

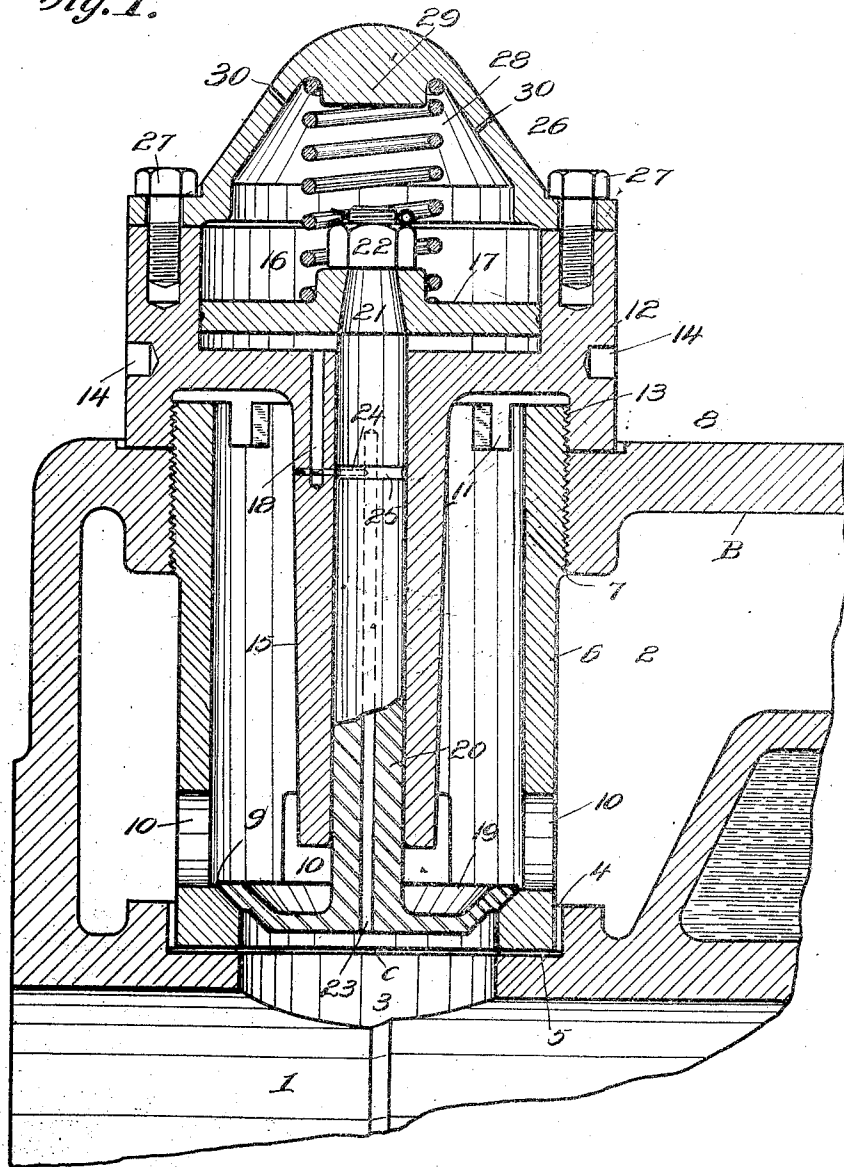
C. WAINWRIGHT.
 COMPRESSOR AND VACUUM PUMP VALVE
 APPLICATION FILED JAN. 4, 1910.

965,052.

Patented July 19, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

Carlton F. Platz
 Edmund Roach

INVENTOR.

Charles Wainwright

BY Victor J. Evans. ATTORNEY

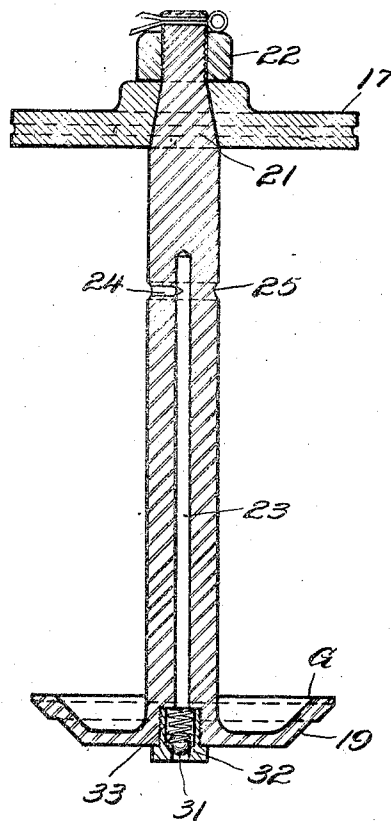
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2 SHEETS—SHEET 2.

Fig. 2.



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CHARLES WAINWRIGHT, OF ERIE, PENNSYLVANIA.

COMPRESSOR AND VACUUM-PUMP VALVE.

965,052.

Specification of Letters Patent. Patented July 19, 1910.

Application filed January 4, 1910. Serial No. 536,257.

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 Compressor and Vacuum-Pump Valves, of which the following is a specification.

This invention relates to improvements in valves for use in vacuum pumps and air compressors for controlling the passage of air from the cylinder to the receiving chamber, the object of the invention being to effect improvements in the construction of the valve, whereby the same is prevented from fluttering and is caused to operate quietly and easily both in opening and in closing.

The invention consists in the construction, combination and arrangement of devices hereinafter described and claimed.

In the accompanying drawings:—Figure 1 is a vertical sectional view of a valve constructed in accordance with this invention, showing the same in place for controlling the passage of air from the cylinder to the receiving chamber of an air compressor or vacuum pump. Fig. 2 is a detail vertical sectional view, showing a modified construction of the valve.

For the purpose of this specification, a portion of an air compressor or vacuum pump is shown in Fig. 1 of the drawings, the cylinder in which the compressor or pump piston operates being indicated at 1, the chamber which receives air from said cylinder being indicated at 2 and the port which establishes communication between the cylinder and the receiving chamber being indicated at 3. In the embodiment of my invention there is provided a circular recess 4 around and above the port 3 in which is placed a gasket 5 against which the inner or lower end of the valve cage 6 abuts the said valve cage being here shown as cylindrical in form, and screwed as at 7 in an opening in the outer wall 8 of the chamber 2. In the inner end of the valve cage 6 is a downwardly tapered valve seat 9, said valve seat communicating with the ports 3 in the sides of the valve cage. At the inner end thereof are ports or openings 10 which co-act with the valve seat and the ports 3 to establish communication between the cylinder 1 and the chamber 2 when the valve herein-
after described, is opened.

In the upper or outer end of the cylin-

drical valve cage are notches 11 for the reception of the arms of a spanner to facilitate the placing of the valve cage in the threaded opening of the wall 8 or its removal therefrom or adjustment therein, as will be understood.

The outer end of the cylindrical valve cage is closed by a cylindrical cap 12 which is screwed thereon as at 13 and said cap having radial openings 14 extending to its perimeter for the reception of the arms of a spanner to enable said cap to be screwed in place or removed from the valve cage. The said cap is formed on its inner side with a centrally disposed tubular sleeve 15 which extends in the valve cage to within a suitable distance of the valve seat 9. In the upper or outer end of the cap 12 is a cylindrical chamber 16 in which operates a piston 17. In one side of the tubular sleeve 15 is a passage 18 which communicates at its outer end with a valve 16 and at its inner end with a bore of said sleeve.

A valve disk 19 of inverted truncated conical form is disposed in the valve cage and is adapted to close against the valve seat 9 and to open therefrom. Said valve disk is provided with an outwardly extending stem 20 which operates in and extends through the bore of the sleeve 15, the upper or outer end of said valve stem extending into the chamber 16 and having a tapered portion 21 which is fitted in and extends through a tapered central opening in the piston 17. The extreme upper or outer end of the valve stem is reduced diametrically and provided with screw threads on which is a nut 22, the said nut bearing on the upper or outer side of the piston 17 and coacting with the tapered portion 21 of the valve stem to securely and yet detachably fasten the said piston to the said valve stem. Hence, the piston is connected to the valve disk for simultaneous movement therewith. The valve stem is provided with a centrally disposed passage 23 which extends from the lower or inner end thereof for a suitable distance and is provided with a port 24 which communicates with an annular circumferential channel 25 the said port, when the valve is in closed position on the seat 9, communicating with the port at the inner end of the passage 18 and, hence, establishes communication through the passages 18 and 23 between the cylinder 1 and the chamber 16 when the valve is closed or seated. When the valve is

opened, the port 24 moves out of register with the port of the passage 18 and, hence, communication between the cylinder 1 and the chamber 16 is cut off. It will be understood that the valve disk 19 when inclosed, cuts off communication between the cylinder 1 and the chamber 2 and when open establishes communication between them. The cap 12 is provided with a cover 26 which is here shown as of conical form and is secured on the cap by means of bolts 27. A spring 28 bears on the upper or outer side of the piston 17, the upper end of the said spring being seated around a boss 29 which extends downwardly in the upper side of the cover 26. Said cover is provided with vent openings 30. The said spring keeps the valve disk normally closed.

The operation of my improved valve is as follows: Since when the valve is closed communication is established through the passages 18 and 23 between the cylinder 1 and the chamber 16, it will be understood that an air cushion is formed in said chamber under the piston 17. When the piston in the cylinder 1 moves toward the valve and the pressure in the cylinder becomes equal to or in excess to that within the chamber 2, the valve rises easily and quietly from its seat against the tension of the spring 28 and opens communication between the cylinder 1 and the air-receiving chamber 2, and cuts off communication between the air-cushioning chamber 16 and the cylinder 1 so that all compressed air in the air-cushioning chamber under the piston 17 is confined in said air cushioning chamber. As the piston recedes from the valve and the pressure in the cylinder 1 becomes less than in the chamber 2, the valve disk closes by the action of the spring 28, the air cushion under the piston 17 in the chamber 16 preventing rapid movement of the valve and causing the latter to quietly and noiselessly close against the seat, thus preventing fluttering and noisy or irregular movement of the valve. In effect the air cushion under the piston 17 partially counter-weights the spring 28 so that the valve 19 is balanced and the pressure of the vacuum pump or compressor in which the valve is employed is greatly reduced. The cover 26 of the cap being removable therefrom enables access to be readily had to the spring 28 so that the spring can be inspected and if defective, can be replaced without the necessity of disturbing the valve.

In the modified construction of the valve shown in Fig. 2, there is a check valve 21 at the lower end of the passage 23 and normally closed against the seat 32 by action of a spring 33. The said check valve is employed when my improved valve is used in an air compressor and to prevent the air pressure in the air cushioning chamber under the piston 17, from diminishing by the leaking of air from the said chamber back into the cylinder 1 of the air compressor.

Having thus described the invention, what is claimed is:—

1. A valve to control the passage of air from the cylinder to the receiving chamber of an air compressor or vacuum pump, said valve comprising a cage having an opening at one side to communicate with said receiving chamber, and an opening at its inner end to communicate with said cylinder and further provided at said inner end with a valve seat, a valve disk in said cage to close against said seat, and having a stem apertured means to guide the stem, a cap on the outer end of said cage having an air chamber communicating with said cylinder through said stem and apertured means, when the valve is closed and into which said stem extends, a piston fast on said stem and operating in said air chamber, and a spring acting on said valve disk to normally seat the same.

2. A valve of the character described, comprising an apertured cage having a valve seat, a closing cap carried by the cage and having a channel therein, a centrally bored guiding projection carried by the closing cap, a valve reciprocally mounted in said guiding projection and having longitudinal and lateral ports, said lateral port adapted to communicate with the channel in the guiding projection, a compression chamber formed on the cap and into which the valve stem extends, a piston carried upon the valve stem and operating within the extension, vented means to close the compression chamber, and a spring interposed between the said means and the valve stem and adapted to normally hold the valve upon its seat whereby the ports and channels are normally held in register.

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

CHARLES WAINWRIGHT.

Witnesses:

E. SHERMAN,
C. A. MASTEN.