(No Model.)

# J. E. MATHEWSON.

## SPRING FOR PUMP VALVES.

No. 588,456. Patented Aug. 17, 1897.

*Fig. 1.*

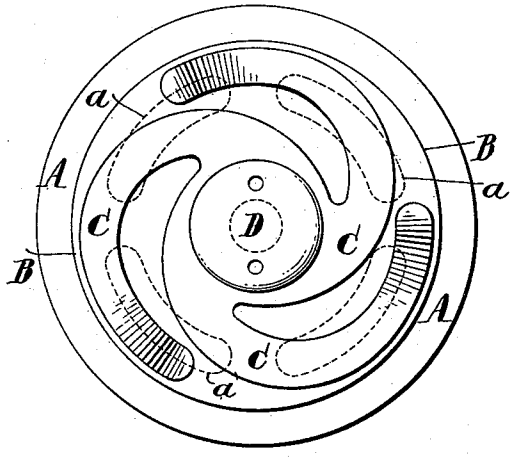
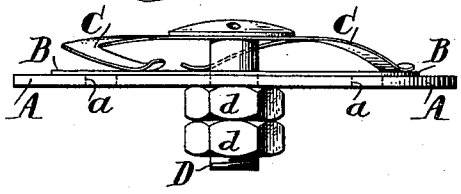



*Fig. 2.*




Witnesses.

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# UNITED STATES PATENT OFFICE.

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## SPRING FOR PUMP-VALVES.

SPECIFICATION forming part of Letters Patent No. 588,456, dated August 17, 1897.

Application filed April 28, 1896. Serial No. 589,361. (No model.) Patented in England February 19, 1895, No. 3,532.

*To all whom it may concern:*

Be it known that I, JEREMIAH EUGENE MATHEWSON, of Bellefield Works, Sheffield, England, have invented a certain new and Improved Spring for Pump-Valves, (for which I have obtained British Letters Patent No. 3,532, dated February 19, 1895,) of which the following is a specification.

The object of this invention is to provide a simple, compact, and efficacious pressure-spring for disk valves of air and other pumps, the pressure of which spring will be so distributed as to preserve the horizontality or verticality (as the case may be) of the valve to which it is applied when the valve is forced from its seat. The common practice has heretofore been to use coiled springs to hold the valves against their seats, but in consequence of their unequal bearing upon the valves they are usually provided with guide-spindles, so as to cause them to seat squarely, the advantage of compactness of arrangement being disregarded. Moreover, the hammering of valves fitted with coiled springs often causes the spindles to break off and damage the machine, but by my invention these disadvantages are avoided, while at the same time the rapid action of the valves is secured.

In the accompanying drawings, Figure 1 shows in plan view and in full size a spring constructed according to my invention and bearing on a seated disk valve, and Fig. 2 is an edge view of the same.

In the figures, A is the seat with its openings *a* for the passage of the fluid impelled by the force-pump. These openings are covered by the thin disk valve B, which is held to its seat by the overlying spring C. This spring is made from a disk of rolled brass or steel slightly less in diameter than the valve itself and punched with a central hole to allow of the passage through it of a central bolt D, which is fixed to the valve-seat A and properly adjusted thereto by nuts *d*. This central bolt forms the guide-stem on which the valve B works, and it serves also to retain the spring C in place. The spring is formed by punching out from the rolled metal curved arms, which taper from their root toward their extremities, which extremities are bent down to press upon the back of the underlying valve.

In the drawings three curved arms only are shown, and this number will in general suffice, but four or more may be used as the diameter of the disk valve to which the spring is to be applied increases, and for smaller valves two bearing-points to the spring may suffice.

It will be understood that the elasticity of the spring will depend upon the thickness and length of the arms. The strength of the spring should be so adjusted as to allow of its valve rising (under pressure) an eighth of an inch or more from its seat, and by the set of the arms their resistance to the rise of the valve may be readily determined.

By distributing the pressure of the spring through its arms upon the back of the valve all tendency of the valve to tip will be avoided, and thus the necessity for guiding-spindles will be removed.

I claim—

1. In combination with a seat as A having ports *a* formed therein and a valve as B adapted to close said ports, a spring-plate having a plurality of symmetrically-disposed arms as C C C extending from a common center and curving outwardly both radially and downwardly and means for holding said spring-plate in position above the valve.

2. In combination with a seat as A having ports *a* formed therein and a valve as B adapted to close said ports, a spring-plate having a plurality of outwardly and downwardly curving arms C C C all turned in the same direction and a bolt D and nuts as *d* whereby the spring-plate is held to the seat A and in position upon the valve B.

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Witnesses:

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