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VALVE.

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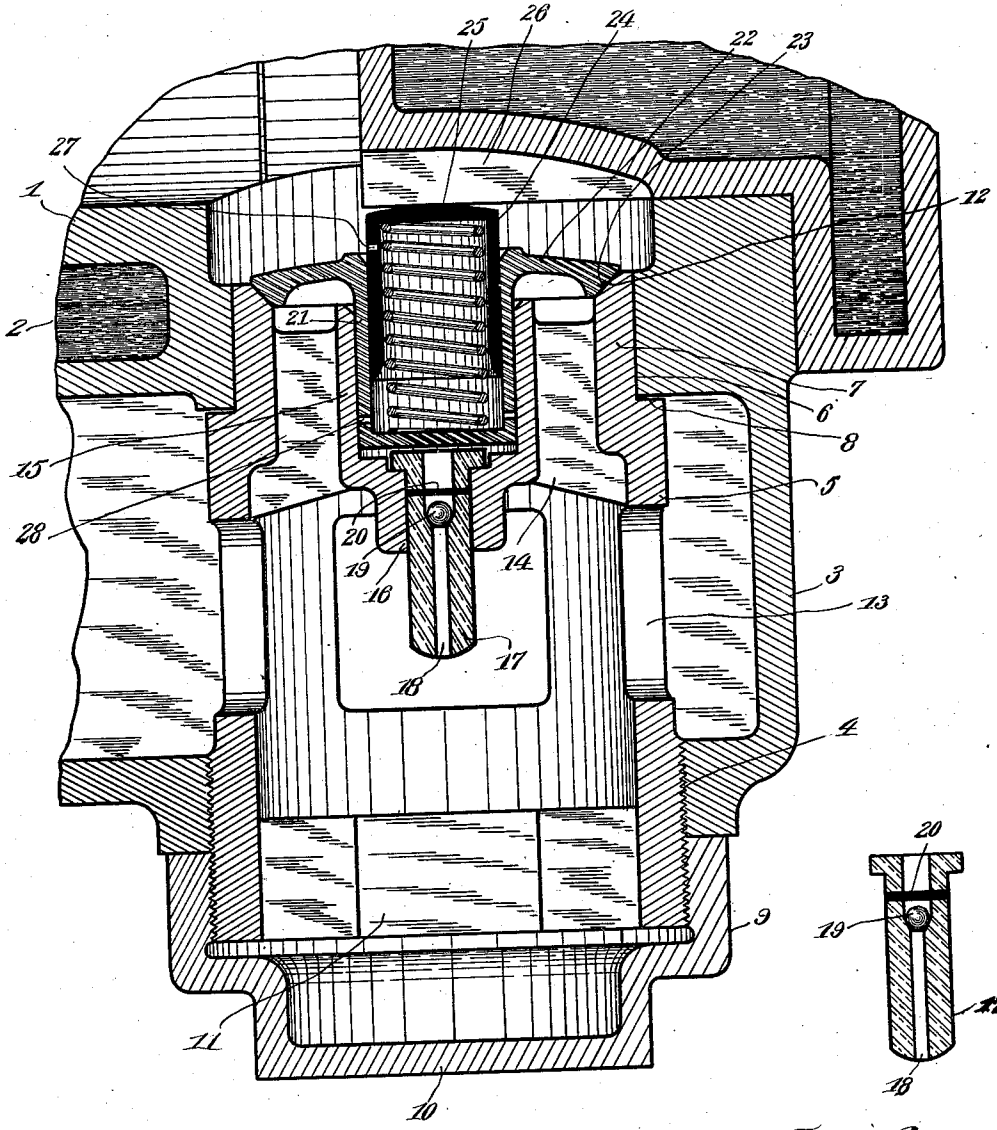

Fig. 1.

Fig. 2.

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VALVE.

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To all whom it may concern:

Be it known that I, CHARLES WAINWRIGHT, a citizen of the United States, residing at Erie, in the county of Erie and State of Pennsylvania, have invented new and useful Improvements in Valves, of which the following is a specification.

This invention relates to valves and more particularly to that type which are used to control the inlet ports of air or gas compressors.

The principal object of the invention is to provide a valve which will have smooth and even opening and closing movements so as to prevent noise and wear upon the valve.

A further object of the invention is the provision of a valve having mechanism to prevent fluttering of the valve and to destroy or check the vacuum formed in unseating the valve so that the valve will rise easily and evenly from its seat and so that it will seat softly without producing any noise.

Further objects of the invention will appear as the following specific description is read in connection with the accompanying drawings, which form a part of this application, and in which:—

Figure 1 is a detail sectional view through a portion of a cylinder of an air or gas compressor and showing the improved valve associated therewith. Fig. 2 is a detail sectional view of the unloading piston.

Referring more particularly to the drawing, 1 represents the cylinder of an air or gas compressor which is provided, as is usual, with a water jacket 2 and an air or fluid chamber or intake compartment 3. This fluid compartment is provided with a threaded aperture 4 in one of its walls in which is threaded a valve guide 5 having a reduced end 6 to enter the intake port 7 of the cylinder. The reduced portion forms a shoulder 8 which limits the inward movement of the guide and causes a portion of the valve to project beyond the fluid chamber 3 where it has threaded thereon a closing cap 9 having a nut face 10 to facilitate its application and removal. The outer or threaded end of the guide is also provided with a polygonal bore or internal nut face 11 which may be engaged by a socket wrench for threading the guide into or removing it from the chamber 3.

The guide 5 is of general cylindrical form and is provided with a beveled valve seat 12 at its upper end and a plurality of inlet ports 13 arranged around its body intermediate the ends and communicating with the fluid chamber 3. Adjacent the seat the guide has formed integrally therewith a plurality of inwardly projecting webs 14 upon which a valve guide tube 15 is mounted. This guide tube is provided at its lower end with a centrally apertured boss 16 in which an ordinary unloading piston 17 (used in connection with unloaders) is mounted. This piston is provided with a central channel 18 controlled by a ball check valve 19 which is limited in its upward movement by a bridge piece 20 extending across the channel above the ball valve's seat. When this ball valve is raised communication is established between the interior of the guide and the interior of the valve casing.

Mounted to reciprocate within the valve guide tube 15 is a cylindrical cushion member 21 formed on or connected directly to the circular valve body 22 whose beveled edge 23 is adapted to seat against the beveled seat 12 of the guide. Mounted within this cushion member is a cushioning piston 24 which is in the form of an inverted cup and arranged between the head of the piston 24 and the bottom of the cushioning member is a spiral spring 25 which normally holds the piston 24 raised against a stop flange or web 26 carried by the casing 1 within the valve port. The piston 24 is provided with a bleeding port 27 and similar ports 28 are formed in the lower end of the cushioning member, for a purpose which will be hereinafter described.

As the valve 22 moves away from its seat 12, a vacuum will be established in the valve guide tube 15 and when this vacuum becomes strong enough the ball valve will be lifted from its seat, thus checking or practically destroying the vacuum and permitting the valve to rise evenly without retardation of this character, against the tension of the spring 25. When the bleeding port 27 passes the upper edge of the valve body, the air within the spring compartment will be compressed to a certain degree and will assist in the seating of the valve when the compressing piston in the cylinder starts forward on its compressing stroke. As the valve starts on its return movement to its seat the ball valve 19 closes and traps a quantity of air beneath the bottom of the

cushion member 21. The fit of this cushion member within the chamber or casing 15 determines the action of the valve 22 in closing. A certain amount of this air compressed between the piston member and the ball valve will pass through the bleeding ports 28 and gain access to the spring chamber and from there is released through the bleeding port 27 when this port is exposed above the upper edge of the valve. The escape of air through the bleeding ports does not permit the valve to seat too rapidly but the fit of the cushioning member is so proportioned and the escape of air so timed that the valve is seated softly and evenly and without noise or fluttering.

Having thus described the invention, what I claim as new is:—

1. In combination, a compressor cylinder having an inlet chamber, an inlet port, a valve carrier associated with the chamber and communicating with said port, a valve guide tube carried by the valve carrier, a valve slidably mounted in the tube and seated on the carrier, means normally acting to seat the valve and to return the same to its seat when raised, and an auxiliary valve carried by the valve tube and communicating with the inlet chamber for controlling the amount of fluid admitted to the tube.

2. In combination, a compressor cylinder having an inlet chamber and an inlet port, a valve carrier associated with the chamber and communicating with the port, a main valve guide tube carried by the carrier, a valve slidably mounted therein and seated on the carrier, an auxiliary valve carried by the tube and communicating with the inlet chamber for controlling the amount of fluid admitted to the tube, and a cushioning plunger carried in the main valve, and operating against the walls of the chamber.

3. In combination, a compressor cylinder having an inlet chamber and an inlet port, a valve carrier associated with the chamber and communicating with the port, a guide tube carried by the valve carrier, an auxiliary valve carried by the tube for controlling the admission of fluid thereto, a main valve adapted to close the inlet port from the inlet chamber to the cylinder, a cushioning member carried thereby and reciprocally mounted in the guide tube, and a cushioning member slidably mounted with the first cushioning member and normally engaging a part of the cylinder.

4. In combination, a compressor cylinder having an inlet chamber and an inlet port, a valve carrier associated with the chamber and communicating with the chamber and inlet port, a guide tube carried by the valve carrier, a main valve seating upon the carrier and normally closing communication between the cylinder and chamber, a cushioning member carried by the main valve and slidably mounted in the guide tube, means carried by the cushioning member for normally holding the valve upon its seat and for returning the same to its seat when raised, said means and the cushioning member being vented, and an auxiliary valve carried by the tube and controlling the amount of fluid admitted thereto from the inlet member.

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

CHARLES WAINWRIGHT.

Witnesses:
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