E. COPE, J. R. MAXWELL & J. R. PADDACK.

STEAM PUMP.

No. 180,701. Patented Aug. 8, 1876.

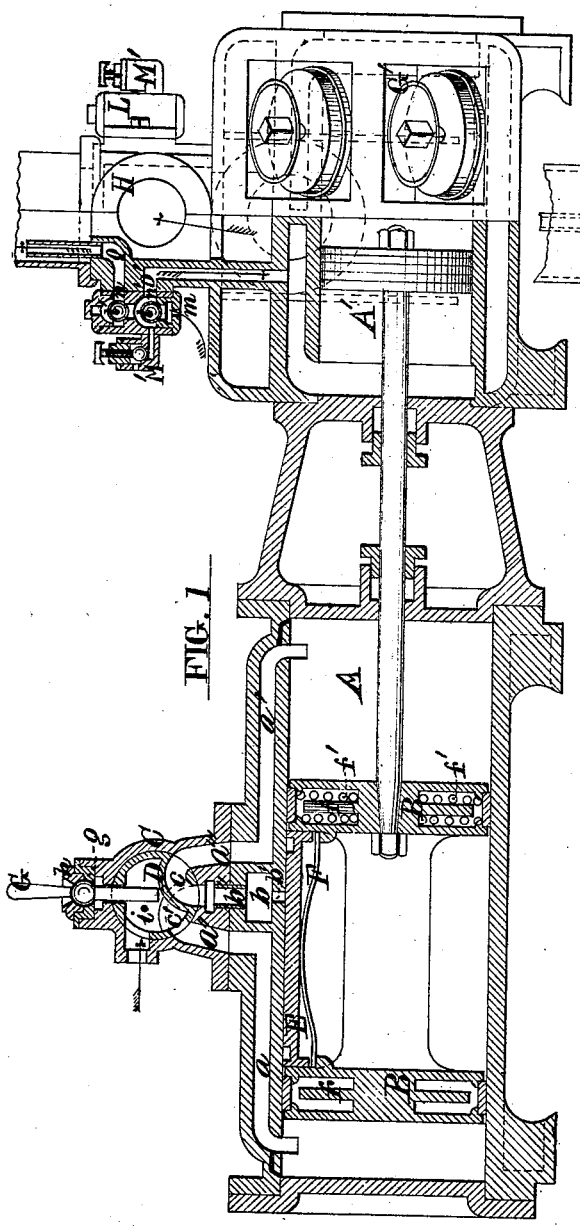

FIG. 1

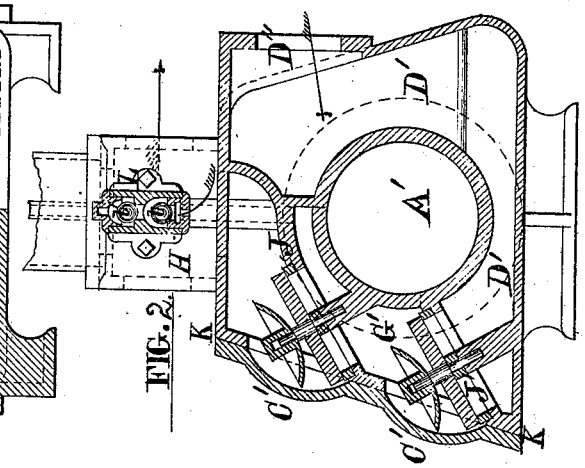

FIG. 2.

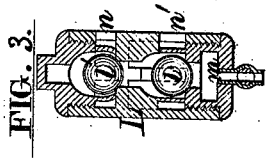

FIG. 3.

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EZRA COPE AND JAMES R. MAXWELL, OF HAMILTON, OHIO, AND JAMES R. PADDACK, OF CHICAGO, ILLINOIS.

IMPROVEMENT IN STEAM-PUMPS.

Specification forming part of Letters Patent No. **180,701**, dated August 8, 1876; application filed September 24, 1875.

To all whom it may concern:

Be it known that we, EZRA COPE and JAMES R. MAXWELL, of the city of Hamilton, county of Butler, and State of Ohio, and JAMES R. PADDACK, of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in the Construction of Steam Pumping-Engines; and we declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing, which forms a part of this specification.

Our invention consists, first, in the construction of the pump and the arrangement of its valves; and, second, in an attachment for maintaining the supply of air in the air-vessels of steam-pumps while they are in motion.

In the drawings, Figure 1 is a longitudinal sectional view of the pump with steam-engine attached. Fig. 2 is a transverse section through the center of the pump. Fig. 3 is an enlarged sectional view of the air-feeding attachment. (Shown attached to the pump in Figs. 1 and 2.)

A′ is the pump-cylinder, cast with and in the center of a large chamber, the latter being subdivided to form valve, vacuum, and suction chambers. The valves are placed at side of the pump-cylinder, within the valve-chambers, upon seats which are secured to or formed upon the partitions J J′, which separate the suction and discharge valve chambers, and the suction-valve and suction chambers. These partitions J J′, and the valve-cap face K, are inclined at an angle, the opening of which is toward the pump-cylinder. These angles may vary as the circumstances of the case may require. We find, however, the most convenient arrangement to be to incline the partitions at an angle of thirty (30°) degrees, and the valve-cap face at an angle of about seventy (70°) degrees to the base-line.

By this arrangement of the valves we gain several very important advantages: first, the water-passages are very direct; second, no additional holes are required to admit a boring-bar to bore out and dress the seats, the main valve-openings in this arrangement admitting the bar; third, the valves are more easily fitted, and are more convenient for inspection and repairs, than when placed in any other position; fourth, the space required for the valve is much less than in any other arrangement.

The valve-chambers are closed with doors or caps C′, which may be removed without disturbing any other part of the pump, and thus convenient access may be had to the valves. The valve-seats are of brass or composition metal, with large openings. The valves may be either brass or rubber, as desired, or as the quality of the water to be pumped may demand.

As heretofore mentioned, the remainder of the large chamber surrounding the pump-cylinder is subdivided by partitions, (shown in dotted lines in Fig. 1,) into two vacuum-chambers, one for each end of the pump, and a suction-chamber. The vacuum-chambers relieve the pump from all shock or jar. The suction-opening D″ is at the top of the suction-chamber D′, as high or even higher than the discharge-valves, thus keeping the pump constantly primed, so that it never fails to fill when in operation.

The air-feeding attachment L consists of two valves, *l l′*, in a chamber which is bolted to the discharge-chamber H, or to the base of the air-vessel. *m* is the air-inlet passage, and *n n′* are air-passages which meet similar passages *o o′* cored or drilled in the discharge-chamber H. The passage *o* extends downward to the suction-valve chamber G′, while *o′* has a pipe screwed into its end, which extends to the upper part of the air-vessel, or above the influence of the discharged liquid.

The operation of the air-feeder is as follows: The pump-piston moving from left to right, as shown in Fig. 1, a vacuum is created in the passage *o′*, and the air, raising the valve *l*, fills this passage, and passes into the suction-valve chamber G′. Upon the return of the piston the air thus admitted is forced upward by the water, opening the valve *l′* and passing through the passage *o* and the pipe to the air-vessel. A stop-cock is usually attached to the inlet-passage *m*, so that the air-feeder may be adjusted to admit the proper supply of air.

In cases where the air-vessel is standing under pressure, and the pump may become

filled with air, so as to defeat its action, we provide the additional air-relief check-valve m' in the chamber M′.

Having thus fully described the construction and operation of our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination of a pump-cylinder, A, with suction, discharge, vacuum, and valve chambers, when constructed in one and the same piece, as and for the purpose specified.

2. The combination of a pump-cylinder, A, with the partitions J J′, which separate the valve-chambers, and upon which the valves or seats are seated, and the valve-cap face K, when said partitions J J′ and face K are placed at an angle to the base-line of the pump, substantially as described.

3. The combination of a pump, with air-passages o and o', and the air-feeding attachment L, substantially as described.

4. The combination of a pump, with air-passages o and o', the air-feeding attachment L, and the air-relief check-valve M′, substantially as described.

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