C. AHRENS.

STEAM PUMP.

No. 189,414. Patented April 10, 1877.

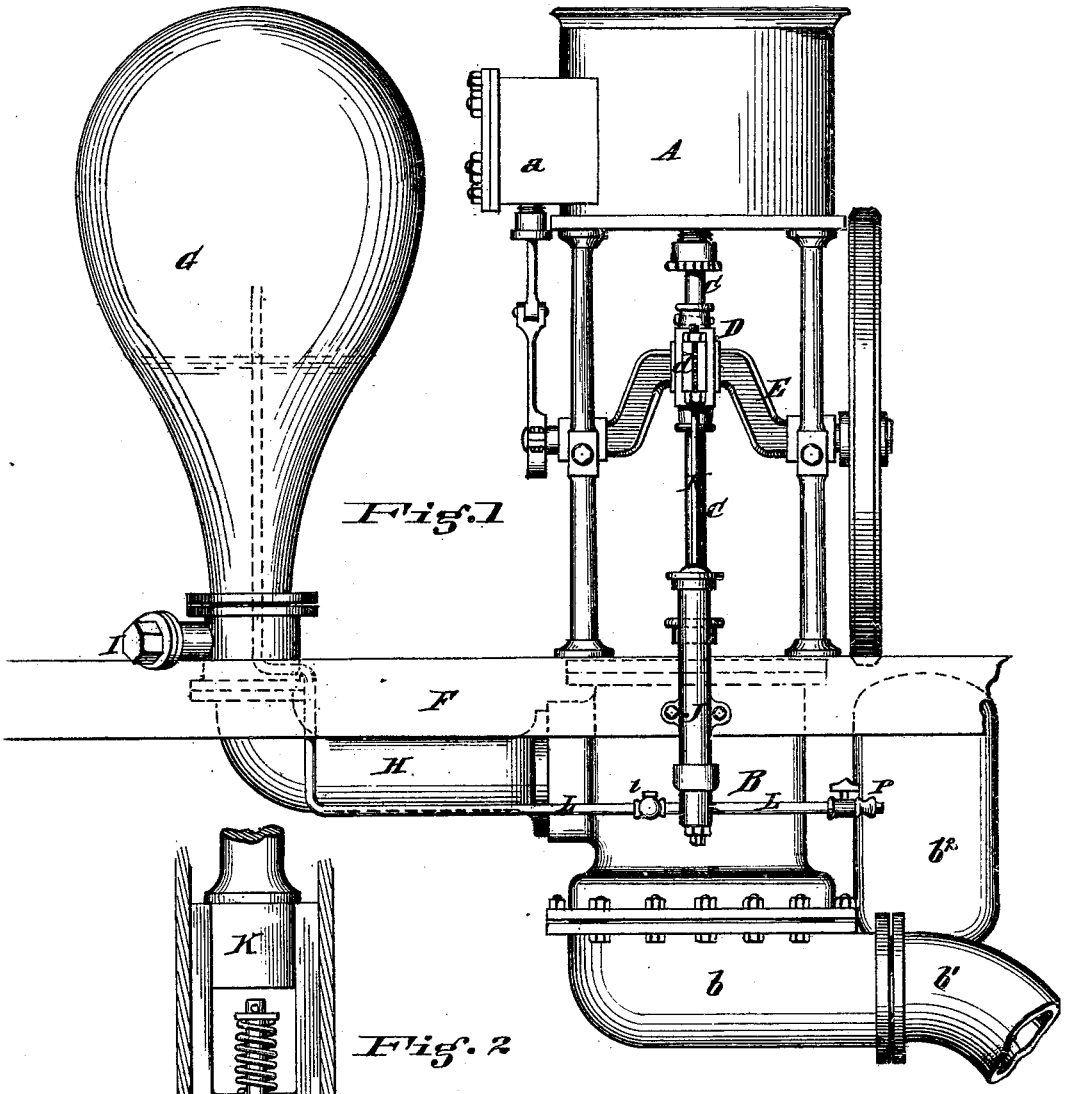

Fig. 1

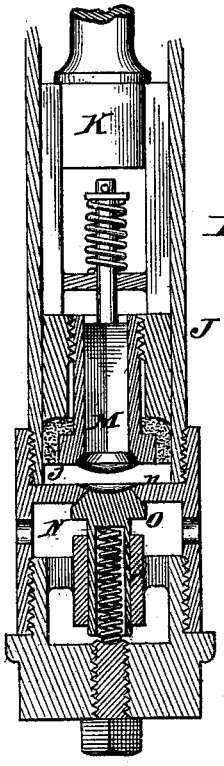

Fig. 2

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CHRISTOPHER AHRENS, OF CINCINNATI, OHIO.

IMPROVEMENT IN STEAM-PUMPS.

Specification forming part of Letters Patent No. 189,414, dated April 10, 1877; application filed May 13, 1876.

To all whom it may concern:

Be it known that I, CHRISTOPHER AHRENS, of Cincinnati, Hamilton county, State of Ohio, have invented an Improvement in Steam-Pumps, of which the following is a specification:

My invention relates to that class of steam force-pumps which employ a pressure-dome, or vessel into which and from which to force the water, and has for its object such a construction and adaptation of devices as that a positive and reliable supply of air may be furnished to the constantly-decreasing bulk under pressure in the dome, said supply being under the control of the operator.

My invention consists, in the first part, in connection with the pressure-pump and air-vessel, of an air-supply pump, whose piston is operated by the piston of the pressure-pump.

My invention consists, in the second part, in the air-pump, of a piston-valve and pressure-chamber valve which shall be in line and in close contact at the forcing end of the piston-stroke.

My invention consists, in the third part, in connection with the air-pump and air-chamber, of supply-pipe suitably governed by stop-cock and check-valve, so that the air from the pump may be directed to the air-chamber or otherwise without stopping the pump.

Figure 1 is a partial elevation, showing a steam fire-pump with my improvement attached. Fig. 2 is a sectional view of the air-pump embodying my invention.

A is the steam-cylinder, and B the suction and force chamber, of a steam fire-pump. C is the piston-rod, and D the cross-head, in which latter slides the boxing of the fly-wheel crank E. The crank E gives motion to the valve in steam-chest *a* in the usual manner. Formed upon the bottom of the chamber B is the reservoir *b*, to which attaches the suction-mouth b^1, and to which also is connected the usual vacuum-chamber b^2. F is the frame of the engine, which supports its weight to the wheels of the carriage. G is the pressure-dome or air chamber, provided with receiving-pipe H from the chamber B, and delivering mouth-piece I. Secured upon the frame F of the engine, directly in line with the position of the piston-rod C, is an air-pump, J, provided with piston-rod K. The upper end of the piston-rod K is provided with a screw-thread, and is secured adjustably to an extension, *d*, of cross-head D by means of jam-nuts, as shown in the drawing. This adjustability admits of changing the position of the path of throw of the air-pump piston to suit the position of the pump. Between the interior of the pressure-dome and the air-pump J I introduce an air-supply pipe, L, fitted with check-valve *l* between the chamber G and the air-pump J, to prevent the return of air from the said chamber. Beyond the air-pump J the pipe L extends, and is provided with a stop-cock, P, to prevent waste of air when pumping into the chamber G, and to provide for the escape of the air, which is constantly being pumped while the engine is running, when it is not wanted in the chamber G. When the pump is working and water is being forced into the dome G through pipe H, and thence out at mouth I, and through the hose, the quantity of air which is to form the elastic cushion of the dome will preferably extend through the space in the dome above the dotted lines shown in the drawing, and the air-supply pipe must extend somewhat into this space, as also shown by dotted lines, in order to escape the encroachment of the water, should it by the gradual wasting of the air decrease the space allotted thereto. But in order to effectually prevent the decreasing of the amount of air in the chamber, I introduce the herein-described positive-moving air-supply pump, with its piston moving in common with and from the piston-rod of the steam-cylinder and force-pump.

Referring to Fig. 2, it will be seen that the piston K of the air-pump is provided with a valve, M, for the purpose of taking air on its upward stroke, and retaining it on the downward stroke in the chamber *j*. The chamber N of the air-pump is provided with a valve, O, seating up against partition *n*, for the purpose of receiving air from the chamber *j* as the piston forces it toward partition *n*, and for retaining it when the piston moves away from said partition. The piston-head K, which is provided with the usual packing, moves right against the partition *n* in finishing the

downward stroke, and the valve M, which is preferably made convex on its head, moves squarely against the correspondingly-concaved head of valve O. Thus it will be seen that the air is entirely forced from chamber *j*, and there will be appreciably none left to expand as the piston performs its upward stroke, to the exclusion of a new supply of air to the said chamber *j;* and it is evident that if there was a small quantity of highly-compressed air left remaining in chamber *j* at the end of the piston-forcing stroke, it would so expand as to prevent the taking of a fresh supply of air, and thus prevent the action of the pump further; hence the adoption of the close forcing-piston and valve above described.

I claim—

1. In a steam-pump, the positive-moving supplemental pump J, adapted to supply air to the air-vessel, substantially as and for the purpose specified.

2. In an air-pump, the combination, substantially as specified, of the pump-barrel, the piston, the valve thereof, the pressure-chamber underneath the pump-barrel, and the valve governing the induction-port of said air-chamber, the relative arrangement of the parts being such as hereinbefore stated.

3. In combination with the air-pump J and air-vessel G, the supply-pipe L, provided with check-valve *l* and the stop-cock P, connected and operating substantially as and for the purpose specified.

In testimony of which invention I hereunto set my hand.

CHRISTOPHER AHRENS.

Witnesses:
EDGAR J. GROSS,
JOHN E. JONES.