it suspended at any point independently of fluid-pressure.

The improvement claimed is hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a vertical longitudinal central section through a pneumatic hoist, illustrating an embodiment of my invention; Fig. 2, a side view in elevation of the same, taken at right angles to Fig. 1; Fig. 3, a plan or top view; Fig. 4, a horizontal section on the line *a a* of Fig. 1; Fig. 5, a vertical longitudinal section, on an enlarged scale, through the valve-chest; and Fig. 6, a transverse section through the same on the line *b b* of Fig. 5.

In the practice of my invention I provide a cylinder 1, which is closed by a top head 2 and a bottom head 3, the latter being shown as connected by bolts 5^a to a ring 4, which surrounds and is suitably secured to the lower end of the cylinder. The cylinder is fitted with a piston, which in this instance is shown as composed of a head 5 and a follower 6, which are connected by bolts 7, a suitable packing, as a cup-leather 8, being interposed between the head and follower. A tubular piston-rod 9, connected at its upper end to the piston-head 5, passes through the bottom head 3, leakage being prevented by a suitable stuffing-box 10 in said head, and carries on its lower end a hook 11 for the attachment of the load which is to be carried by the hoist.

A valve-chest 15 is secured to the lower ring 4 of the cylinder 1, said valve-chest being provided with a coupling-nut 15^a or equivalent flanged or threaded nozzle for the attachment of a fluid-supply pipe 16 and with a lateral nozzle 15^b, the bore of which communicates with a passage leading into the lower end of the cylinder. Communication between the supply-pipe 16 and the lower end of the cylinder is controlled by a supply-valve 12, which is fixed upon a stem 12^a and is normally held downwardly on its seat on a partition in the valve-chest by fluid-pressure in the supply-pipe and by a spring 12^b. An exhaust-valve 13, which is fixed upon a stem 13^a and is normally held upwardly on its seat on a partition in the valve-chest by a spring 13^b, controls communication between the lower end of the cylinder and an exhaust-pipe 19, the lower end of which is connected to a nozzle 19^a on the top of the valve-chest. The supply-valve 12 is unseated, as required, by means of a double-armed lever 34, which is pivoted on the lower end of the valve-chest, one of the arms of said lever being located in position to abut against and raise the valve-stem 12^a and the other being connected to a chain 34^a, by which the lever may be actuated from a lower level. The exhaust-valve 13 is similarly unseated, as required, by a lever 35, which is pivoted on the lower end of the valve-chest, said lever being adapted when moved downwardly to engage a projection 13^c on the lower end of the exhaust-valve stem 13^a, and thereby to unseat the exhaust-valve, and being connected to a chain 35^a, by which it may be actuated from a lower level.

The exhaust-pipe 19 communicates at its upper end with the cylinder 1 above the piston and is also in constant communication with the atmosphere through openings 20, formed in the body of the upper cylinder-head 2 and in a cylindrical wall which projects upwardly therefrom and surrounds a gear space or chamber 2^a, the top of which chamber is closed by a removable cap 29, provided with a suitable eye 33, through which a connection may be passed for suspending the hoist in operative location. The discharge of fluid through the vent-openings 20 prevents dirt and grit from being drawn into the cylinder during the downward movements of the piston.

A regulating-screw 24 of coarse pitch fits

freely in the bore of the tubular piston-rod 9 and is journaled to rotate in a bearing 2^b in the top cylinder-head 2, said screw engaging a nut 25, formed integral with or fixed to the follower 6 of the piston. A bevel-pinion 36, fixed upon the upper end of the regulating-screw, engages a corresponding gear 37, secured upon a shaft 38, which is journaled in a lateral bearing 2^c in the wall of the gear-chamber 2^a of the top head and carries upon its outer end an operating-wheel 39, which may be rotated by hand at any desired speed by means of a chain 40 passing over it. The interior of the tubular piston-rod 9 should be filled with oil to act as a lubricant for the regulating-screw.

It will be obvious that it is essential to the operativeness of a construction substantially as above described that inasmuch as the piston carries the nut of the regulating-screw 24 said piston must be prevented from rotating in the cylinder. To this end a rod or stout tube 21 may be secured to the top cylinder-head, said rod passing through a properly-packed opening in the piston-head and follower and fitting at its lower end in a recess in the bottom cylinder-head 3. The same end may be attained by connecting the piston-rod 9 eccentrically to the piston, as shown in the drawings. Either or both of the above means for preventing rotation of the piston may be adopted, in the discretion of those skilled in the art to which my invention relates.

In operation when it is desired to lift a load the operator unseats the supply-valve 12, thereby admitting fluid under pressure from a compressor, accumulator, or other source of supply through the supply-pipe 16, the valve-chest 15, and the port controlled by the valve 12 to the cylinder-space below the piston, said fluid by its pressure upon the piston elevating the latter and the load attached to the hook 11. The operator at the same time takes hold of the chain 40 for the purpose of controlling the speed of rotation of the shaft 38 and through the gears 37 and 36 of the regulating-screw 24. The piston being, as before described, prevented from rotating, its upward movement will impart rotation to the regulating-screw, the speed of which will be controlled by the operator through the chain 40 and intermediate members. It will be seen that the control of the traverse of the piston by that of the rotation of the regulating-screw, which is thus provided, effectually prevents sudden, irregular, or unsteady movements of the piston and load and that the speed of traverse of the piston may be regulated by the operator to the greater or less degree which is desired for the movement of the load and the load held suspended at any desired point. When a load is to be lowered, the exhaust-valve 13 is unseated, (the supply-valve 12 having been previously seated,) whereupon the fluid on the lower side of the piston passes to the upper side thereof and to the atmosphere through the vent-openings 20, and the piston and attached load will be caused to descend by gravity. The speed of the piston and load is controlled by the operator, who rotates the wheel 39 through the chain 40 at the rate desired, and the lowering of the load is effected steadily and without jerks through his control of the rotation of the regulating-screw. In lowering, as in raising, the load may be held suspended at any desired point.

I claim as my invention and desire to secure by Letters Patent—

1. In a pneumatic hoist, the combination of a fluid-pressure cylinder, a piston fitting therein, a rod fixed to said piston and adapted to be connected to a load, means for admitting and releasing fluid to and from the cylinder, a regulating-screw engaging a nut on the piston and rotatable by the traverse thereof, means for preventing rotation of the piston, and means for controlling the speed of rotation of the regulating-screw.

2. In a pneumatic hoist, the combination of a fluid-pressure cylinder, a piston fitting therein, a rod fixed to said piston and projecting through a packed opening in one end of the cylinder, a pipe leading from a source of fluid-pressure supply to the end of the cylinder through which the piston-rod passes, a supply-valve controlling said pipe, a pipe communicating with the opposite end of the cylinder and with an atmospheric vent-opening, an exhaust-valve controlling said pipe, a regulating-screw engaging a nut on the piston and rotatable by the traverse thereof, and means for controlling the speed of rotation of the regulating-screw.

3. In a pneumatic hoist, the combination of a fluid-pressure cylinder, a tubular piston-rod fixed to the piston and projecting through a packed opening in one end of the cylinder, means for admitting and releasing fluid to and from the cylinder, a regulating-screw fitting freely in the piston-rod and journaled at one end of the cylinder, a nut fixed to the piston and engaged by the regulating-screw, means for preventing rotation of the piston, and means for controlling the speed of rotation of the regulating-screw.

4. In a pneumatic hoist, the combination of a fluid-pressure cylinder, a piston fitting therein, a rod fixed to said piston and adapted to be connected to a load, means for admitting and releasing fluid to and from the cylinder, a regulating-screw engaging a nut on the piston and rotatable by the traverse thereof, means for preventing rotation of the piston, a manually-operable shaft journaled on the cylinder, and gearing connecting said shaft with the regulating-screw.

5. In a pneumatic hoist, the combination of a fluid-pressure cylinder, a piston fitting therein, a rod fixed to said piston and projecting through a packed opening on one end of the cylinder, means for admitting and releasing fluid to and from the cylinder, a head closing

the end of the cylinder opposite that through which the piston-rod passes, a regulating-screw journaled in said head and engaging a nut on the piston, a shaft journaled laterally in said head, gearing connecting said shaft with the regulating-screw, means for manually operating and controliing said shaft, and means for preventing rotation of the piston.

6. In a pneumatic hoist, the combination of a fluid-pressure cylinder, a piston fitting therein, a rod fixed to said piston and projecting through a packed opening in one end of the cylinder, means for admitting and releasing fluid to and from the cylinder, a head closing the end of the cylinder opposite that through which the piston-rod passes and having a peripheral wall surrounding a gearing space or chamber, a regulating-screw journaled in said head and engaging a nut on the piston, a shaft journaled in the wall of the gearing-chamber, gearing inclosed in said chamber and connecting said shaft with the regulating-screw, means for manually operating and controlling said shaft, a removable cap closing the outer end of the gearing-chamber, and means for preventing the rotation of the piston.

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