

No. 679,533.

Patented July 30, 1901.

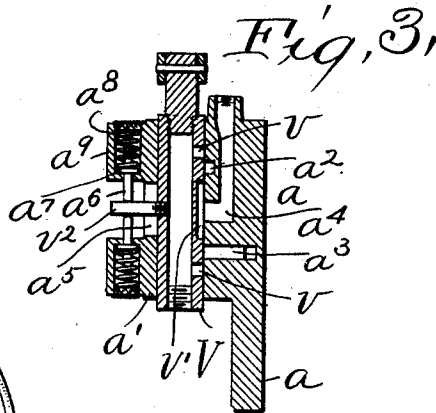
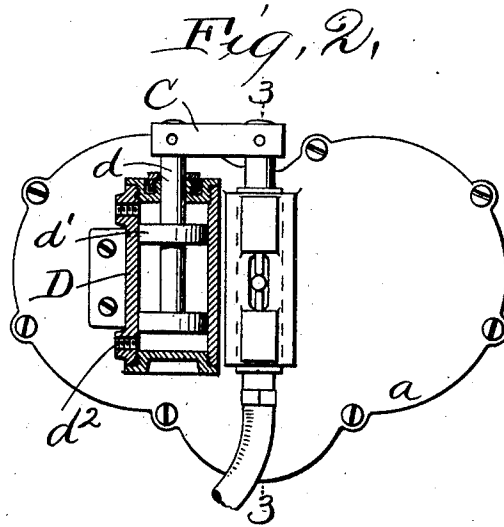
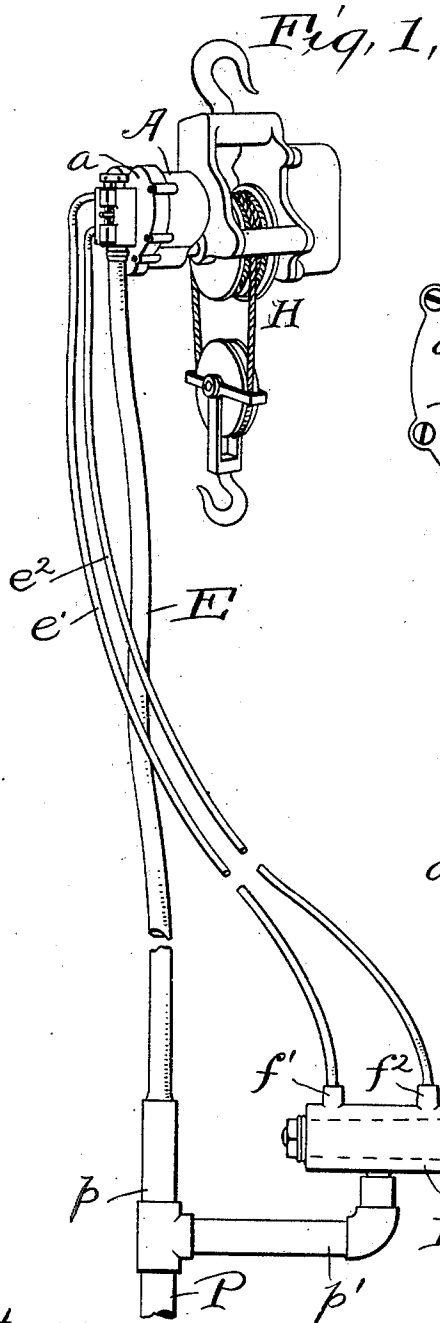
E. Y. MOORE.

CONTROLLING VALVE OF FLUID MOTORS.

(Application filed Mar. 27, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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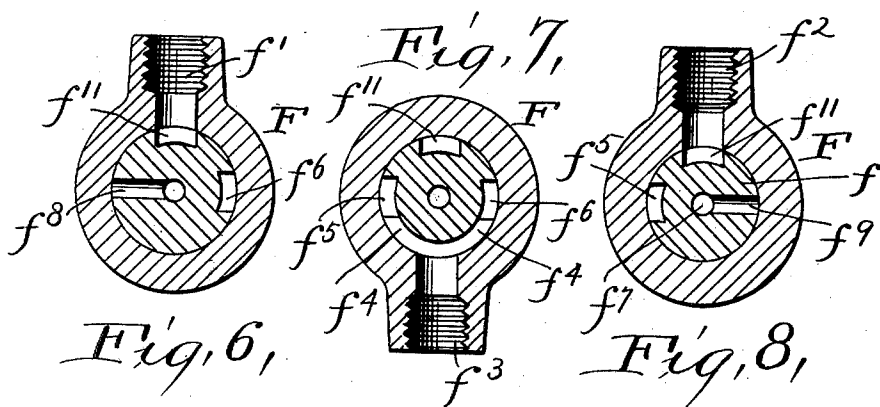
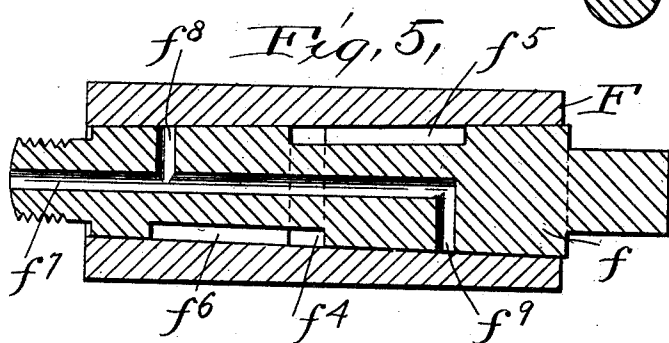
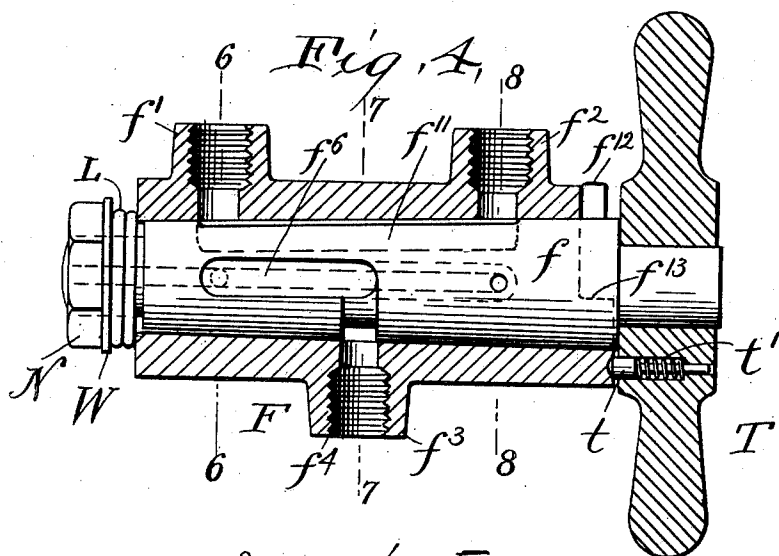
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UNITED STATES PATENT OFFICE.

EDWARD Y. MOORE, OF CLEVELAND, OHIO, ASSIGNOR TO THE CHISHOLM AND MOORE MANUFACTURING COMPANY, OF SAME PLACE.

CONTROLLING VALVES OF FLUID-MOTORS.

SPECIFICATION forming part of Letters Patent No. 679,533, dated July 30, 1901.

Application filed March 27, 1901. Serial No. 53,030. (No model.)

To all whom it may concern:

Be it known that I, EDWARD Y. MOORE, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Systems for Controlling Valves of Fluid-Motors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

My invention relates to pneumatic mechanism for controlling the valves of fluid-operated motors; and it is particularly applicable to a hoisting system wherein a valve-shifter consisting of a piston within a cylinder is connected to a reversing-valve, and thus controls the operation of a motor which actuates the hoisting machinery. Such a system is shown herein specifically as applied to a hoist which is intended to be typical of raising mechanism generically.

The particular object of the present invention is to provide efficient means for restoring the piston of the valve-shifter to its normal or mid position promptly and with economy of air.

The invention consists in the arrangement and means I employ to accomplish this end. More especially, it lies in certain combination and construction of parts more fully described hereinafter and definitely set forth in the claims.

In the drawings which fully illustrate my invention, Figure 1 is a perspective view of hoisting apparatus in connection with my controlling valve or cock in side elevation. Fig. 2 is a front elevation of the hoist-motor and shows in section the shifter-cylinder for operating the valve of the same. Fig. 3 is a longitudinal section of the valve and cover-plate of said motor. Fig. 4 is a vertical longitudinal section of the controlling-valve. Fig. 5 is a horizontal longitudinal section of the same. Figs. 6, 7, and 8 are cross-sections, respectively, on the lines 6 6, 7 7, and 8 8 of Fig. 4.

Referring to the parts by letters, A represents an air-motor arranged to operate any suitable hoisting apparatus, (illustrated by the hoist H.) This motor is provided with a cover α , which may carry a guide or chest α'

for an operating-valve V. The valve V may be of the general construction shown in Fig. 3, consisting of a hollow cylinder adapted to receive compressed air and provided with openings $v v$, which may communicate with the ports $a^2 a^3$ in the valve-seat, so as to operate the motor referred to forwardly or rearwardly in a manner well understood. A recess v' on the exterior of the valve may connect either of the ports $a^2 a^3$ with the exhaust-port a^4 . A stud v^2 on the valve V projects through a slot a^5 in the guide. Plungers a^6 have rigid heads a^7 , against which thrust helical springs a^8 . Said springs and heads lie within housings a^9 of the guide a' . The extremities of these plungers a^6 abut the stud v^2 when it is in mid-position and would evidently operate to hold the valve V in mid-position if unrestrained. A cross-head C unites the valve V rigidly with a piston d . This piston may have two heads d' , substantially equidistant from the heads of the encompassing cylinder D. This cylinder and piston arrangement I call the "valve-shifter." Ports d^2 afford means for admitting compressed air to either end of this cylinder, respectively, through the auxiliary air-hose $e' e^2$. A main hose E delivers air to the valve V for operating the motor; but the air from it cannot reach the motor to operate it unless the valve V, controlled by the hose $e' e^2$, permits it. I use in connection with the above-described apparatus a valve F for controlling the air in the hose $e' e^2$, which I will now describe.

The controlling-valve F is preferably in the form of a cock having a body with a bore preferably tapered, in which is mounted a plug f . The body F is provided with an inlet-nipple f^3 and discharge-nipples $f' f^2$, preferably arranged as shown, which discharge-nipples communicate, respectively, with the auxiliary hose $e' e^2$. The plug f at a point adjacent to the inlet-nipple f^3 is provided with a peripheral groove or recess f^4 , with which recess communicate longitudinal recesses $f^5 f^6$, which are opposite each other. The recess f^6 extends to a point adjacent to the discharge-nipple f' , while the recess f^5 extends to a point adjacent to the discharge-nipple f^2 . Evidently from this construction the discharge-nipple f' may be caused to communi-

cate with the inlet-nipple f^3 , while communication from the nipple f^3 to the nipple f^2 is shut off, and vice versa. The plug is also provided with a bore f^7 , with which passages $f^8 f^9$ communicate. The passage f^8 is on the same side as the recess f^5 and the passage f^9 on the same side as the recess f^6 , so that when either one of the discharge-nipples is connected with the inlet-nipple f^3 the other is connected with the outer air through the bore f^7 . The plug is further provided with a longitudinal groove or recess f^{10} , cut along its body parallel with and midway between the recesses f^5 and f^6 , and this recess at the mid-position of the cock thus brings the nipples $f' f^2$ directly into communication with each other. When this is done, compressed air, which has been previously admitted through either hose $e' e^2$ into the cylinder D, escapes around through this recess f^{10} into the other hose and passes to the opposite end of the cylinder D. As the pressure on opposite sides of the piston becomes equal one of the springs a^8 returns it to its normal mid-position. A stop f^{12} , carried by the plug, limits its rotation by abutting a shoulder f^{13} on the body F when the plug comes to either of its extreme positions. A hand-wheel F' may be rigidly secured to the plug for turning it. This hand-wheel carries a spring-pressed detent-plunger t in a recess t' , which may project beyond the inner face of the wheel, and a small hollow is provided in the body F, in which it catches to indicate the point at which the two nipples $f' f^2$ are in communication. A usual spring L, washer W, and nut N keep the plug snugly in its seat.

The main hose E and the cock F may be connected to the same main pipe P, as by the branches p and p' , as shown.

The operation of my controlling system is as follows: With the reversing-valve V and the valve-shifter in the mid or off position and the controlling-valve F in the corresponding position, if it is desired to drive the engine forwardly, for example, the controlling-valve is turned to the corresponding extreme position. This discharges compressed air into the proper side of the valve-shifter cylinder connecting the other side with the atmosphere, whereby compressed air drives the valve-shifter as desired. As soon as the motor has operated sufficiently the controlling-valve is turned back to the intermediate position, which couples the two ends of the valve-shifter cylinder together, discharging compressed air on one side around through the hose into the other side, thus immediately bringing the valve back to the central position. This coupling together of the two ends of the shifter-cylinder at the off position is of importance, as it causes the main valve to respond much more quickly to the controller-valve than if the compressed air were not allowed to pass around to the other end of the shifter-cylinder.

Having described my invention, I claim—

1. In an air system, the combination of a valve, a valve-shifter therefor, controlling means, a pair of air-ducts leading therefrom to opposite parts of the valve-shifter, an air-supply pipe leading to said controlling means, said controlling means being adapted to connect either of said air-ducts with the air-supply pipe, and also to shut off the air-supply to the ducts but couple the two ducts together, substantially as described.

2. The combination of a motor, a reversing-valve therefor, a valve-shifter connected with said reversing-valve, a controlling-valve, a pair of air-ducts leading therefrom to the shifter, an air-supply pipe leading to said controlling-valve, said controlling-valve having one position where it couples one of the air-ducts with the supply and the other with the outer air, another position wherein it couples the other air-duct with the supply and the remaining one with the outer air, and an intermediate position wherein it disconnects each air-duct from the supply and from the outer air and couples the two air-ducts together, substantially as described.

3. The combination of a reversing-valve having an intermediate off position, means tending to return said valve to its said off position when displaced in either direction, a valve-shifter consisting of a plunger within a cylinder and connected with said valve, means for admitting compressed air to either end of the cylinder and for connecting together the two ends of the cylinder, substantially as described.

4. The combination of a reversing-valve having an intermediate off position, means tending to return said valve to its said off position when displaced in either direction, a pneumatic valve-shifter connected with said valve, a controlling-valve, a pair of air-ducts leading therefrom to opposite parts of said shifter, a supply-pipe leading to said controlling-valve, said controlling-valve having three positions one of which connects one of said ducts with the supply-pipe, the other of which connects the other duct with the supply-pipe, and the third being an intermediate position which disconnects each duct from the supply-pipe and connects both ducts together, substantially as described.

5. In an air system, in combination, a valve-body, a plug mounted therein, said body having outlets, air-ducts leading from said outlets and adapted to control said system, said plug having a recess which may connect together said two outlets, substantially as described.

6. In an air system, in combination, a valve-body, a plug having recesses therein, said body having two outlets and an inlet, air-ducts leading from said outlets and adapted to control said system, said plug having two extreme positions which may connect either of said outlets with the said inlet, and an intermediate position in which said outlets are

connected together, substantially as described.

5 7. In an air system, in combination, a valve-body, a plug having recesses therein, said body having two outlets, a cylinder and piston, air-ducts leading from said outlets to opposite sides of said piston, one position of said plug connecting said outlets together, substantially as described.

10 8. In an air system, in combination, a valve-body, a plug having recesses therein, said body having an inlet and two outlets, a cylinder and piston, air-ducts connecting each of said outlets with one end of said cylinder,
15 said plug having two extreme positions in which either of said outlets may be connected with said inlet while the other outlet is connected with the outer air, and an intermediate position in which said two outlets are connected, substantially as described.

20 9. The combination of a tubular valve-body having an inlet and a pair of outlets, a plug within said body having an external recess adapted in the intermediate position of the
25 plug to couple said two outlets together, a pair of recesses on opposite sides of the plug

adapted in one extreme position to couple one outlet-opening with the inlet-opening and in the other extreme position to couple the other outlet-opening with the inlet-opening, 30 substantially as described.

10. The combination of a tubular valve-body having an inlet and a pair of outlets, a plug within said body having an external recess adapted in the intermediate position of 35 the plug to couple said two outlets together, a pair of recesses on opposite sides of the plug adapted in one extreme position to couple one outlet-opening with the inlet-opening and in the other extreme position to couple the other 40 outlet-opening with the inlet-opening, and passage-ways contained in the interior of said plug and leading outside of it, and adapted to connect with one outlet-opening when the other outlet-opening is connected with the in- 45 let, substantially as described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

EDWARD Y. MOORE.

Witnesses:

ALBERT H. BATES,
H. M. WISE.