(No Model.)

F. RICHARDS.

VALVE FOR AIR COMPRESSORS.

No. 602,473. Patented Apr. 19, 1898.

Fig. 1.

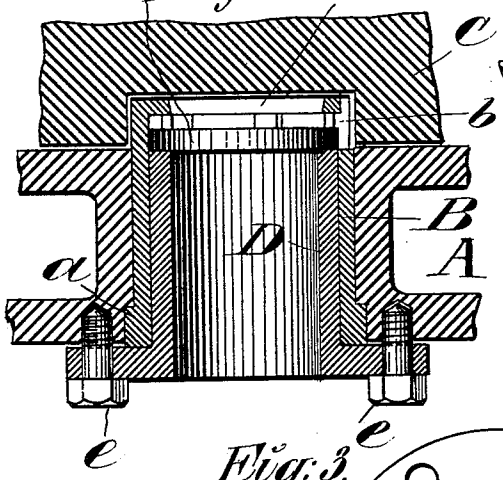


Fig. 2.

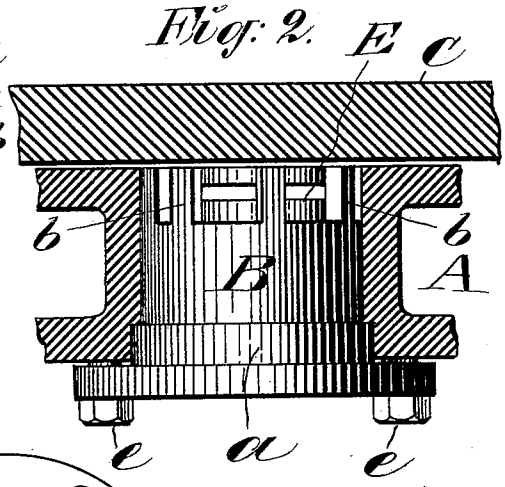


Fig. 3.

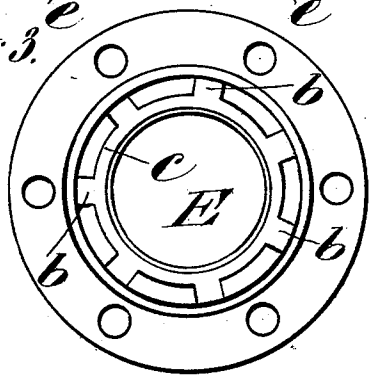


Fig. 5.

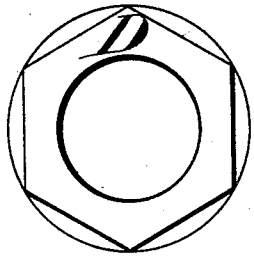
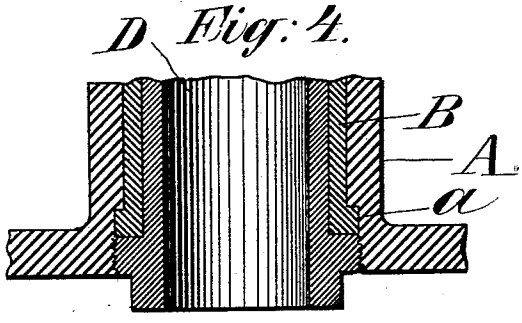


Fig. 4.



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FRANK RICHARDS, OF NEW YORK, N. Y.

VALVE FOR AIR-COMPRESSORS.

SPECIFICATION forming part of Letters Patent No. 602,473, dated April 19, 1898.

Application filed January 18, 1897. Serial No. 619,637. (No model.)

To all whom it may concern:

Be it known that I, FRANK RICHARDS, a citizen of the United States, and a resident of New York, in the county and State of New York, have invented certain new and useful Improvements in Valves for Air-Compressors, of which the following is a specification.

My invention is chiefly directed to the inlet-valves for air-compressor cylinders, and has for its object the provision of a valve of cheap construction, of easy application, renewal, or removal, and especially as light as possible, so that it may be easily moved and offer a minimum of resistance to the free ingress of air, but substantial enough to prevent egress of air. To accomplish all of this and to secure other and further advantages in the matters of construction, application, operation, and use, my improvements involve certain novel and useful features of invention, as will be herein first fully described and then pointed out in the claims.

In the drawings, Figure 1 is a vertical view, partly in section and partly in elevation, showing my improved appliance mounted in the base of an air-compressor, the valve-disk being located above the bottom line of the air-compression cylinder. Fig. 2 is a vertical view, partly in section and partly in elevation, showing the valve-disk located below the bottom line of the cylinder to admit of the use of a piston without a recess in its face. Fig. 3 is a plan view of the entire fitment of either Figs. 1 or 2 as it appears when dismounted from the compressor. Fig. 4 is a vertical section representing a manner of securing the fitment different from that indicated in previous figures, but within the limits of my invention. Fig. 5 is a plan view of the under side of the fitment shown in Fig. 4, representing its formation for the application of a wrench.

In all the figures like letters of reference wherever they occur indicate corresponding parts.

The improved valve is principally adapted for use upon vertical or approximately vertical machines; but it will operate to advantage in other forms.

A represents a fragment of the lower cylinder-head, which may be also the base of the machine. This is usually made double to inclose a water-space in which cold water may be circulated for the purpose of keeping the head as cool as possible. For each inlet-valve used the lower head should have a hole through it, preferably bored and preferably having its outer margin faced or made substantially true, so that the parts may be properly brought to working position. The lower portion of this opening is recessed, as indicated, so as to receive the narrow flange *a* on the bottom of the valve-case.

B is the valve-case, fitting the opening smoothly and having the bottom flange above alluded to. The upper end of this case is supplied with a number of bars *b b*, which serve as guides for the valve as it rises or moves and at the same time allow the air to pass between them and into the interior of the cylinder. The bars *b* are united by a ring *c* of smaller interior diameter than the valve, so that the ring will prevent the valve from lifting too high or leaving its seat too far.

The valve-case with the ring-stop for the valve may be made long enough so that the valve-seat will be level with the upper or inner surface of the cylinder-bottom A, as in Fig. 1, or the extreme top of the valve-case may be level with the bottom, as in Fig. 2. In the former construction the piston C should be provided, as shown, with a recess in its working face to admit the valve-case, and in the latter the working face of the piston may be flat, as indicated.

The valve-seat is formed by the inner end of the cylindrical shell D, which is secured or fastened (air-tight) in the case B, the upper end or valve-seat being of such a height that the valve will when upon this seat and beginning to rise allow free passage for the air into the interior of the cylinder. As the piston rises the air will rush up through the center of the cylindrical shell D, raising the valve until it is stopped by the ring above it, and then pass freely through the openings between the bars and then into the cylinder.

The valve is represented at E. It is in any case made light and may be made of aluminium, vulcanized fiber, or whatever material may be suitable. It is in the form of a simple disk.

The ring *c* need not always be continuous, the portions between the bars being sometimes

omitted, leaving the bars with overhanging parts, which are sufficient to arrest the movements of the valve.

As shown in Figs. 1 and 2, the shell D is provided with a flange through which bolts, as *e*, pass, these being tapped into the base, as indicated. When this shell is brought to place, it forces the flange on shell B snugly against the seat provided for it, and it makes a tight joint with the lower end of shell B. Thus the air is prevented from escaping from the cylinder during the operation of compressing it and this without any extra packing.

An equivalent means of holding shell D in place is shown in Fig. 4, wherein the lower end of the shell is enlarged to receive the flange on shell B and the enlargement threaded to enter a correspondingly-threaded opening in the base, and the bottom of the shell D fashioned, as indicated in Fig. 5, to receive a wrench. By turning the shell thus made the parts are brought to proper bearing, same as by use of the separate bolts.

To remove and replace the valve, the inner shell has only to be taken out and returned to place. The whole fitment may be withdrawn at once, if desired, for the outer shell is only locked by the inner one.

The device constructed and arranged in accordance with the foregoing explanations will be found to answer all the purposes or objects of the invention before alluded to.

Having now fully described my invention, what I claim as new herein, and desire to secure by Letters Patent, is—

1. In combination with the air-compressor base perforated and recessed as explained, the outer casing fitting the perforation and having a flange at the bottom for entering the recess, and the inner removable shell having the flange at the bottom, the latter being arranged to force the flange on the casing against its seat in the recess and to form a joint with the compressor-base, substantially as shown and described.

2. The herein-described appliance for air-compressors, the same being composed of the outer casing having the overhanging ring or projections and a flange at the bottom, the inner removable casing also having a flange at the bottom, the valve-disk, and means for securing the parts in place, the flange on the inner casing being arranged to force the one on the outer casing against its seat in the recess and to form a tight joint with the base of the compressor, substantially as and for the purposes set forth.

Signed at New York, in the county and State of New York, this 15th day of January, A. D. 1897.

FRANK RICHARDS.

Witnesses:
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