

J. W. MATHIESON.

STEAM-PUMP.

No. 173,031.

Patented Feb. 1, 1876.

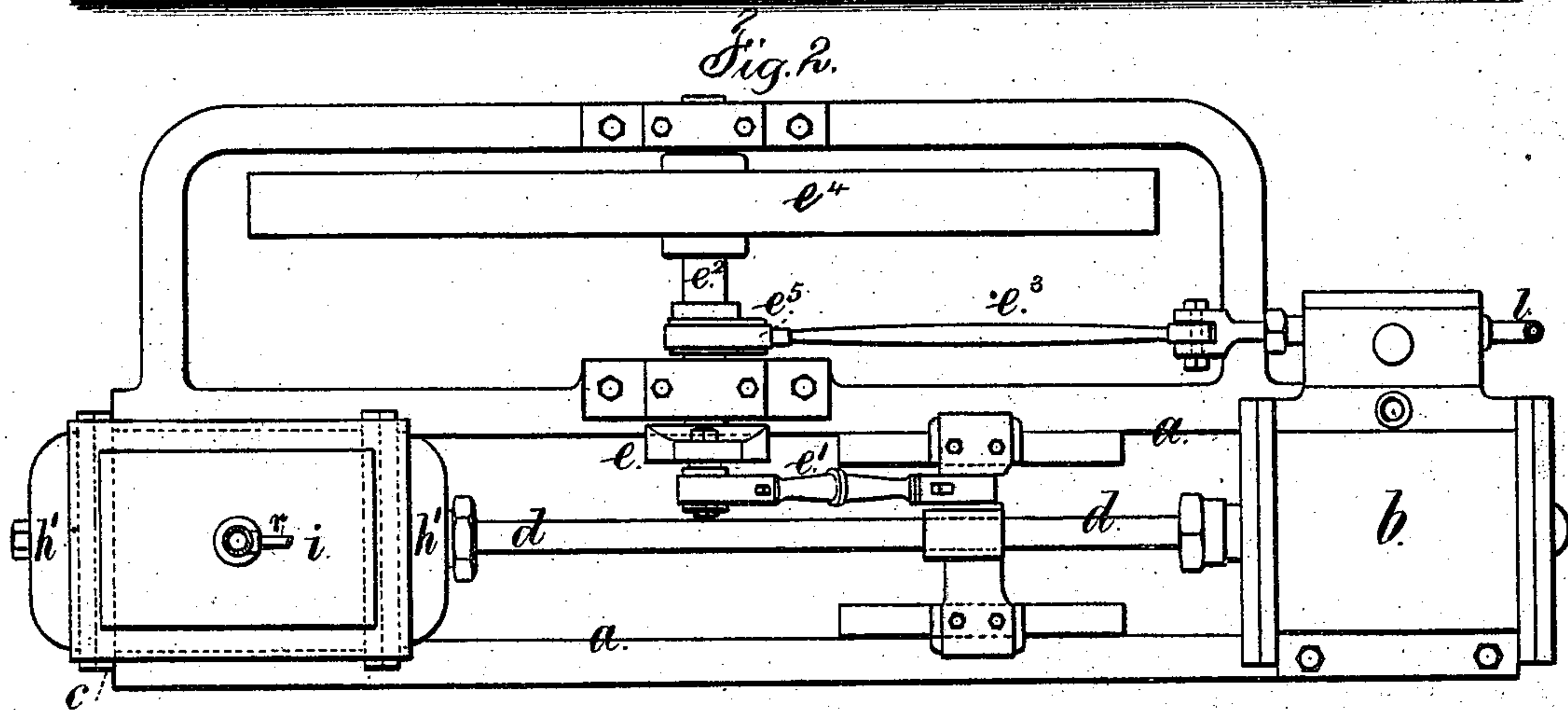
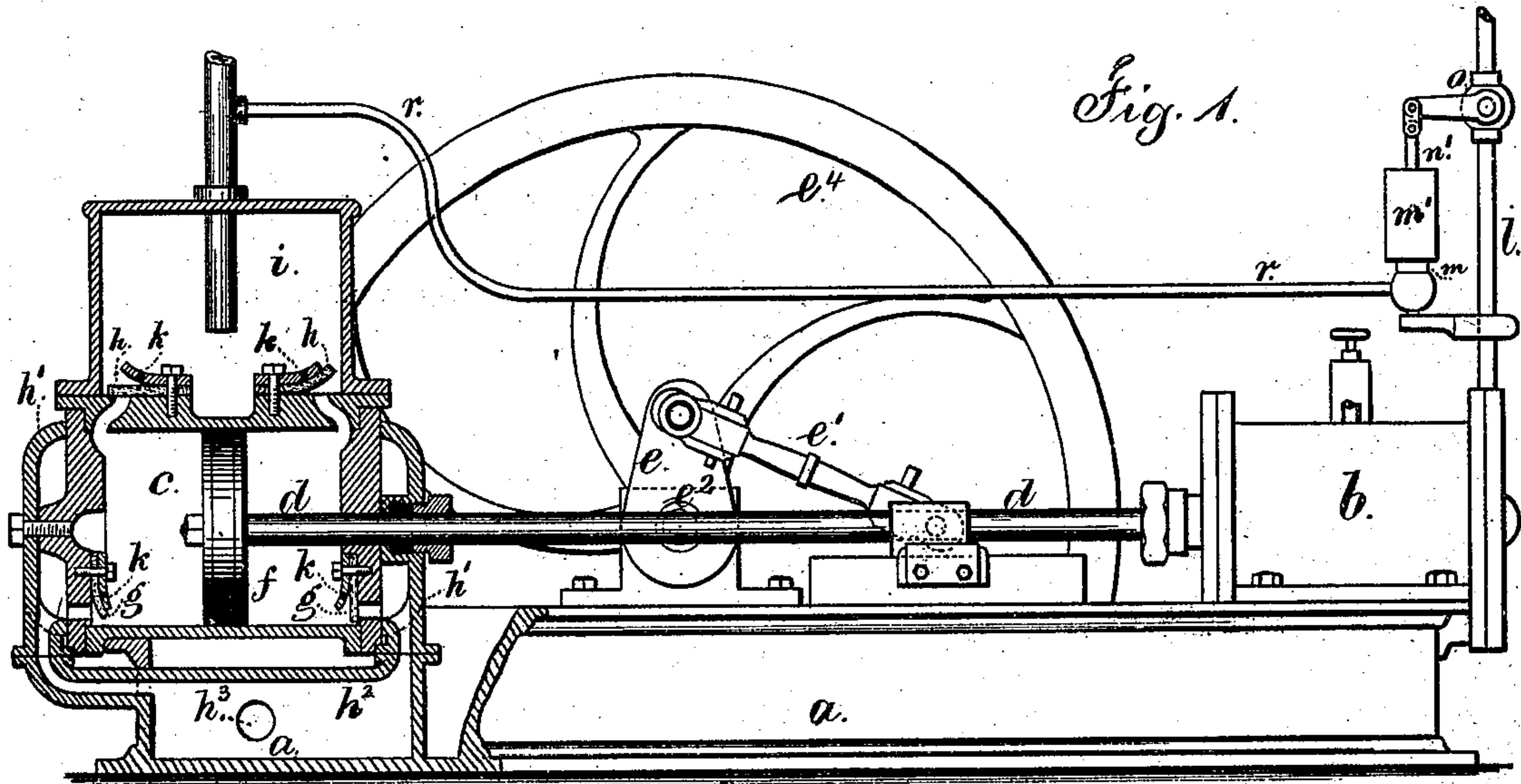
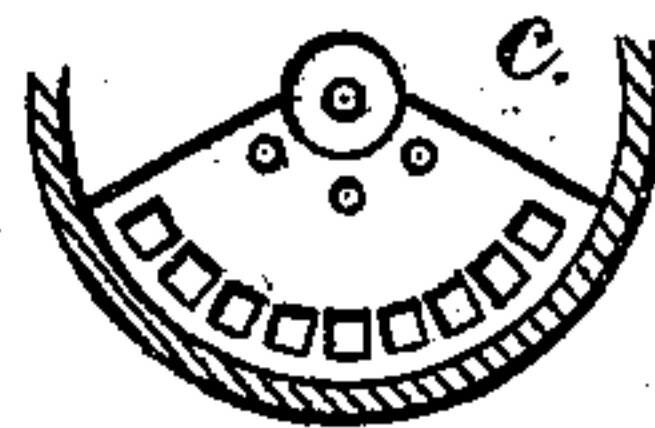


Fig. 4.



Inventor.

James W. Mathieson.

Witnesses
Charles Smith
Harold Smith

for L. W. Serrell

Atty.

UNITED STATES PATENT OFFICE.

JAMES W. MATHIESON, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN STEAM-PUMPS.

Specification forming part of Letters Patent No. **173,031**, dated February 1, 1876; application filed July 6, 1875.

To all whom it may concern:

Be it known that I, JAMES W. MATHIESON, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Pumping-Engines, of which the following is a specification:

This invention is intended to be used either for water, or as an air pump or compressor, vacuum-pump, or blowing-engine.

In the drawing, Figure 1 is a vertical section. Fig. 2 is a plan of the pumping-engine, and Fig. 3 is a section of the governor.

The bed-plate *a*, steam-cylinder *b*, pump-cylinder *c*, single piston-rod *d*, crank *e*, and fly-wheel *e'* are as usual in steam-pumps, and the pitman or connecting-rod *e'* is attached at one side of the cross-head and adjacent to the piston-rod, and said pitman and its crank *e* swing clear of the piston-rod, so as to limit the movement of the pistons by the crank, and the piston-rod extends from the steam to the water piston through the cross-head, and is secured thereto by a screw or key. The pump-cylinder *c* is horizontal, and the piston *f* reciprocates therein.

The induction-valves *g* are upon the inner surfaces of the cylinder-heads, near the bottom, and the outer sides of the heads are provided with movable caps *h'*, that form ports connecting with the hollow bed-plate or chamber at *h''*, to which the suction-pipe *h'''* is connected when the engine is used for pumping, or through which pipe *h'''* water to lubricate the cylinder is supplied as required, the water being drawn into the cylinder, and serving to lessen friction and to fill the passage-ways and spaces at the termination of each stroke, and thereby insure greater efficiency of the pump in its action upon air.

The eduction-valves *h* are at the top of the cylinder *c*, and open into the compression-chamber *i*.

Both the induction and eduction valves are formed of sheets of rubber, secured to the seats by bolts which pass through curved guards *k*, and through holes in the rubber, and the valve-openings are numerous, or provided with bridges to prevent the rubber being drawn into the openings.

The elevation, Fig. 4, represents the inner surface of a portion of one of the cylinder-heads.

The curved guards *k* limit the distance that

the sheet-rubber valves move in opening, and the sheet-rubber valves press closely against these guards *k* when open. The action of each guard is thus to compress the valve upon the side next to the guard, and to stretch the other side, which action assists the valve to spring back quickly to its seat when liberated, and the guards are perforated to allow the air to reach the back of the valve and facilitate the movement as the valve seats itself.

I am aware that valves of india-rubber between a seat and a back plate or guard, that limits the movement of such valve, have been used.

My improvement is especially available as an air-pump, because the induction-valves, being upon the inner surface of the head, close rapidly by the action of the water that is admitted with the air into the air-pump; hence the air will be expelled upwardly above the water as the piston moves toward the head and causes the water to rise, and the air, escaping through the eduction-valves at the top of the cylinder, is followed by any surplus water, and the eduction-valves, closing in such water, are rendered perfectly tight thereby, and a much better vacuum is obtained upon the return stroke of the piston than in the pumps heretofore constructed.

It will be apparent that the guard-plates prevent too great movement of the valves, that the valves close rapidly and tightly upon the metal surfaces around the water-ways, and that the exit-valves close instantly by gravity, as they are in a horizontal position, and the water above them insures their being tight.

I claim as my invention—

The induction-valves *g* upon the inner surfaces of the cylinder-heads, near the lower portions thereof, covering the inlet-openings and formed of india-rubber, and protected by the perforated guards *k* at the backs of such valves, in combination with eduction-valves similarly constructed, and applied at the exit-openings above the cylinder, in the manner and for the purposes set forth.

Signed by me this 2d day of July, A. D. 1875.

JAMES W. MATHIESON.

Witnesses:

GEO. T. PINCKNEY,
CHAS. H. SMITH.