F. L. MILLER.

VALVE FOR AIR COMPRESSORS, &c.

APPLICATION FILED OCT. 18, 1916.

1,280,063.

Patented Sept. 24, 1918.

FIG. 1.

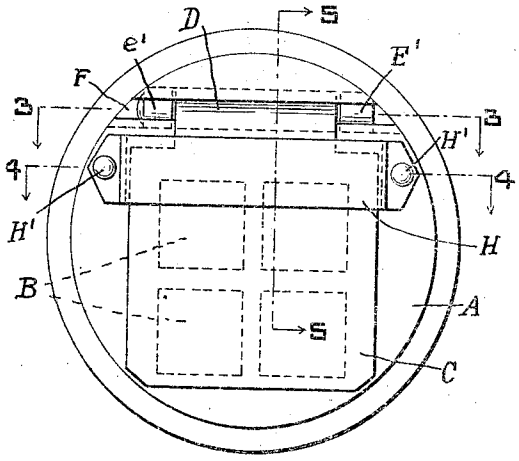


FIG. 2.

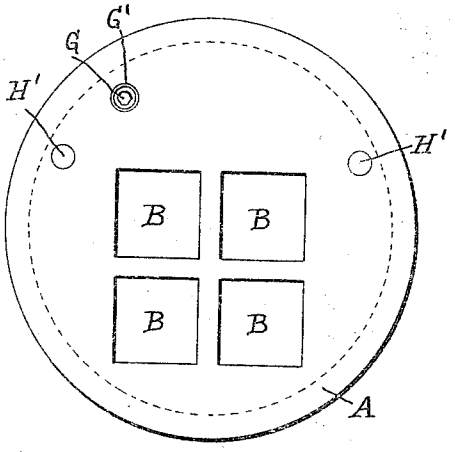


FIG. 3.

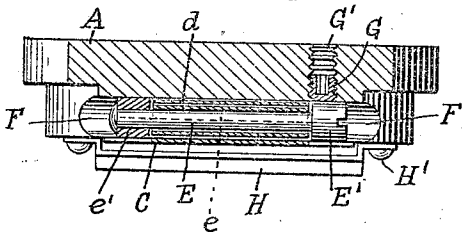


FIG. 5.

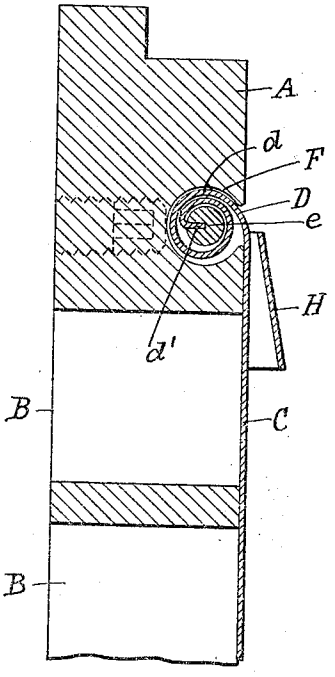
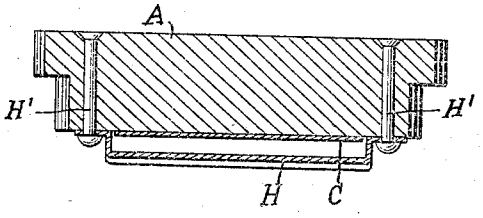


FIG. 4.



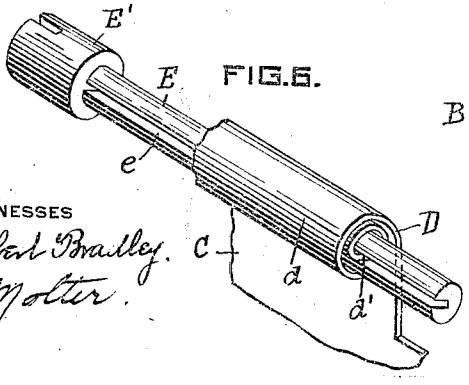


FIG. 6.

WITNESSES

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UNITED STATES PATENT OFFICE.

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VALVE FOR AIR-COMPRESSORS, &c.

1,280,063. Specification of Letters Patent. Patented Sept. 24, 1918.

Application filed October 18, 1916. Serial No. 126,227.

To all whom it may concern:

Be it known that I, FRANK L. MILLER, a citizen of the United States, and resident of Parkersburg, in the county of Wood and State of West Virginia, have invented certain new and useful Improvements in Valves for Air-Compressors, &c., of which the following is a specification.

The object of this invention is to provide a simple and highly efficient valve for air compressors, vacuum pumps and like apparatus wherein the valves—inlet and outlet—open and close with high frequency, being necessarily instantly responsive to the required movement, and when closed operating to seal the ported seat.

The invention is embodied in a valve having a marginal hinge, and a further object is to provide an efficient and compact mounting for the hinge, together with novel means for regulating the tension thereof. The invention also includes positive means of improved construction for limiting the opening movement of the valve.

In the accompanying drawings, Figure 1 is an elevation of a valve seat and valve embodying the invention. Fig. 2 is an elevation of the reverse face of the seat shown in Fig. 1. Fig. 3 is a sectional plan taken through the hinge on line 3—3 of Fig. 1, and Fig. 4 is a similar view taken on line 4—4 of Fig. 1. Fig. 5 is a vertical section of a portion of the valve seat and the valve, taken on line 5—5 of Fig. 1, the same being drawn to a larger scale. Fig. 6 is a detail view of the hinge bolt and a portion of the valve hinge.

Referring to the drawings, A designates a seat-forming head ported at B for the passage of air, the ports being adapted to be closed at one face of the seat by hinged valve C. Head A is adapted to be secured in the wall of the cylinder of an air compressor, vacuum pump, or like apparatus, being preferably mounted in the cylinder head, and as the arrangement in this regard is in accordance with usual practice, no portion of such cylinder or cylinder head is illustrated. The seat and valve may be used interchangeably for controlling the inlet and outlet, the head being mounted to face the valve either inwardly or outwardly depending on whether it is to perform inlet or outlet service.

Valve C is provided with a resilient hinge-forming marginal portion D, and in the preferred adaptation the valve is formed of a piece of relatively thin sheet or plate metal, and resilient margin D is an integral extension of the valve body. Margin D is curled in barrel form as indicated at *d*, and the inner edge *d'* thereof is deflected inwardly in straight-edge formation to enter longitudinal groove *e* in hinge bolt E, the latter provided at one end with head E' slotted to receive a screw-driver and at its opposite end upset as shown in Fig. 3 to confine the bolt embracing head *e'* which maintains the bolt and hinge assembled.

For compactly mounting the hinged valve on the seat, the latter is formed with cavity F which is preferably open at its ends through opposite edges of head A, and at one side is open through the valve-closed face of the seat, whereby the curled spring hinge and its bolt may be entered in cavity F, with the valve body flatly engaging the face of the seat, as in Fig. 5. Cavity F is substantially circular in cross-section whereby the curled hinge-forming marginal portion of the valve may be tightened or loosened to vary its tension by turning bolt E with a screw-driver, the interlocking connection between the bolt and marginal edge *d'* causing the bolt when turned to increase or relax the tension, as will be understood. The bolt is held in the desired position by set screw G, preferably of socket type entered in threaded cavity G' in seat A.

The opening movement of the valve is limited by the keeper H which extends across the valve adjacent its hinged side, the keeper being secured to the seat at opposite sides of the valve by rivets H', thereby locking the valve in operative position, the keeper in addition to limiting the opening movement also prevents the lateral movement necessary for sliding the spring hinge out of its confining cavity F. With the valve and seat constructed in accordance with the invention, the hinge mounting is carried by and is wholly within the lines of the seat, the only projecting portion being stop H. The spring hinge is highly sensitive and responds instantly to the rapid vibrations of the valve, and at the same time the hinge operates to maintain the valve closed against the seat excepting at those instants when the valve is opened by suction or pressure produced within the apparatus.

I claim:

1. In a valve for compressors, etc., the combination of a valve seat formed with a cavity open through the valve closed face thereof, a plate valve having one end formed into a coiled spring and mounted in said cavity for holding the valve normally seated and for opposing opening movement thereof.

2. In a valve for compressors, etc., the combination of a valve seat formed with a cavity which is open through the valve closed face thereof, and a valve having a curled resilient marginal portion lying within said cavity and comprising a spring hinge for holding the valve normally closed and for opposing opening movement thereof.

3. In a valve for compressors, etc., the combination of a seat formed with a cavity which is open through the valve closed face thereof, a valve having a curled resilient marginal portion lying within said cavity and comprising a spring hinge for the valve, and an adjustable tension regulating device within said cavity and to which said marginal portion of the valve is secured.

4. In a valve for compressors, etc., the combination of a valve seat having a cavity which is open through the valve closed face thereof, a valve having a curled resilient marginal portion lying within said cavity and comprising a spring hinge, a hinge bolt within the cavity and embraced by said curled marginal portion and in engagement therewith whereby the turning of the bolt is adapted to vary the tension of the spring, and means for securing the bolt in adjusted position.

5. In a valve for compressors, etc., the combination of a valve seat formed with a cavity open through the valve closed face thereof, a valve having a coiled end lying within said cavity, and a stop secured to the seat and overhanging the valve for limiting the opening movement of the latter.

6. In a valve for compressors, etc., the combination of a valve seat having a cavity open through the valve closed face thereof, a valve having a coiled end lying within said cavity, a rotatable bolt operatively secured to the hinge for holding the same under tension, and a set screw entered in the seat and adapted to engage said bolt for retaining the same in adjusted position.

7. In combination with a member forming a valve seat and having a cavity therein opening toward the seat face of said member, a bolt within said cavity and extending longitudinally thereof and a plate valve having a coiled end extending through said opening and around said bolt and with its inner end secured to said bolt.

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

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."