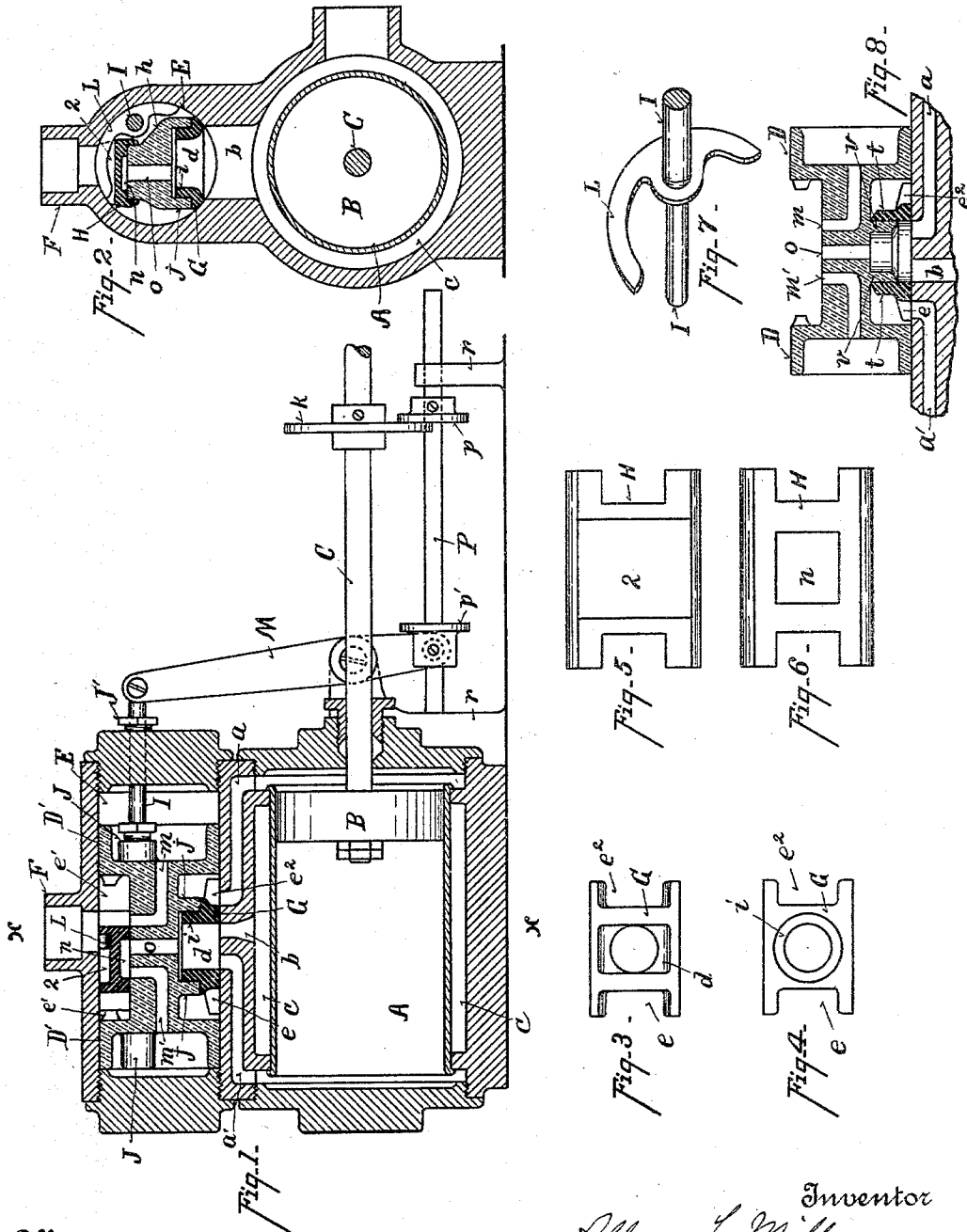


(No Model.)

A. T. MILLER.
VALVE FOR MOTORS.

No. 545,368.

Patented Aug. 27, 1895.



Witnesses
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UNITED STATES PATENT OFFICE.

ALLEN T. MILLER, OF DAYTON, OHIO, ASSIGNOR TO KUHNS BROTHERS, OF
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VALVE FOR MOTORS.

SPECIFICATION forming part of Letters Patent No. 545,368, dated August 27, 1895.

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To all whom it may concern:

Be it known that I, ALLEN T. MILLER, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Valves for Motors, of which the following is a specification.

My invention relates to valves for motors; and it consists in the construction and combination of parts as hereinafter described and claimed.

The several features of my invention will be more fully set forth in the description of the accompanying drawings, making a part of this specification, in which—

Figure 1 is a central vertical section of my improved motor in position for use. Fig. 2 is a central cross-section on line *x x*, Fig. 1. Fig. 3 is a bottom plan view of the main valve. Fig. 4 is a top plan view of the same. Fig. 5 is an enlarged top plan view of the auxiliary valve. Fig. 6 is an enlarged bottom plan view of the same. Fig. 7 is a perspective view of the tripping-finger and shaft. Fig. 8 is a modified form of main valve.

A represents the cylinder of the motor; B, the piston operated in said cylinder; C, the piston-rod.

a represents one of the supply-ports; *a'*, the port for operating on the other face of the piston.

b represents the exhaust-port connected alternately with ports *a a'*, voiding water or other pressure medium into the chamber *c*.

D D' represent the duplex piston reciprocating in the cylinder E. F represents the supply-pipe tapping said cylinder.

G represents the main valve, provided with cut-off sections adapted to respectively cover and uncover the ports *aa'*. *d* represents a discharge-port connecting either of said ports with the exhaust-port *b*. Said valve is of curved form, fitting the face of the cylinder E. Said valve is provided with an annular flange *i*, fitting and seating in the tubular flange *j*, formed on the shank or neck *h* of the piston D.

e represents a port formed outside of the flange *j* and receiving its pressure-supply from the inlet F through the passages *e'* between the cylinder walls and the neck *h*. *e*²

represents a similar port on the opposite side of the valve G.

H represents the auxiliary valve gained on the piston-neck *h* and provided with two seats which cover and uncover, respectively, ports *m m'*, which ports are to admit pressure medium into the cylinder E for moving the duplex piston D D' in the proper direction, according to the throw of the auxiliary valve. Said auxiliary valve is provided with a tripping device constructed as follows:

I represents a shaft reciprocating in the bearing-box J and likewise journaled in the stuffing-box J' in one of the cylinder-heads K. Said shaft is provided with a finger L, which projects over into the recess 2 on the top of the valve H and engages with the flanges at either end. Said shaft I is operated by the rock-lever M, which is operated by the piston-rod C in the following manner: *k* represents a disk keyed upon said piston-rod and adapted to engage at each end of the stroke with the puppets *p p'* secured to the rod P, which is journaled in the brackets *r*. The rock-lever M is pivoted to the boss of the puppet *p'*, and as the piston-rod C reciprocates it strikes the said puppets alternately and throws the rock-lever M, which reciprocates the shaft I which carries the finger L, and throws the auxiliary valve H in either direction, covering and uncovering ports *m m'*, as the case may be. As shown in Fig. 1, the port *m* is open. The force of the pressure medium which drives the main piston holds the duplex piston D D' in the position shown. Said medium is supplied through the port *e*², thence through port *a* onto the piston B, which will propel it forward. The valves remain in this position until the disk K has struck the puppet *p'*, which will throw the auxiliary valve in the opposite direction, closing port *m* and uncovering port *m'*, which will admit the medium of force to the duplex piston D, which will force the said piston back in the cylinder E, carrying with it the main valve G, which covers port *a*, and admitting the medium through the port *a* onto the opposite face of the piston for driving the motor in the reverse direction. The exhaust is alternately through the supply-ports and through the port *d* of the main valve and

port *b* in the cylinder to exhaust-chamber *c*. The exhaust from the cylinder E, when the piston D D' is thrown, is through the ports *m* *m'* alternately with the port *n* of the auxiliary valve, thence by port *o*, which communicates with the port *d* of the main valve, and thence with the exhaust-chamber. It will be observed that the neck of the piston D D' carries the main valve and piston D D', reciprocates in the cylinder E, and sustains the thrusts and wear caused by the change of the stroke. The main and auxiliary valves, it will be observed, are practically balanced and may be moved easily. The exhaust ports and passages are made so as to cushion the movement of the piston by the resistance of the exhaust through the passages.

In the modification shown in Fig. 8 the main valve is provided with an annular stem *t* seating on the annular boss *v* on the neck of the piston D D', which holds the main valve firmly in position laterally but yet allows it to drop down as it wears away, so as to keep its contact with the seat, and the pressure being sufficient to hold it in its seat. Likewise the auxiliary valve H, while being practically balanced, has a slight excess of pressure on its top side to hold it to its seat.

It will be observed that the ends of the duplex piston D D' are connected by a neck or shank, around which the pressure medium passes, to supply the ports *a a'* and *m m'*, respectively. The said piston has its bearing-support in cylinder E and but little wear is brought upon the main and cut-off valves, while the piston D D' is practically balanced in the cylinder E.

I claim—

The combination with a motor cylinder and its ports and piston, the auxiliary cylinder E, and the duplex piston D D' having its ends connected by a neck *h* provided on the under side with an annular flange, of the main valve G having an annular flange engaged with the corresponding flange of the said piston neck and provided with a central discharge port and with ports *e e'* at its ends, and the auxiliary valve H seated upon the upper side of the piston neck *h*, substantially as described.

In testimony whereof I have hereunto set my hand.

ALLEN T. MILLER.

Witnesses:

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