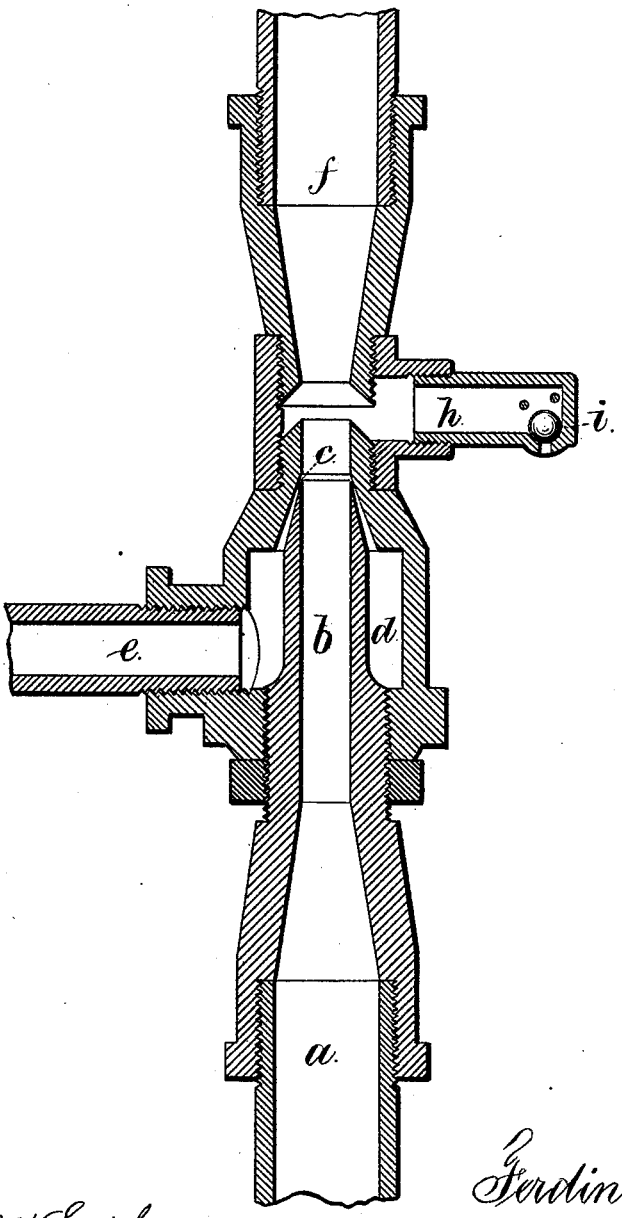
F. STEELE.
Steam Ejector.

No. 196,053. Patented Oct. 9, 1877.



Witnesses
Chas. H. Smith
William G. Mott

Inventor.
Ferdinand Steele.
per Lemuel W. Serrell
Atty

UNITED STATES PATENT OFFICE.

FERDINAND STEELE, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN STEAM-EJECTORS.

Specification forming part of Letters Patent No. **196,053,** dated October 9, 1877; application filed August 28, 1877.

To all whom it may concern:

Be it known that I, FERDINAND STEELE, of Brooklyn, in the county of Kings and State of New York, have invented an Improvement in Steam-Ejectors, of which the following is a specification:

Ejectors have been made in various ways. In some instances the steam-jet has been surrounded by an annular water-way, and in other instances the steamway has been annular and surrounded the tubular water-way. In all these instances the rush of steam lengthwise of the water-way produces behind it a vacuum by driving out the atmosphere, and hence water can be drawn from certain limited depths and forced up to heights proportioned to the pressure of the steam. In all instances the column of water above the ejector is a weight that has to be sustained by the steam.

In some instances I have found, in practice, that the pressure of steam is superior to the weight of the column of water, and tends to produce a vacuum in the lower end of the stand-pipe above the jet, at a point where such vacuum is detrimental, for such vacuum action at that point tends to increase the weight of water that is resisted and sustained by the pressure of steam.

I have therefore arranged my ejector in such a manner that while the vacuum action of the issuing jet of steam will be maintained below the jet of steam, the vacuum-action above the jet of steam will be prevented, in order that there may be no reaction to increase the duty that the steam has to perform in sustaining the column above the jet.

I accomplish this object by the application of an air inlet and valve above the steam-jet in the lower part of the standing column, so that when the force of steam is greater than that required for sustaining the weight of the column of water, air will be drawn into the chamber at the bottom of the stand-pipe, and promote the more rapid delivery of the water upwardly by increasing the volume of the material acting to eject the water. When the steam is sufficient only to sustain the weight of the column of liquid, the air-valve will close automatically.

In the drawing I have represented my improvement by a vertical section.

a is the inlet water-pipe; *b*, the parallel tube through which water is drawn by the annular jet of steam issuing from the mouth *c*. The steam-chamber *d* surrounds the tube *b*, and the pipe *e* supplies steam to the same.

The stand-pipe *f* discharges the water, and near the base thereof is a chamber, *h*, opening laterally into such stand-pipe, and there is a valve at *i*, opening inwardly, so that whenever the issuing jet of steam produces a vacuum action or minus pressure in the base of the stand-pipe, the valve will rise automatically, and allow air to pass into the stand-pipe with the steam and in aid of the same.

I am aware that injectors for steam-boilers have been made with a valve that is opened by a spring to allow the escape of the condensation; but such valve closes by the pressure.

In my ejector the normal condition of the valve is closed, and it is only opened by external atmospheric pressure when there is a vacuum or minus pressure in the stand-pipe.

I claim as my invention—

The combination, with the water-tube, steam-jet, and stand-pipe in an ejecting apparatus, of an inlet-valve and chamber at the base of the stand-pipe, for the purposes and substantially as set forth.

Signed by me this 25th day of August, A. D. 1877.

F. STEELE.

Witnesses:
CHAS. H. SMITH,
WILLIAM G. MOTT.