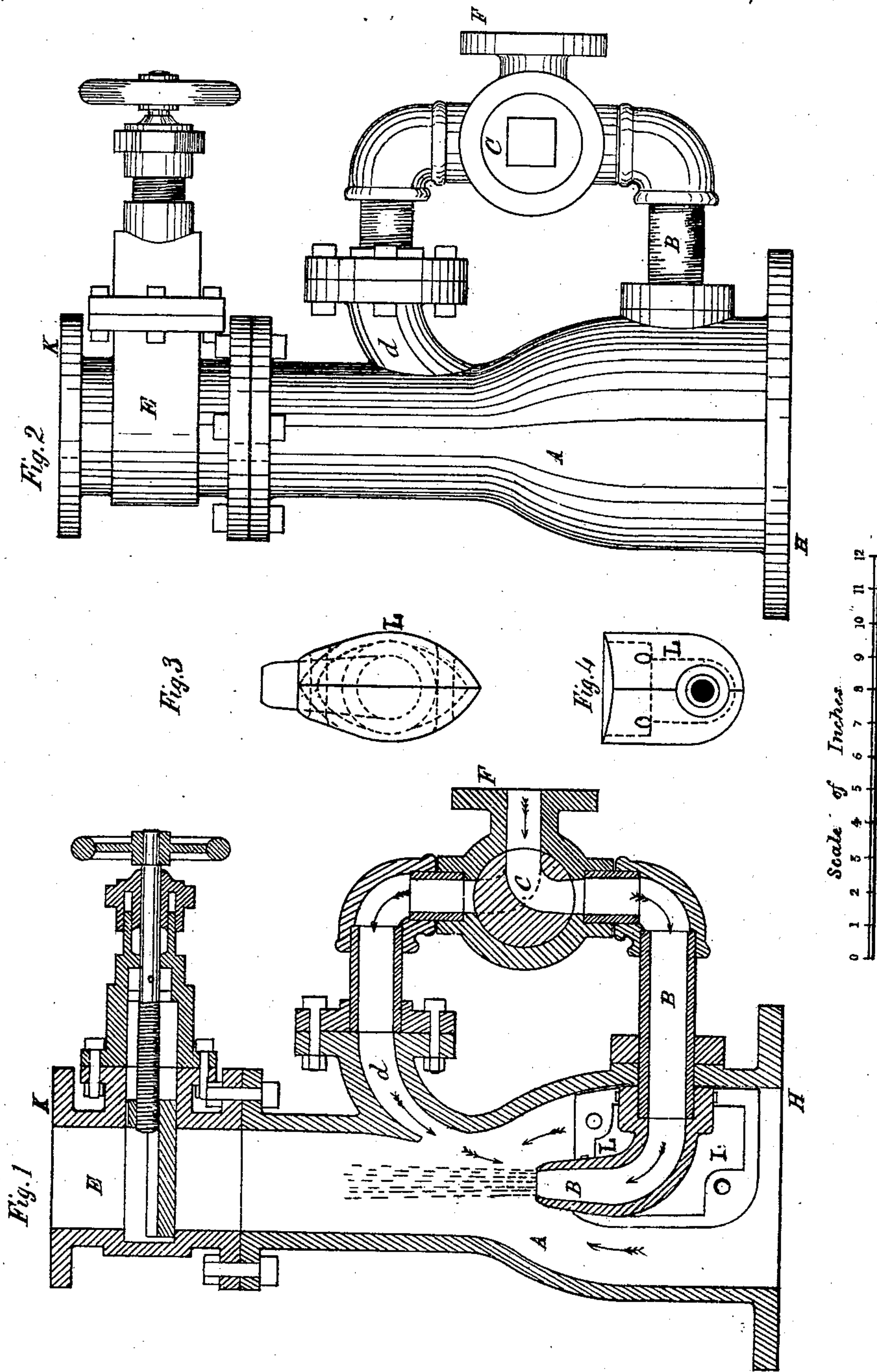


J. D. TOPPIN.  
Steam-Jet Pumps.

No. 134,018.

Patented Dec. 17, 1872.



Witness { *A. P. Young*  
*Charles Gaston*

*John D. Toppin*



# UNITED STATES PATENT OFFICE

JOHN D. TOPPIN, (UNITED STATES NAVY,) OF NEWARK, NEW JERSEY.

## IMPROVEMENT IN STEAM-JET PUMPS.

Specification forming part of Letters Patent No. 134,018, dated December 17, 1872.

*To all whom it may concern:*

Be it known that I, JOHN D. TOPPIN, of the city of Newark, State of New Jersey, have invented certain new and useful Improvements in Steam-Jet or Ejector-Pumps; and declare the following to be a full and exact description of the same, reference being had to the accompanying drawing, in which—

Figure 1 is a vertical cross-section of my improved pump; Fig. 2 is a side elevation of the same; and Figs. 3 and 4 are detached views of the direct-acting steam-pipe and its casing.

In the construction of pumps where steam is used as a direct means of ejecting the water or other fluid it is desirable to have as few obstructions in the pump-chamber as possible in order that the water may not be impeded in its passage through the same; and in order that the steam may not be condensed before acting upon the water it is important that the ejection or direct-acting steam-pipe where it enters the pump-chamber should be protected from the cooling action of the water by a coating of some non-conducting substance. As foreign matters, such as chips, dirt, &c., are liable to enter and obstruct the pump-chamber, or the pipes connecting therewith, it is necessary also to provide convenient and efficient means for removing the same and entirely clearing the pump-chamber of any substances that may have lodged therein.

In the arrangements heretofore in use, (I refer more particularly to the pump of N. S. Chappel, patented August 29, 1865,) which provide a means of reversing the direction of the current of steam so as to clear the pump of obstructions, the construction is necessarily such as to materially clog the pump-chamber, the device for reversing the direction of the current of steam being placed inside of the same, and any attempt to provide the ejection-pipe in such pumps with a coating of non-conducting substance would seriously if not entirely obstruct the pump-chamber.

My improvements relate, first, to the more easy removal of temporary obstructions in the pump-chamber and connecting-pipes by reversing the direction of the current of steam by means of a two-way cock or double-seated valve placed outside of the pump-chamber, thereby causing the steam to enter the pump-

chamber by another passage, situated above the nozzle of the direct-acting steam-pipe, and blowing in the opposite direction; second, to providing the jet or direct-acting steam-pipe, where it enters the pump-chamber, with a peculiarly shaped and constructed casing, which will admit of a non-conducting substance being placed between such casing and the steam-pipe, and at the same time be made of such form as to offer the least possible resistance to the flow of water through the pump-chamber, thereby increasing the quantity of water raised relatively to the steam consumed; third, to the form and construction of the pump-chamber, which I make especially to avoid sharp or abrupt corners or any obstructions which would resist the flow of the water, so that the velocity imparted by the action of an impinging jet of steam may not be retarded or interrupted, as has been the case in pumps of this character heretofore in use.

In order to enable those skilled in the art to make and use my improved ejector-pump, I will proceed to describe its construction and operation.

In the drawing, A represents the main pump-chamber. B is the direct-acting steam-pipe. C is a two-way cock or double-seated valve, which also acts as a stop-cock for letting on and shutting off the steam from the boiler, when desired. *d* is a reverse-acting steam-pipe, for the purpose of introducing the steam into the pump-chamber above the direct-acting pipe B in order to remove any obstructions that may lodge in the chamber A or adjoining pipes, and is connected with the double-seated valve C. E is a gate-valve for closing the delivery-pipe when the pump is not working. L is a casing placed around the nozzle of the direct-acting steam-pipe B, more particularly shown in Figs. 3 and 4, being composed of two shell-like halves, so as to fit closely around the mouth of the pipe B and against the side of the chamber A in order to prevent any water coming in contact with the pipe B, and made in the form of a cut-water, as shown in Fig. 3.

When the pump is ready for use a steam-pipe, connecting with the boiler, is attached to the flange F of the two-way cock, which also acts as a stop-cock. A pipe, connecting with the well or other body of water it is de-



sired to pump, is attached to the lower end of the pump at H, and a delivery-pipe is attached to the upper end at K.

When it is desired to set the pump in operation, assuming sufficient steam in the boiler for that purpose, the valve-gate E is opened and the two-way cock turned into the position shown in Fig. 1, when, the steam being let on, it will blow through the pipe B into the pump-chamber A, in the direction indicated by the arrows, producing a partial vacuum below the steam-jet, causing the water to rise and flow through the pump and driving it into the delivery-pipe. Should any substance too large to pass get into the pump-chamber or pipes connected therewith, by turning the two-way cock to the opposite position the steam will pass through the reverse passage *d*, and the motion of the water being forcibly reversed, any obstructions will be washed out of the pump back into the well and removed from further harm.

It will be perceived that the construction and peculiar form of my pump are such that the water receives the full force of the steam-jet without being retarded in its passage through the chamber A by any obstructions running across said chamber, as is the case in the ejector of N. S. Chappel, above-referred to, and the casing L, which surrounds the ejection or direct-acting steam-pipe B, so as to allow space for the interposition of a non-conducting substance, is constructed in the form of a cut-water, thereby offering slight resistance or obstruction to the fluid passing through

the chamber A. The reverse-acting steam-pipe *d* is also placed in such a position as to offer no resistance to the flow of water or other fluid, and being placed at the upper part of the chamber A and above the direct-acting pipe B, the action of the steam coming from it is more effective in clearing the pump of obstructions, while its connection with the double-seated valve C admits of almost instantaneously reversing the direction of the force of steam in the pump-chamber.

I do not claim the use of a jet of steam for the purpose of pumping water or other fluids, or providing the steam-nozzle with a casing containing non-conducting substance; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. A steam-ejector pump, having a two-way cock or double-seated valve placed outside of the pump-chamber, substantially as and for the purposes shown and described.

2. The casing L, of cut-water form, placed around the direct-acting steam-nozzle, substantially as and for the purposes shown and described.

3. The arrangement and construction of the pump-chamber A with the reverse-acting steam-pipe entering above the nozzle of the direct-acting steam-pipe, substantially as and for the purposes shown and described.

JOHN D. TOPPIN.

Witnesses:

A. P. YOUNG,  
ISAAC GASTON.