

(No Model.)

J. B. PITCHFORD.
Air Compressor.

No. 233,432.

Patented Oct. 19, 1880.

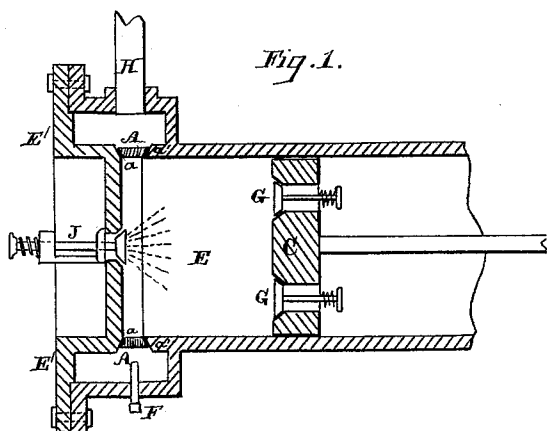


Fig. 1.

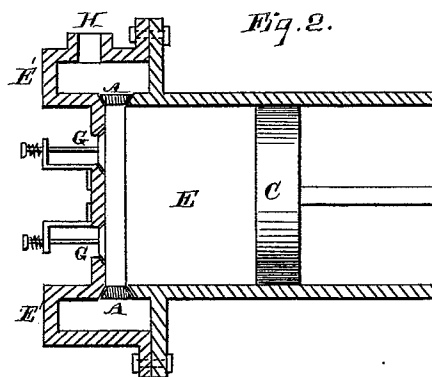


Fig. 2.

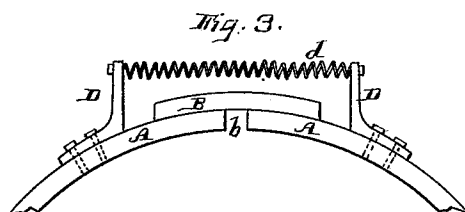


Fig. 3.

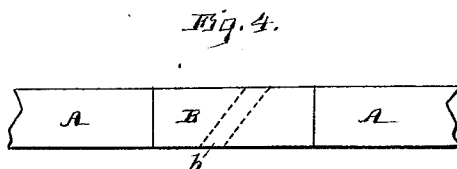


Fig. 4.

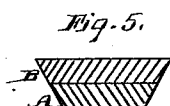


Fig. 5.

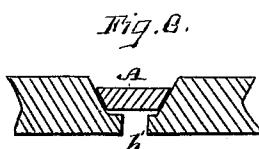


Fig. 6.

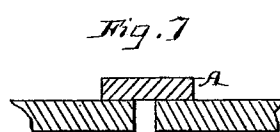


Fig. 7.

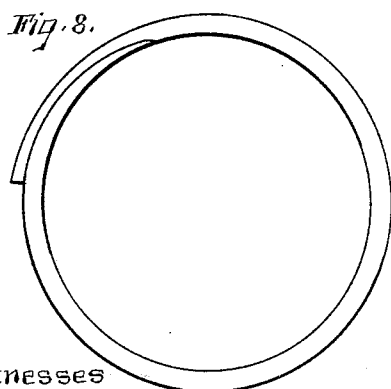


Fig. 8.

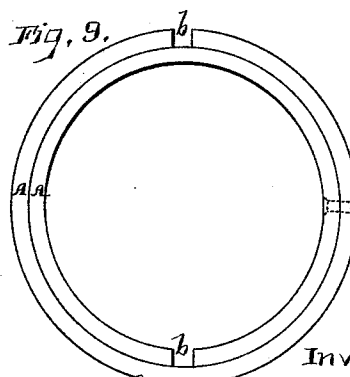


Fig. 9.

Witnesses

Frank H. Brooks
Geo. H. Strong.

Inventor

John B. Pitchford
Edy Dewey & Co.
Attys

UNITED STATES PATENT OFFICE.

JOHN B. PITCHFORD, OF GOLD HILL, NEVADA.

AIR-COMPRESSOR.

SPECIFICATION forming part of Letters Patent No. 233,432, dated October 19, 1880.

Application filed March 11, 1880. (No model.)

To all whom it may concern:

Be it known that I, JOHN B. PITCHFORD, of Gold Hill, county of Storey, and State of Nevada, have invented an Improved Air-Compressor; and I hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to certain improvements in that class of devices intended for compressing or pumping air; and my improvements consist in providing a peculiar cut or split metallic ring having a suitable point and covering an annular discharge-opening, said ring answering for a discharge-valve or outlet for the air compressed within the cylinder, and closing by its own elasticity the discharge-port, so that the air shall only enter at the inlet valve or valves. By discharging the discharge-valve in the manner described a large and free outlet for the air is obtained without the undue friction which would be incident to the working of a large slide-valve, as is more fully described in the accompanying drawings, in which—

Figures 1 to 9 are views of my invention.

Let E represent an ordinary air-compressing cylinder, and C the piston.

In Fig. 1 I have shown my ring-valve A applied to a single-acting compressor with inlet-valves G G in the piston.

On the end of the cylinder E is the head E', and between this head and the cylinder is the annular opening *a*, the seat *a'* of the valve being formed beveled on each side, as shown, one side made on the end of the cylinder and the other on the head or cover, as shown. The ring-valve A is also formed beveled to fit in this seat accurately. At any suitable point in this ring is made a cut or split, *b*, which allows the ring to expand at the stroke of the piston which compresses the air, this compressed air then passing out of the annular opening *a*, to be led off through the discharge-pipe H to a receiver or to whatever point it is to be utilized. The instant the pressure is relieved the elasticity of the metallic ring brings it to its beveled seat, thus closing the opening *a* and allowing air only to enter the cylinder at the inlet-valves G G.

In order that the annular opening shall be completely closed, and even the split or cut in the ring shut when the valve is in its seat, a

joint or cover, B, is formed over the split portion of the ring-valve A. This joint is formed of a piece of metal, which is secured to one of the ends of the ring A, and the other end moves freely. When internal pressure enlarges the ring and allows the compressed air to pass through the annular opening *a* to the discharge-pipe H, the free end of the ring slides along the joint B, but not past it. When pressure is relieved and the ring closes, assuming its normal position in its seat, even if the ends of the ring did not meet accurately, no air can pass the opening *b*, since the joint B covers it.

F represents an adjustable stop, which will regulate the lift of the discharge-valve A, but projections cast inside the casings will prevent its rising too far.

J represents a jet in the center of the head for cooling the air by means of water.

Fig. 2 shows the application of the valve to single or double acting compressors where the inlet-valves G are in the heads.

The split-ring valves may be applied to horizontal or vertical compressors, and can be used with any kind of inlet-valves.

The split or cut ring may be made in one or more pieces, and various methods of forming the joint can be applied.

Fig. 3 shows the manner of making the joint where the ring is cut, in which A A are ends of the ring, B the piece of metal covering the cut *b*. D D are brackets, to which a spring, *d*, is connected for pulling the ring together in case its own elasticity is not sufficient. Fig. 4 is a top or outside view of the ring, showing the lap covering the joint.

It will be observed that the ring-valve A is beveled in cross-section, as shown in Fig. 5, and the lap B, which covers the joint, has also beveled edges, which fit the annular seat around the end of the cylinder.

Fig. 6 shows a method in which the cut ring may be used without having an annular opening all around the end of the cylinder. In this case a V seat or groove is turned all around the barrel of the cylinder, and holes are made to communicate with it and the interior of the cylinder, A representing the ring, and *b'* one of the slots or holes.

Fig. 7 shows a manner of applying a flat cut

ring around the cylinder, with holes for the passage of the air.

Fig. 8 represents the ends of the ring lapping by each other in a tongue-joint, which would be but another way of carrying out my principle.

Fig. 9 is still another form, in which the ring is double, one inside of the other, with the cuts *b* on opposite sides. The opening and closing of this valve is accomplished by the action of the piston alone as it draws in and forces out the air alternately. Both these rings (shown in Fig. 9) expand simultaneously to allow egress of air, and when they spring together the cut or slot of one is covered by the solid part of the other. With the cut ring made in any of these or corresponding forms, with suitable joint-covers, a free exit of air is possible, while when the air is entering the cylinder the discharge-opening is tightly closed.

The operation of the discharge-valve is insured without any friction of mechanism whatever and a large discharge-opening is obtained, no power being wasted in moving valves or forcing air through necessarily small openings. The discharge-pipe *D* can be set at any height, so that the ring-valve can be sealed with water.

In this form of valve less movement is required to give a proportionately larger discharge than those commonly in use, and it is virtually a double-seated valve, and will give twice the discharge-opening with a quarter of an inch lift than a valve which seats on the end of the cylinder. The valve is also lighter than other forms giving the same opening, so that less power is required to overcome its inertia.

Some of those valves opening at the end of the cylinder open the whole end of said cylinder;

but a quarter of an inch lift will allow the free discharge of the cylinder full of air. The discharge-opening therefore is, in that class of valves, only equal to the area of a quarter-inch annular slit the circumference of the cylinder; but that class of valves have to be moved at a great velocity as soon as the pressure in the cylinder exceeds the pressure on the back of them, and in order to check their momentum it is necessary to have strong springs or buffers to cushion against. From there they rebound when running at high speeds, thereby checking the discharge of air from the cylinder. My encircling split ring will obviate this defect, because the momentum imparted is equal in all directions, and the valve has no greater tendency to fly from the seat more at one point than another, and, having a double seat, it gives the same opening with one-eighth inch lift as the ordinary valves do with a quarter-inch lift.

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

In an air compressing or pumping apparatus, a discharge-valve consisting of an encircling cut or split metallic ring provided with a sliding covering-joint at its point of division, and having free ends, in combination with and fitting into a continuous annular opening or slotted groove in the compressing-cylinder, whereby a free discharge is obtained and the opening closed tightly on the return-stroke of the piston, substantially as herein described.

In witness whereof I have hereunto set my hand.

JOHN B. PITCHFORD.

Witnesses:

WILLIAM C. WATERS,
A. H. RICKETTS.