F. E. SAXBY.

CONDENSERS FOR STEAM-PUMPS.

No. 180,069. Patented July 18, 1876.

FIGURE 1.

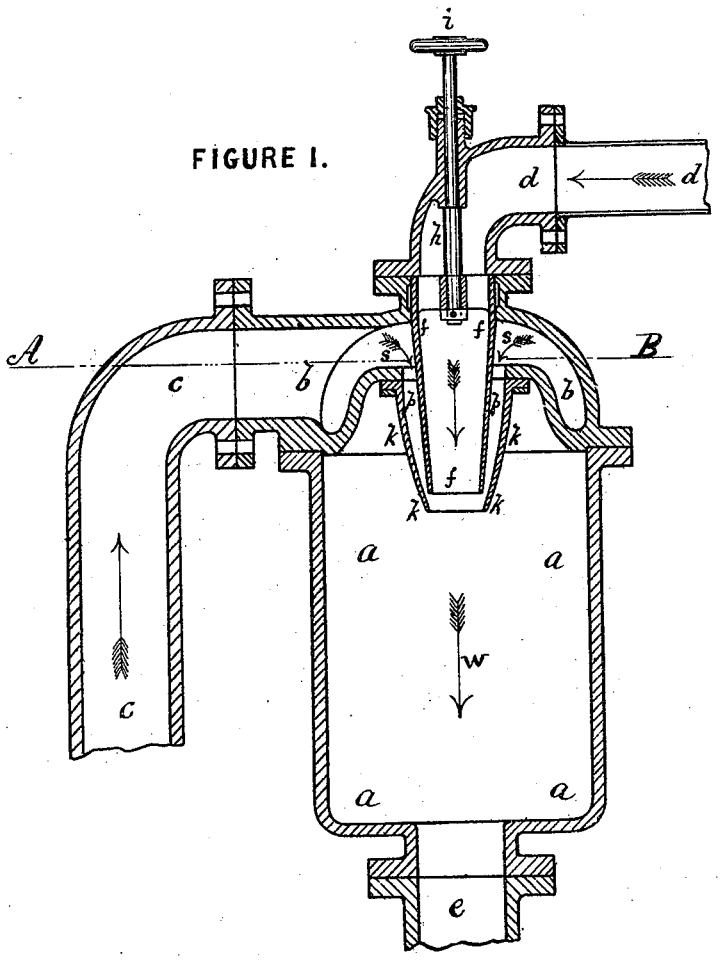
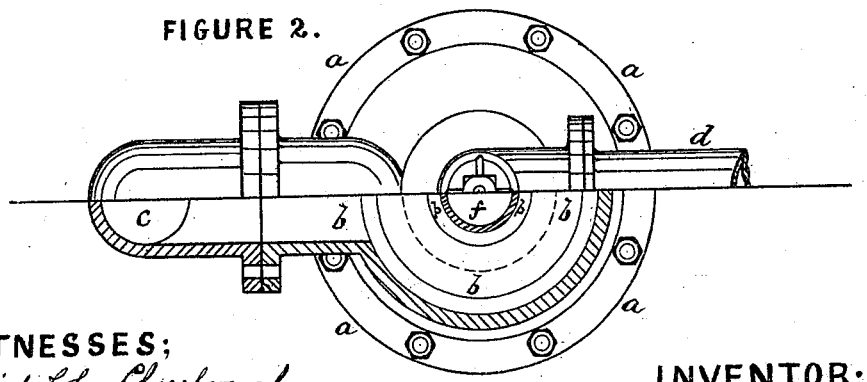


FIGURE 2.



WITNESSES;

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UNITED STATES PATENT OFFICE.

FREDERICK EBENEZER SAXBY, OF LIVERPOOL, ENGLAND.

IMPROVEMENT IN CONDENSERS FOR STEAM-PUMPS.

Specification forming part of Letters Patent No. **180,069**, dated July 18, 1876; application filed March 13, 1875.

To all whom it may concern:

Be it known that I, FREDERICK EBENEZER SAXBY, of Liverpool, in the county of Lancaster, in that part of the United Kingdom of Great Britain and Ireland called England, have invented certain new and useful Improvements in Condensers for Steam-Pumps; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawing, making a part of this specification, in which—

Figure 1 represents a sectional elevation of the condenser. Fig. 2 represents a plan, shown half in section, through the line A B, Fig. 1.

Similar letters of reference, where they occur in the separate figures, denote like parts in the drawing.

My invention relates to improvements in that class of condensers generally used for steam pumping-engines, where a vacuum is created by the intermingling and condensing of the exhaust-steam with and by the suction or inlet water of the pump during its passage through such condenser; and my invention consists in constructing such condenser on the principle of an injector, and in the combination and arrangement of parts, as hereinafter more fully described, and pointed out by the claim.

To enable others skilled in the art to make and use my invention, I will proceed to describe the same with reference to the drawing.

a is the body or main chamber of the condenser; *b*, the upper chamber of the condenser. *c* is the water suction or inlet pipe to condenser. *d* is the exhaust steam-inlet pipe, from the cylinder of the steam-pump. *e* is the suction-pipe of the pump, connecting the pump to the condenser. *f* is an internal pipe, leading from the steam-inlet *d* into the main body of the condenser *a*. *h* is a spindle for regulating the pipe *f*, the spindle being worked by the wheel *i*. *k* is a conical india-rubber valve, which passes around the pipe *f*, leaving a space, *p*, for the inlet-water to pass, as shown by the arrows *s*. The conical india-rubber valve *k* is attached by bolts or otherwise to the flange forming the under part of the upper chamber *b* of the condenser.

In action the pump forms a vacuum in the condenser *a*, and the water is drawn through the pipe *c*, the upper chamber *b* of the condenser, and the passage *p*, and discharges in a straight column, as shown by the arrow *w*. The water draws the exhaust-steam with it and condenses it, and thus forms a vacuum on the back of the piston of the pumping-engine.

The flow of water and operation of the condenser can be regulated by the wheel *i*, which adjusts the internal pipe *f* as required.

The pipe *d* is fitted with a suitable cock, for exhausting the steam from the steam-pump into the air or into the condenser, as required, and as usual in such cases.

The chief feature of the invention is the elastic valve *k*, which is of flexible india-rubber, and expands and contracts upon the internal pipe *f* with the forward and backward strokes of the water-piston, thus filling the double function of water valve and pipe, the valve closing tight upon the pipe when the piston moves back, forming a perfect non-return valve, by which the receiving-pipe is kept continually full, and the water caused to flow upon the first motion of the piston.

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

In a condenser for steam-pumps, the flexible or elastic india-rubber valve or pipe *k*, leading from the upper chamber *b* of the condenser, and communicating with the water suction or inlet pipe, and in combination with the internal pipe *f*, leading from the exhaust-steam pipe of the steam-pump, substantially as specified.

In testimony that I claim the foregoing as my invention I affix my signature in presence of two witnesses.

FREDERICK EBENEZER SAXBY.

Witnesses:

FREDERICK JOHN CHEESBROUGH,
JOHN HAMILTON REDMOND,
Both of 15 *Water Street,*
Liverpool, England.