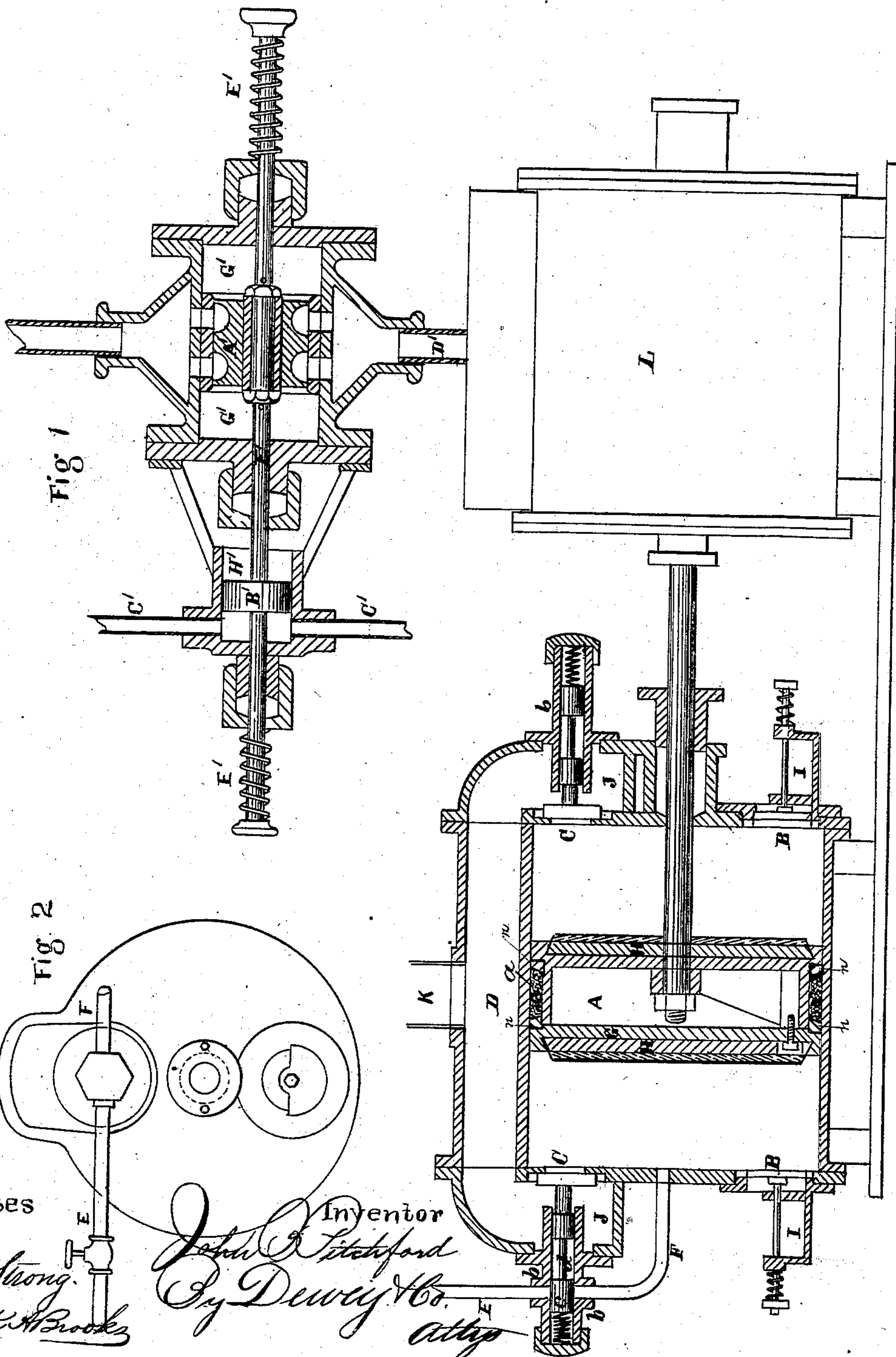


J. B. PITCHFORD.  
Air-Compressor.

No. 215,540.

Patented May 20, 1879.





# UNITED STATES PATENT OFFICE.

JOHN B. PITCHFORD, OF GOLD HILL, NEVADA.

## IMPROVEMENT IN AIR-COMPRESSORS.

Specification forming part of Letters Patent No. **215,540**, dated May 20, 1879; application filed February 26, 1879.

*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 that the following is a full, clear, and exact description thereof, reference being made to the accompanying drawings.

My invention relates to an improved air-compressor; and my improvements consist, first, in a peculiar construction and operation of the discharge-valves, whereby, by suitable connection to the stem of said valves, which operate in sleeves or cylinders, the supply of water to the air-cylinder is automatically regulated, and no water will be used in the cylinder unless the compressor is working, but not then until the air-valve opens, which is the time it is needed.

It further consists in the method of placing the inlet-valves and the drip-plates connected with them, and also in combining brass rings and hemp packing on the piston, so as to carry the moisture all around the piston in the air-cylinder by capillary attraction, and thereby keep it lubricated.

Figure 1 represents a longitudinal section of the air-cylinder and piston. Fig. 2 is an end elevation of the air-cylinder.

Let A represent a piston, which is made of cast-iron, with a follower, G, of the same material. A space, *a*, is left for hemp packing, which is retained by the follower. Each side of the hemp packing are two or more grooves, turned and fitted with brass snap-rings *n n*. A dovetailed recess is formed on each side of the piston, into each of which is fitted a plate of rubber, H, as shown. This rubber plate projects an eighth of an inch, or more, beyond any part of the piston, as shown, so that the piston can be run clear to the end of the stroke, and the rubber may touch the heads of the cylinder at each end without any danger of breaking them, and by this means all the air is expelled from the cylinder at each stroke of the piston.

The inlet-valves B B are made to open into the cylinder, and when closed are flush with the cylinder-head inside, leaving no space for air. They are made of metal, faced with vulcanized rubber. Outside the inlet-valves is a

tray or dripper, I, for catching any water that may be discharged at the first opening of the valve.

The discharge-valve chamber J is shown as cast on the cylinder-head, and a free passage communicates from the discharge-valves C C to the discharge-pipe D, which is cast with the cylinder. An air-pipe, K, leading to the air-receiver, is attached to the pipe D.

The discharge-valves C C close flush with the cylinder-head inside. Each of these valves is constructed with a guide-stem, *d*, on the back of it, which acts as a piston-valve, sliding back and forth in the sleeve *b*, forming part of the cover. A water-pipe, E, is connected to this sleeve in such a manner that the passage can be closed or opened by the action of the piston-valve, as hereinafter described.

The pipe E, connected to one side of the sleeve *b*, leads from the water-supply, which is intended to have a greater pressure than that of the air. The jet-pipe F is connected from the sleeve *b* to a jet in any suitable place in the cylinder-cover.

From what has been described, it will be seen that when the air-discharge valve is closed the piston has also shut off the water by the ring or valve *c* on the valve-stem *d*, closing the supply-pipe E. No water will therefore be used in the cylinder unless the compressor is working, and even then it will not be used until the air-valve C opens, which is just the time that it is needed, and that will only be for about one-fifth of the stroke of the piston when making seventy pounds of air. The small piston water-valve *c*, being balanced, offers very little resistance to the opening of the air-discharge valve C, on the stem of which it is placed.

Fig. 1 is a longitudinal section of a governor which is constructed and operated in such a manner as to regulate the speed of the engine by the pressure of the air in the air-receiver.

The governor-valve A' is attached to the stem F' in the usual manner, and plays in a chamber or cylinder, G', with which the steam-pipe D' connects. C' C' are pipes leading to and from the air-receiver, and B' is a piston playing in a chamber, H', and actuated by the pressure of the air in the air-receiver, which

pressure is communicated to the chamber H' through the pipes C' C'.

Adjusting-springs E' E' are intended for regulating the governor. These springs are adjusted so as to set the spindle or stem, on which the governor-valve and piston are placed, up or down, and maintain the piston B' in a certain position in its chamber under any desired pressure. Any excess, however, of that specified pressure will push the piston B' and stem F' down, and thus commence to close the throttle-valve A', thereby reducing the speed of the engine.

This governor is placed in position, as shown, on the steam-chest of the steam-cylinder L. This steam-cylinder is made in the usual way.

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

1. The improvement in air-compressors, con-

sisting in the piston A and its follower G, with their metallic packing snap-rings *n n*, in combination with the hemp or other porous packing fitted into the central groove, *a*, so as to carry the moisture around the piston by capillary attraction, and thus lubricate it, substantially as herein described.

2. The discharge-valves C, with their stems *d* and valves *c*, in combination with the pipe E and jet-tube of an air-compressor, whereby an intermittent jet of water is discharged into the cylinder, substantially as and for the purpose herein described.

In witness whereof I have hereunto set my hand.

JOHN B. PITCHFORD.

Witnesses:

M. G. FOOTE,  
W. G. HYDE.