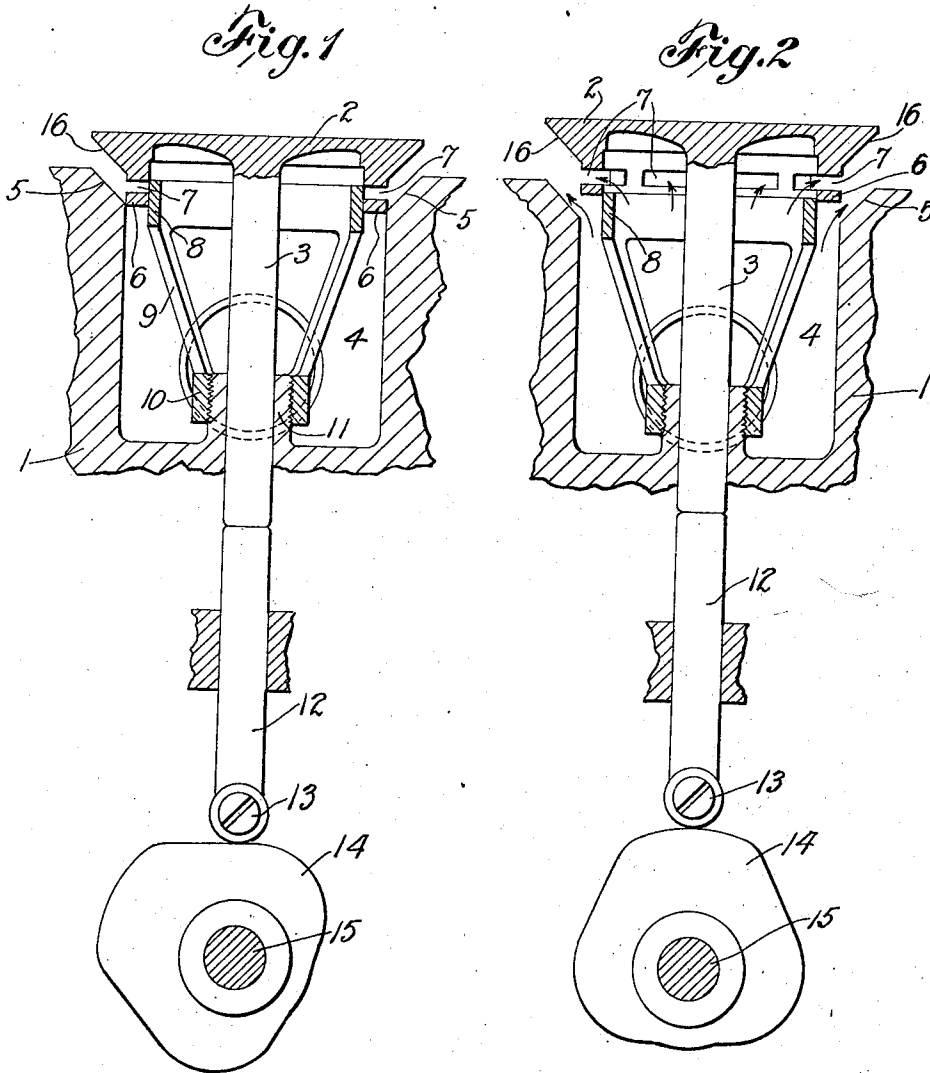


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 PUPPET VALVE.
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1,242,576.

Patented Oct. 9, 1917.



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 per Fred W. Baker
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UNITED STATES PATENT OFFICE.

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PUPPET-VALVE.

1,242,576.

Specification of Letters Patent.

Patented Oct. 9, 1917.

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To all whom it may concern:

Be it known that I, ROBERT MILLER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Puppet-Valves, of which the following is a specification, reference being had therein to the accompanying drawing:

My present invention relates to certain new and useful improvements in puppet valves of the type commonly employed in connection with steam engines, air compressors, pumps of various kinds, internal combustion engines, explosive motors used in automobiles and the like, and various other species of mechanism or apparatus. A puppet valve as ordinarily constructed having a member attached to a stem, which member moves back and forth with relation to a seat, is usually very much restricted as regards its port area, since in order to open widely and give a large port area a very high lifting of the valve is required, while on the other hand too great a diameter for the valve or the use of a plurality of valves results in considerable noise and often times a very objectionable leakage. The object of my invention is to avoid these commonly noted defects in valves of the puppet type and with a given size of valve provide greater port area with no increase in leakage, thus improving the construction, operation and effectiveness of a valve of a given size over what is possible with the same valve as not constructed with my improved features, besides enabling the operation of the valve to be less noisy than heretofore. The invention comprises numerous details and peculiarities in the construction, combination and arrangement of the various parts, substantially as will be hereinafter described and then more particularly pointed out in the claims.

In the accompanying drawings illustrating my invention:

Figure 1 is a vertical section of my improved puppet valve as it appears when lifted from its seat, but with the ports not yet opened.

Fig. 2 is a similar vertical section showing the valve wide open and the ports likewise in coincidence.

Similar characters of reference designate corresponding parts throughout the different figures of the drawing.

1 denotes the wall of an engine or other apparatus in which is a valve chamber 4, said chamber being in communication with the inlet or discharge pipe of the engine. The chamber 4 is provided with the inclined valve seat 5 adjacent to which is the puppet valve 2 having an inclined face 16, which moves toward and away from the seat 5 in the closing and opening movements of the valve. The valve 2 is carried by a stem 3 which reciprocates through a boss 11 on the inner wall of the chamber 4. Stem 3 is actuated by rod 12 having anti-friction roller 13 in contact with which is a cam 14 on the main shaft 15 of the engine, it being obvious that the rotation of the cam reciprocates the rod 12 and thereby acts on the valve stem 3 and moves said stem back and forth with relation to its seat 5. The valve 2 on its inner side below the inclined face 16 is provided with a cylindrical flange or skirt 6 which is formed with a series of lateral ports or openings 7. The skirt 6 lies between the wall of the chamber 4 at a point contiguous to the seat 5 and a stationary sleeve 8, which is supported by a rigid attachment to some part of the engine, pump, or apparatus at a point within the chamber 4, as for instance, by means of the arms 9 projecting from the internally screw-threaded collar 10 which screws upon the boss 11, which affords a bearing for the stem 3. Thus the stationary sleeve 8 is so carried that the contents of the chamber 4 may pass freely between the supports 9 and in the interior of the sleeve 8 and above the same so as to be in contact with the inside of the valve 2 as well as filling all the space throughout the chamber 4.

The reciprocating movement of the valve 2 causes its skirt 6 to play back and forth between the stationary sleeve 8 and the seat 5. When the valve 2 is closed, its inclined face 16 will be in contact with the seat 5 and obviously the ports 7 will be closed because they will be on the side of the seat 5 toward the interior of the chamber 4. When the valve opens and the inclined face 16 lifts away from the seat 5, the valve will pass into the position shown in Fig. 1, and the skirt 6 will prevent any connection between the interior of the chamber 4 and the opening between the face 16 and seat 5 until a point is reached where the skirt 6 passes the seat 5 and allows an inlet to take place under the edge of the skirt 6, and as the outward

movement of the valve 2 continues this space will grow larger, as shown in Fig. 2, and at the same time another opening will be established through the port 7 with the interior of the chamber 4 over the outer edge of the sleeve 8, that is to say, when the valve is opened in the position shown in Fig. 2, the inlet will take place above and below the sleeve 8, the passage above being through the ports 7 which open into the space between the face 16 and the seat 5, while the passage below sleeve 8 is directly under the skirt 6 and into the space between face 16 and seat 5, so that a much greater increase in the area of the inlet is permitted by the employment of the ports 7.

In those cases where it is desirable to positively operate the valve, the stem 3 will be brought into contact with the cam follower 12, but when the valve is not to be positively operated the follower 12 need not, of course, be used. The contour of the cam 14 is such that the follower rod 12 and the stem 3 may be accelerated slowly at first until the valve 2 reaches the position shown in Fig. 1. The continued movement of the cam finally brings the valve into the position shown in Fig. 2, which is the full open position where the skirt on the valve 2 so registers with reference to the seat 5 and the inner sleeve 8 that the fluid may pass simultaneously below the edge of the skirt 6 and through the ports 7. The closing operation will be exactly the reverse to that just described for the opening.

Many changes in the precise form and exact character of the various parts may be made without exceeding the scope of my invention, or changing its essential character, and I, therefore, reserve the liberty of so varying and rearranging the details as may be found necessary in carrying the invention into actual practice.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A puppet valve for internal combustion

engines having a port-provided skirt, in combination with a seat for said valve, and a stationary sleeve inside the valve between which sleeve and the seat the said skirt has a range of motion.

2. A puppet valve for internal combustion engines comprising a valve proper, having a stem and a peripheral face, a seat for said face, a skirt on the valve consisting of a cylindrical flange provided with ports, and an inner stationary ring adjacent to the seat, between which ring and the seat the skirt moves.

3. A puppet valve, provided with an apertured skirt, in combination with a valve casing and a seat thereon for the valve, and a stationary ring or sleeve within said casing opposite to the seat, said ring being so located that when the apertured skirt lifts above it an opening will be established between the valve casing and the outside thereof simultaneously with the opening of the passage between the valve and its seat.

4. A puppet valve for internal combustion engines having a face and a port-provided skirt adjacent to said face, in combination with a seat for said valve, and an inner stationary sleeve between which and the seat the said skirt has a range of motion.

5. In a puppet valve for internal combustion engines, the combination of a head and area-increasing means, said head acting to protect said area-increasing means at critical periods in a cycle, and opening when such periods have passed, so that said area-increasing means can function.

6. A puppet valve, provided with an apertured skirt in combination with a casing and a valve seat, and a ring within said casing, said ring being so located that when the skirt lifts above it an opening will be made between the valve casing and the outside thereof at the same time the valve lifts from its seat.

In testimony whereof I affix my signature.

ROBERT MILLER.