G. P. ABORN.

AIR COMPRESSOR AND PUMP.

APPLICATION FILED APR. 11, 1910.

1,041,939. Patented Oct. 22, 1912.

Fig. 1.

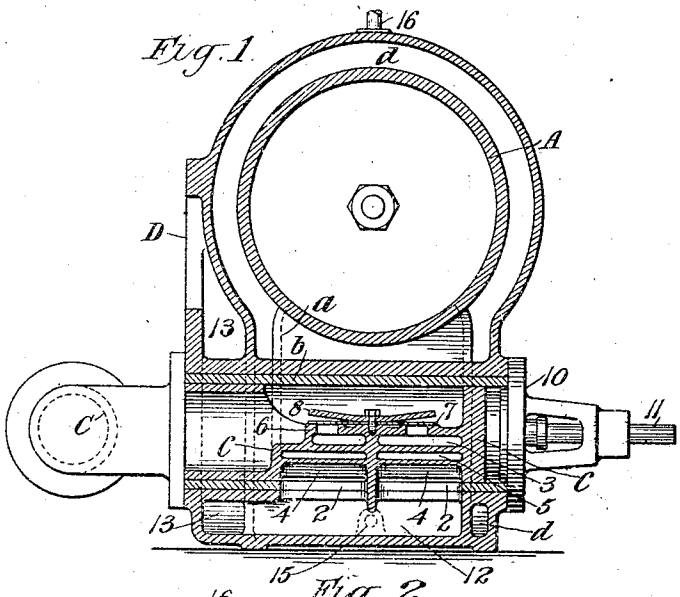
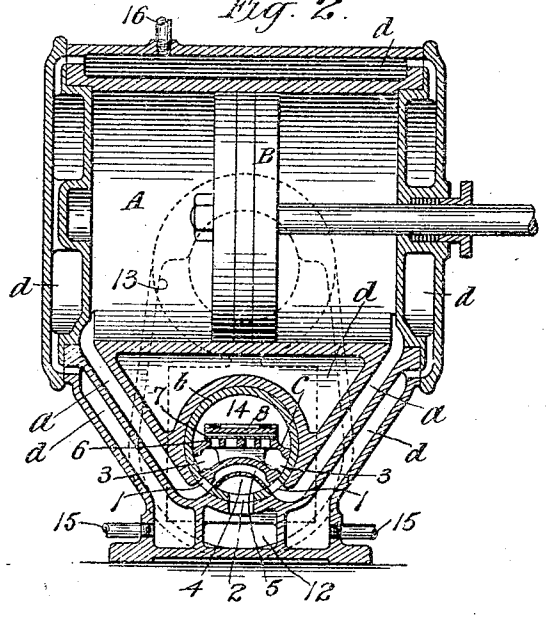


Fig. 2.



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UNITED STATES PATENT OFFICE.

GEORGE P. ABORN, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE BLAKE & KNOWLES STEAM PUMP WORKS, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

AIR COMPRESSOR AND PUMP.

1,041,939. Specification of Letters Patent. Patented Oct. 22, 1912.

Application filed April 11, 1910. Serial No. 554,599.

To all whom it may concern:

Be it known that I, GEORGE P. ABORN, a citizen of the United States, residing at Boston, county of Suffolk, and State of Massachusetts, have invented certain new and useful Improvements in Air Compressors and Pumps, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to an improved pump or compressor for air or gases.

The especial object of the invention is to provide an improved rotary valve construction, but the invention includes, however, certain specific features of construction by which the thorough jacketing of the cylinders and valve chamber and the efficient draining of the air cylinder are secured.

In the accompanying drawings, forming a part of this specification, there is shown for purpose of illustration a dry vacuum pump embodying all the features of the invention in their preferred form, and this construction will now be described in detail and the features forming the invention then specifically pointed out in the claims.

In the drawings:—Figure 1 is a central cross section of the pump. Fig. 2 is a central longitudinal section of the pump.

Referring to the drawings, A is the pump cylinder and B the pump piston, *a* the single suction and discharge passages at opposite ends of the cylinder, *b* the valve casing and *c* the single rotary valve within the valve casing controlling the inlet and discharge through passages *a*. This valve casing *b* consists of a sleeve extending across the pump and at one end open to the pump discharge C removably secured to the pump, and at the other end closed by a head 10 through which passes the valve rod 11 by which the rotary valve *c* is oscillated. The casing *b* has the cylinder ports 1 for the passages *a* and the suction port 2, and the valve *c* has the discharge ports 3, suction cove 4, and flash port 5 for equalization of the pressure at opposite ends of the cylinder at the end of the stroke, the suction cove 4 connecting with central suction chamber 12 through port 2 and suction chamber 12 being connected by suction passage 13 with the suction D. The rotary valve *c* carries a valve plate 6 between the ports 3 and the discharge chamber 14 through which the air is delivered to discharge C, this valve plate 6 being provided with ports controlled by flap valves 7 on the back of the plate, which are shown as common metal flap valves with the backing 8. The flash port 5 is preferably used, as is common in pumps of this class, but this feature forms no part of the invention and may be omitted. The cylinder, passages and valve chamber are all well jacketed by the water jacket *d* having inlet pipes 15 and outlet pipe 16. The valve chamber is preferably arranged below the cylinder, as shown, any water being thus more readily and with more certainty drained from the cylinder.

The operation of the valve and flow of fluid will be readily understood from the drawings and a brief statement. As shown in the drawings the piston B has completed its stroke to the right, and the valve *c* is in position with the equalizing or flash port 5 connecting the cylinder passages *a* for the opposite ends of the cylinder so as to permit the air compressed in the clearance spaces in front of the piston to escape to the suction space behind the piston and relieve the pressure for suction on the next stroke, as usual in air compressors. For the next stroke of the piston B, that is to the left, the valve *c* is shifted so as to connect the delivery port 3 with the cylinder passage *a* at the left end of the cylinder to port 1 and to connect the suction cylinder 12 at the right end of the cylinder with passage *a*, port 1, suction cove 4 and port 2. The air is now compressed in front of the piston B and, when the delivery pressure is reached, the flap valve 7 on the back of valve *c* opens and the air is discharged through discharge port 3, valve 7 and the open end of the valve *c* to the discharge C, while air is drawn in behind the piston from inlet D through passage 13, chamber 12, suction cove 4 and cylinder passages *a*. At the end of the stroke to the left the valve is again shifted to the position shown in Fig. 2, so as to close the cylinder ports to suction and discharge and connect them by equalizing or flash port 5, and the operation described is then repeated with the valve *c* reversed for the next stroke in the opposite direction.

It will be seen that by removing the discharge connection C, the valve *c* may be withdrawn from casing *b*, carrying with it the automatic discharge valve, so that the

complete valve is thus readily accessible and removable for cleaning and replacement. The rotary valve performs all the ordinary functions of suction and discharge, and the automatic discharge valve serves as a check valve to prevent the back flow of air or gases at the beginning of the discharge stroke. The arrangement of the valve chamber and ports is such as to provide for convenient and efficient jacketing throughout, and, with the valve below the cylinder, as shown, the complete drainage of the cylinder is assured.

What I claim is:—

1. In an air pump or compressor, the combination with the cylinder and its suction and discharge ports at opposite ends of the cylinder, of a valve casing extending across the pump and open at one end, a removable discharge connection at the open end of the casing, and a single rotary valve in the casing removable through the open end of the casing when the discharge connection is removed and controlling suction and discharge for both ends of the cylinder.

2. In an air pump or compressor, the combination with the cylinder and its suction and discharge ports, of a valve casing extending across the pump and open at one end, a removable discharge connection at the open end of the casing, a rotary valve in the casing removable through the open end of the casing when the discharge connection is removed, and an automatic discharge valve carried by and removable with the rotary valve, said automatic valve being on the back of the rotary valve and opening transversely to the axis of rotation of the valve.

3. The combination with cylinder A and its passages *a*, of a valve chamber extending across the pump, a rotary valve in the chamber, a discharge connection at the end of the chamber, suction passage 13 at the discharge side of the pump and jacket *d* for the air passages and valve chamber.

4. The combination with cylinder A and its passages *a* on the lower side of the cylinder, of a valve chamber extending across the pump below the cylinder, a rotary valve in the chamber, a discharge connection at the end of the chamber, suction passage 13 at the discharge side of the pump, suction chamber 12 below the valve casing, and jacket *d* for the air passages, valve chamber and suction chamber.

5. The combination with cylinder A and its passages *a*, of a valve chamber extending across the pump, rotary valve *c* having discharge passage 3 and suction cove 4 and controlling the passages *a* for both ends of the cylinder, the discharge connection at the end of the valve chamber, and automatic valve 7 on the back of valve *c* controlling the discharge from port 3.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

GEORGE P. ABORN.

Witnesses:
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