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H. M. DUNLAP ET AL.

1,638,114

AIR COMPRESSOR

Filed Jan. 14, 1925

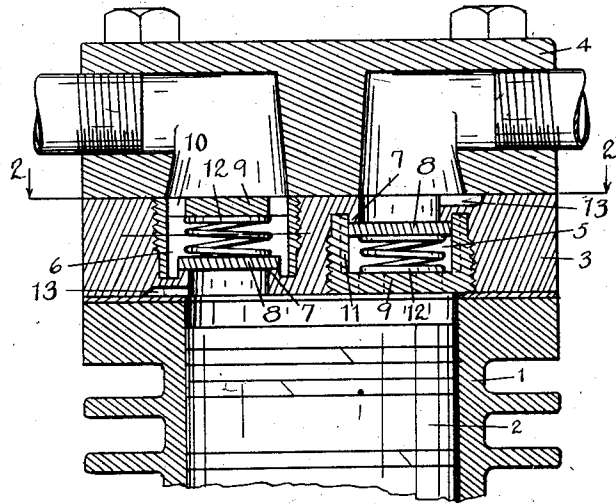


FIG. I.

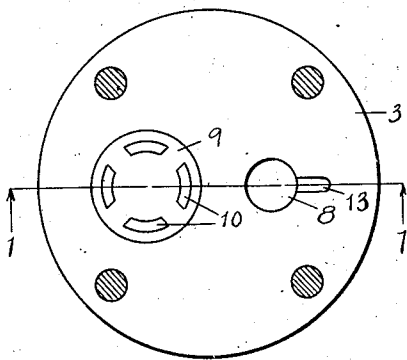


FIG. II.

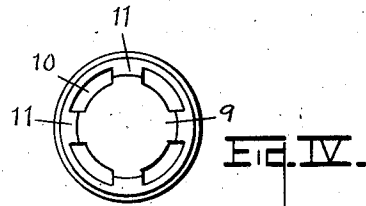


FIG. III.

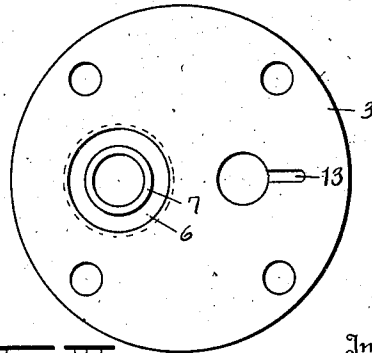


FIG. IV.

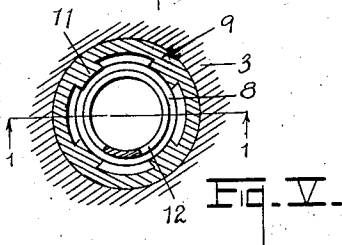


FIG. V.

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# UNITED STATES PATENT OFFICE.

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## AIR COMPRESSOR.

Application filed January 14, 1925. Serial No. 2,269.

This invention relates to improvements in air compressors.

The main object of this invention is to provide in an air compressor an improved valve structure in which the valves are not likely to become fouled with lubricant or other material so as to become inefficient and inoperative.

A further object is to provide an air compressor having these advantages in which the parts are very simple in structure and readily assembled.

Objects pertaining to details and economies of our invention will definitely appear from the detailed description to follow.

We accomplish the objects of our invention by the devices and means described in the following specification. The invention is clearly defined and pointed out in the claims.

A structure embodying the features of our invention is clearly illustrated in the accompanying drawing forming a part of this application, in which:

Fig. I is a fragmentary section of an air compressor embodying the features of our invention taken on a line corresponding to line 1—1 of Fig. II.

Fig. II is a horizontal section on a line corresponding to line 2—2 of Fig. I.

Fig. III is a plan view of the inner head member with the discharge valve cage and valve removed.

Fig. IV is an inverted view of one of the valve cages.

Fig. V is a detail section on a line corresponding to line 5—5.

In the drawing the sectional views are taken looking in the direction of the little arrows at the ends of the section lines and similar numerals of reference indicate similar parts in all of the views.

Referring to the drawing, our improved compressor comprises a cylinder 1 and a piston 2. The head of the cylinder comprises an inner head member 3 and an outer head member 4. The inner head member is flat or plate-like so that its faces may be readily machined, as may also the inner face of the outer head member.

The inner head member is provided with valve chambers 5 and 6 having annular raised valve seats 7 at the inner ends thereof. The valve chamber 5 being the inner valve chamber, its valve seat faces inwardly

and the valve chamber 6 being the outer valve chamber, its valve seat faces outwardly. The diameter of the valve chambers is substantially greater than that of the valve seats.

The valves 8 are in the form of flat disks, their diameter corresponding to the outside diameter of the valve seats, so that no part of the valve overhangs the seat. The valves are retained and supported by means of plug-like cages 9 which are threaded into the valve chambers and are provided with ports 10 in their outer ends. These valve cages have spaced longitudinal valve guiding ribs 11 which project beyond the valve seats so that the valves are guided throughout their movement.

The springs 12 are supported by the valve cages to coact with the valves. The valve chambers are arranged so that the inlet valve cage overlaps the cylinder wall as shown in Fig. I, the cylinder thereby constituting a locking means for the cage rendering it impossible for the cage to loosen up and fall into the cylinder.

The outer head member overlaps the discharge valve cage thereby constituting a locking means therefor. While the results of the loosening of the discharge valve cage would not be so serious as might occur from the loosening of the inlet valve cage, it is of course desirable that the parts be retained in their adjusted position. It has been the experience of users of the pumps of this type that the valve wears down its seat and falls into the cylinder, causing very serious damage. To prevent such an accident, we form a groove 13 which extends from the port laterally, the groove being formed at the inner side of the head so that in case of excessive wear on the valve seat, the pump becomes inoperative or inefficient so that repairs are made before a serious accident occurs.

By thus supporting and guiding the valves the seats are kept clean by the action of the valves thereon, there being no tendency for burned lubricant or other matter to build up on the valve or on the valve seat, thus preventing the effective operation of the valve as is frequently the case where the plate or disk valves are provided with radial guide projections or other guiding means whereby the valves or their radial guides overhang the seat.

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We have illustrated and described our improvements in an embodiment which has proven very satisfactory. We have shown only such portions of a compressor as seem desirable to illustrate an embodiment or adaptation of our improvements. It is believed that the disclosure made will enable those skilled in the art to embody or adapt the same as may be desired.

10 It will be observed that the head member 3 may be arranged either side up. Sometimes the valves are subject to a very considerable wear, and to prevent wearing to the extent that the discharge valve will fall  
15 into the cylinder, and thereby break the cylinder causing serious injury thereto, we provide a groove-like recess 13 opening below the valve seat which renders the compressor entirely inoperative before there is sufficient  
20 wear to permit the valve to drop into the cylinder.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:

25 1. In a compressor, the combination of a cylinder, a head therefor comprising superimposed head members, the inner head member having inlet and discharge valve chambers therein provided with annular raised  
30 valve seats, the outer head member having passages therein communicating with said valve chambers, disk valves coacting with said seats, the valve chambers being of a diameter substantially exceeding that  
35 of the valve seats, valve cages having ports in the outer ends thereof threaded into said valve chambers with their said guiding ribs projecting inwardly beyond the faces of  
40 said valve seats, the outer ends of said cages being flush with the faces of said inner head member, the valve cage of the inlet valve being disposed in overlapping relation to the cylinder wall, the valve cage of the discharge valve being arranged in overlapping  
45 relation to the outer head member providing locking means for the cages, and springs arranged within said cages to coact with said valves.

50 2. In a compressor, the combination of a cylinder, a head therefor comprising superimposed head members, the inner head member having inlet and discharge valve chambers therein provided with annular raised valve seats, the outer head member having  
55 passages therein communicating with said

valve chambers, disk valves coacting with said seats, the valve chambers being of a diameter substantially exceeding that of the valve seats, valve cages having ports in the outer ends thereof disposed in said valve  
60 chambers with their guiding ribs projecting inwardly beyond the faces of said valve seats, and springs arranged within said cages to coact with said valves.

3. In a compressor, the combination of a  
65 cylinder, a head therefor comprising superimposed head members, the inner head member having inlet and discharge valve chambers therein provided with annular raised valve seats, the outer head member having  
70 passages therein communicating with said valve chambers, disk valves coacting with said seats, the valve chambers being of a diameter substantially exceeding that of the valve seats, valve cages having ports in the  
75 outer ends thereof disposed in said valve chambers, the outer ends of said cages being flush with the faces of said inner head member, the valve cage of the inlet valve being disposed in overlapping relation to the cylinder wall, the valve cage of the discharge valve being arranged in overlapping relation to the outer head member providing locking means for the cages, and springs arranged within said cages to coact with said valves.  
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4. In a compressor, the combination of a cylinder, a head therefor comprising superimposed head members, the inner head member having inlet and discharge valve chambers therein provided with annular raised  
90 valve seats, the outer head member having passages therein communicating with said valve chambers, disk valves coacting with said seats, the valve chambers being of a diameter substantially exceeding that of the valve seats, valve cages having ports in the outer ends thereof disposed in said valve chambers, and springs arranged within said cages to coact with said valves.  
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5. In a compressor, the combination of a  
100 cylinder, a head member, a valve chamber provided with a valve seat, a groove-like recess in said head member opening to said valve chamber below the valve seat, and a valve coacting with said seat.  
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In witness whereof we have hereunto set our hands.

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