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VALVE.

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To all whom it may concern:

Be it known that I, JOHN R. BOWLER, a citizen of the United States of America, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Valves, of which the following is a full, clear, and exact description.

This invention relates to valves and has for some of its principal objects to provide a valve which is simple in construction, which consists of a small number of parts, is reliable in operation, and may be employed either as an intake or discharge valve in connection with air, or other fluid, compressors, Diesel engines and other kinds of machines and apparatus. Other objects and advantages will appear as the invention is hereinafter disclosed.

Referring to the drawings which illustrate what I now consider a preferred form of the invention,

Fig. 1 is a sectional elevation of the valve;

Fig. 2 is a cross-sectional view taken on the line 2—2 of Fig. 1; and

Fig. 3 is an inverted plan view of the device shown in Fig. 1.

It will be seen that the valve comprises a casing provided with inlet and outlet ports, and a valve member therein which cooperates with a valve seat. The casing is shown in the form of a cup-shaped element 10 having a cylindrical interior 11 and a cap 13 detachably secured to the element 10 as by means of coacting screw-threads 14. The cut-away portions 12 provided on the element and cap serve to enable these elements to be gripped by wrenches or other suitable tools to secure and detach the cap from the cup-shaped element.

A valve or valve member 15 is mounted within the casing for slidable relative movement with respect thereto in an axial direction. This valve member is shown (see Fig. 2) provided with a cylindrical portion 16 which slidably engages the interior 11 of the element 10 and preferably constitutes the sole guiding means of the valve in its opening and closing movements. The bottom of the element 10 (see Fig. 3) is shown provided with one or more openings 16 which I shall hereinafter refer to as outlet ports, and the cap 13 is shown provided with an opening 17 which I shall hereinafter refer to as an inlet port. The cap 13 is provided with a valve seat 18 adapted to be engaged

by the frustro-conical portion 19 of the valve 15 to control communication between the inlet and outlet ports 17 and 16. It will be noted that when the valve is closed or seated, as shown in Fig. 1, no fluid can pass from the inlet to the outlet ports through the valve casing. When the valve moves away from the seat 18, in other words when the valve opens, fluid may pass from the inlet port 17, through the passages or peripheral slots 20 provided in the valve member 15, and thence through the outlet ports 17. The operation of the valve may be controlled in various ways, simple and preferred means being illustrated in the drawings and described as follows.

The valve member 15 is provided with a downwardly extending boss 21 which is engaged by the upper turn of a compression spring 22. The other end of said spring abuts against the end wall of the element 10. It will therefore be seen that the valve 15 is biased to seated or closed position. So long as the total fluid pressure on the upper part of the valve 15 (i. e. at 17) fails to exceed the total fluid pressure on the lower part of the valve (i. e. at 11 or 16) by an amount sufficient to overcome the upwardly exerted force of the spring 22, the valve will remain closed. However when the first named fluid pressure is sufficiently high to overcome both the opposing fluid pressure and the force of the spring, the valve member 15 will move away from the seat 18 and fluid will pass through the valve in the following path: through the inlet port 17, past the valve seat, through passages or slots 20 into chamber 11 and thence outwardly through the outlet ports 16.

The boss 21 is preferably provided with a slot 25 adapted to receive a screw-driver or flat bit whereby the valve member 15 may be rotated or oscillated with respect to the cap 13 for the purpose of grinding the valve, i. e. to cause the valve portion 19 to fit the valve seat.

The character and strength of the spring 22 determine the difference in fluid pressure (on opposite sides of the valve) at which the valve will open. It will therefore be clear that by choosing a suitable spring this point of opening may be selectively controlled within reasonable limits. The initial tension of the spring may be selectively controlled by the choice of a gasket or washer 30, or brass or other suitable mate-

rial, having a thickness corresponding to the tension desired. By employing a relatively thick washer or gasket 30 the initial force of the spring 22 will be less than when a relatively thin gasket is employed.

As hereinbefore set forth my valve is adapted to various uses. It may be employed either as an intake or discharge valve thus minimizing the number of stock and spare parts which must be kept on hand. If used in connection with air, or other fluid, compressors, it would be held in place by a suitable cage (not shown). The specific valve illustrated, and particularly the casing thereof, is designed to be applied to the second stage of air compressor, on a Winton Diesel engine No. 24 W. and, in actual service in this connection, has been found to be most effective and reliable in operation.

In accordance with the provisions of the patent statutes, I have herein described the principle of operation of my invention, together with the apparatus which I now consider to represent the best embodiments thereof, but I desire to have it understood that the apparatus disclosed is only illustrative and that the invention can be carried out by other means. Also while it is designed to use the various features and elements in the combinations and relations described, some of these may be altered and others omitted within the scope of the following claims, and the invention extends to such use.

What I claim is—

1. A valve for high pressure air compressors comprising in combination, a two-part

casing, one of said parts having an inlet port and the other part having an outlet port, one of said parts being provided with a frustro-conical valve seat and the other with a cylindrical bore, a valve member having a solid substantially cylindrical portion adapted slidably to engage the inner cylindrical wall of the last named part of said casing, said valve member having a frustro-conical end adapted to engage said valve seat, the diameter of the base of the frustrum being substantially the same as that of said cylindrical portion of the valve, said valve member having a plurality of peripheral slots parallel to the axis of said member and through which fluid is adapted to pass from one of said ports to the other in substantially straight paths, and a compression spring in engagement with the end of said valve member opposite the frustro-conical end and in engagement with one of said parts of the casing for biasing said valve toward closed position.

2. A valve as set forth in claim 1 in which the spring consists of a helix which is of spiral configuration when compressed into a plane, and which has its smaller end adjacent the valve member.

3. A valve as set forth in claim 1 in which the exteriors of the two parts of the casing are similar whereby the valve may be interchangeably employed as a suction or a discharge valve.

In testimony whereof I hereto affix my signature.

JOHN R. BOWLER.