No. 886,402. PATENTED MAY 5, 1908.

O. S. PIKE.

CUSHIONING DEVICE FOR PISTONS.

APPLICATION FILED SEPT. 16, 1904.

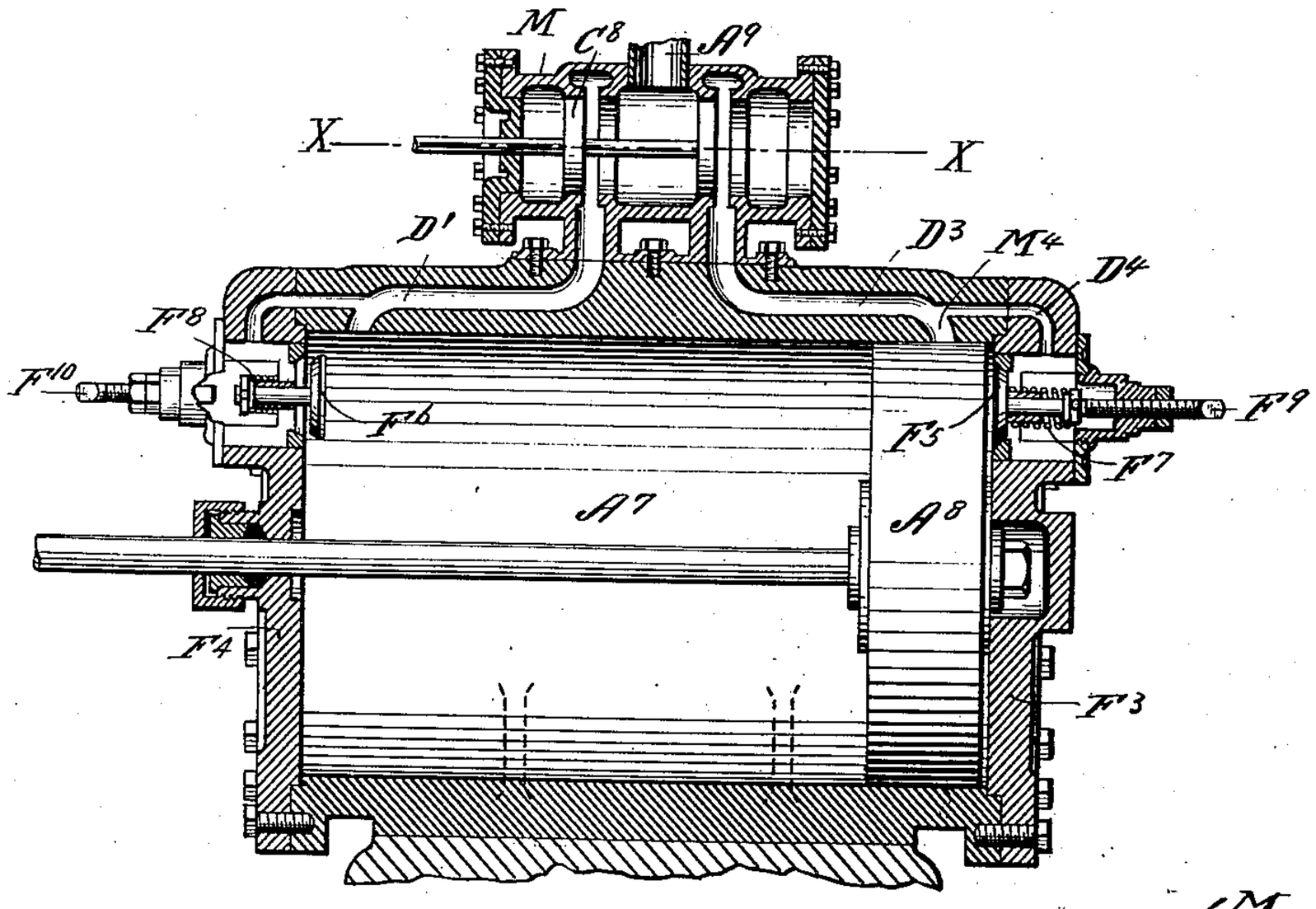

Fig. 1.

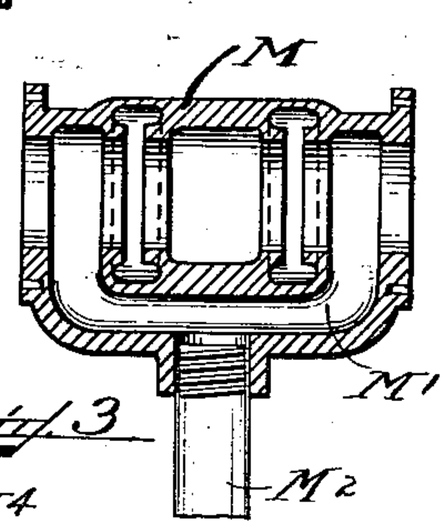

Fig. 3.

Fig. 2.

Witnesses:
V. A. Mussen
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Inventor:
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UNITED STATES PATENT OFFICE.

OTTO S. PIKE, OF MALDEN, MASSACHUSETTS, ASSIGNOR TO AMERICAN PNEUMATIC SERVICE COMPANY, OF DOVER, DELAWARE, A CORPORATION OF DELAWARE

CUSHIONING DEVICE FOR PISTONS.

No. 886,402. Specification of Letters Patent. Patented May 5, 1908.

Application filed September 16, 1904. Serial No. 224,643.

To all whom it may concern:

Be it known that I, OTTO S. PIKE, of Malden, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Cushioning Devices for Pistons, of which the following is a specification.

My invention relates to reciprocating pistons operated by fluid and its object is to provide means whereby the piston reciprocating in the cylinder can be brought to rest or reversed in its motion at the end of its stroke without shock or jar.

My invention consists of certain novel features hereinafter described and particularly pointed out in the claims.

In the accompanying drawings which illustrate a construction embodying my invention, Figure 1 shows a section of the apparatus with the piston to the right of the cylinder. Fig. 2 shows a similar section with the piston at the left of the cylinder. Fig. 3 shows a section of the valve chest, on the line x x Fig. 1.

Like letters of reference refer to like parts throughout the several views.

A^7 is the cylinder and A^8 the piston; the piston A^8 is operated by motive fluid from any suitable source through the pipe A^9. The admission of this motive fluid through the cylinder A^7 is controlled by the piston slide valve C^8 in the valve chest M. The construction of this valve C^8 and valve chest M is well known to the art. The motive fluid being admitted to the right or to the left of the piston A^8 according as the valve C^8 is in its right hand or left hand position in the valve chest M. Fig. 1 shows the valve C^8 in its left hand position, and Fig. 2 shows the valve in its right hand position. This valve C^8 may be operated manually or by any suitable mechanical means. In the cylinder heads F^3 F^4 are the check valves F^5 F^6; these valves open inwardly and the springs F^7 and F^8 tend to hold them in a closed position. When the piston A^8 is stationary both valves F^5 F^6 would be closed on their seats unless prevented by the adjusting screws F^9 F^{10} hereinafter described. In Fig. 1 however, the valve F^6 is shown in the position it would take when the piston A^8 is moving to the right, and in Fig. 2 the valve F^5 is shown in the position it would take when the piston A^8 is moving to the left. The purpose of these valves F^5 F^6 is to secure an air cushion at the ends of the cylinder A^7 to prevent the piston A^8 from coming to the end of its stroke with a shock. As the piston A^8 moves to the right, the motive fluid in front of it escapes through the port D^3, the valve chest M, the port M′ and pipe M^2 into the atmosphere. As the piston A^8 nears the end of its motion toward the right, it overlaps the opening M^4 of the port D^3 and the pressure generated in the closed space combined with the spring F^7 tends to keep the valve F^5 tightly closed. The valve F^5 however, may be kept from entirely closing by the adjusting screw F^9 so that the motive fluid may escape by the valve F^5 slowly, and thus allow the piston A^8 to come home slowly.

In case the nature of the work of the apparatus does not necessitate the piston A^8 ending its stroke at an exact point, the adjusting screw F^9 may be drawn back so that the valve F^5 will remain tightly closed during the right hand motion of the piston A^8; and consequently causing the piston A^8 to come to rest on a cushion made of the motive fluid instead of allowing the piston to strike the cylinder head M^5. When the motive fluid is admitted to the port D^3 so as to force the piston A^8 to the left, some of the motive fluid can pass through the port D^4 to the right of the valve F^5, and by forcing open the valve F^5 can pass into the cylinder to the right of the piston A^8. After the piston A^8 has moved a short distance to the left, the opening M^4 of the port D^3 is uncovered by the piston A^8 thus allowing the full volume of motive fluid to enter the cylinder. The action of the valve F^6 is entirely similar to that of the valve F^5 previously described.

I do not limit myself to the arrangement and construction shown as the same may be varied without departing from the spirit of my invention.

Having thus described the nature of my invention and set forth a construction embodying the same, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In an apparatus of the character described, a cylinder, a piston in said cylinder, a valve controlling the admission and exhaust of the motive fluid to and from said cylinder, a valve for cushioning the piston at the end of its stroke, and means for adjusting said valve.

2. In an apparatus of the character de-

scribed, a cylinder, a piston in said cylinder, a valve controlling the admission and exhaust of the motive fluid to and from said cylinder, a valve at each end of the cylinder for cushioning the piston at the end of its strokes, and means for adjusting said valves.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses, this twelfth day of September A. D. 1904.

OTTO S. PIKE.

Witnesses:
A. L. NUSSIL,
E. L. HARLOW.