No. 615,992. Patented Dec. 13, 1898.

T. E. JONES.

PUMPING APPARATUS.

(Application filed May 6, 1896.)

(No Model.)

Fig. 1.

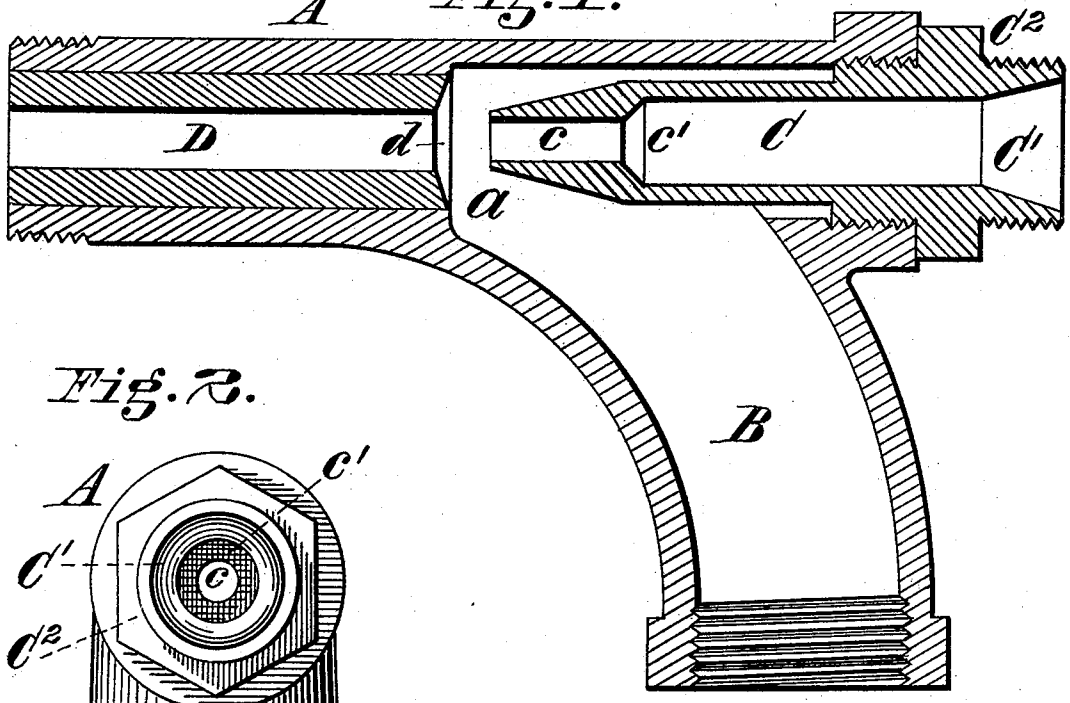


Fig. 2.

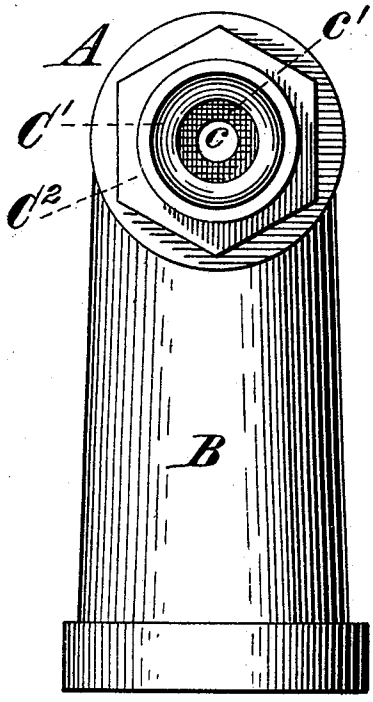


Fig. 4.

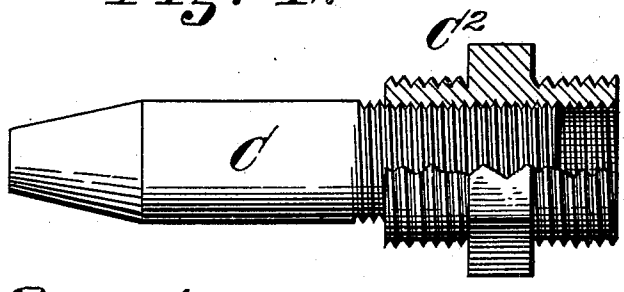
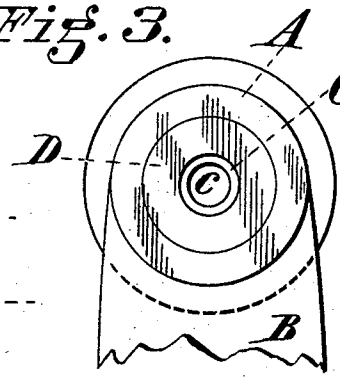


Fig. 3.



Witnesses

L. M. Jones

K. L. Butler

Inventor

Thomas E. Jones

by John E. Jones

his Attorney

UNITED STATES PATENT OFFICE.

THOMAS E. JONES, OF CINCINNATI, OHIO.

PUMPING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 615,992, dated December 13, 1898.

Application filed May 6, 1896. Serial No. 590,435. (No model.)

To all whom it may concern:

Be it known that I, THOMAS E. JONES, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Pumping Apparatus, of which the following is a specification.

My invention relates more especially to improvements in the pumping device or ejector patented by me January 7, 1890, No. 419,126; and it consists in the novel features of construction hereinafter fully described, and particularly set forth in the claim.

In the accompanying drawings, Figure 1 is a central longitudinal section of my invention, showing it supplied with a hollow reducer or bushing in its fluid outlet or discharge end for use in the capacity of both lifting and forcing; Fig. 2, a rear end view; Fig. 3, a fore end view with the pendent Y branch broken off; and Fig. 4, an elevation, partly broken and in section, showing the steam or pressure supply nozzle in a modified form to that seen in Fig. 1, so as to provide for longitudinal adjustment of the nozzle proper or jet-tube within the shell.

A represents the horizontal main portion or body of the shell, having a curved downwardly-turned Y branch B, which latter has an internal screw-thread at its lower end for accommodating the usual vertical suction or lifting pipe. (Not shown.)

C represents the steam-nozzle projecting into the vacuum-chamber *a* of the shell from the rear end of the latter and concentric therewith. I prefer to construct this nozzle of uniform or constant diameter internally up to a point an inch (more or less, as desired) from its outlet or discharge end and then contract the remainder of its bore about one-half, as seen at aperture *c* in Fig. 1, a tapered shoulder or throat *c'* intervening to obviate any material resistance to the steam, which has an even passage under full force and with the friction reduced to a minimum from the tapered inlet-orifice C' to said shoulder or throat *c'*.

Nozzles as heretofore constructed have had a taper bore down to their discharge-orifices, which offers considerable frictional resistance to the steam, growing greater as the passage-way became smaller toward the outlet. My constant bore obviates this great resistance to a material extent, and when the steam passes quickly therefrom into the lesser or contracted orifice *c* it is slightly compressed and emits with greater force from the nozzle into the chamber *a* to produce the necessary vacuum and effectually cause the resultant lifting of the fluid or other matter through the curved branch B from the suction-pipe below. The inner end of the nozzle is preferably tapered back to a line drawn diametrically through the shoulder or throat *c'*, so as to offer as little resistance or obstruction as possible to the onward passage of the liquid at the point where the latter and the steam meet.

In Fig. 1 I show the nozzle and its double screw nipple or coupling C^2 as being made integral to provide for ordinary lifting purposes and provided with a head or enlargement, forming a shoulder, to engage the end of the shell A, so as to make a tight joint; but in Fig. 4 I show a modified form, in which the nozzle is made longitudinally adjustable within said coupling and also detachable therefrom by merely screw-threading the nozzle externally and the coupling internally, whereby the nozzle can be arranged or set forward within the vacuum-chamber to provide for the lifting of warm water or other warm liquids or forcing water running into the shell and set or turned on its thread rearwardly for the lifting or the lifting and forcing of cold water or other liquids. In this form of the device the coupling is also shouldered to produce between it and the shell a tight joint.

In Fig. 1 I show a removable bushing or lining D, driven into place within the outlet or delivery end of shell A, which contracts or reduces the liquid passage-way or aperture to the desired extent for the forcing action of the device and adapts it to use as a force-pump and boiler-feeder. The inner end of the bushing is concaved or made slightly funnel-mouthed at *d* to properly receive the liquid under pressure from the vacuum-chamber and freely guide it to the central bore or contracted aperture, which latter duly registers with the nozzle C.

When the device is used simply as a lift or ejector, the bushing is then omitted or re-

moved, and the liquid raised is thus permitted to pass through the outlet in full volume from below.

Suitable pipe connections (not shown) are made, as usual, to the steam-inlet and the water inlet and outlet, and any desired elastic fluid—such as steam, air, or the like under pressure—may be used in the nozzle.

It will be seen that the rear wall of the curved branch B forms a curved or inclined deflecting-plate extending below the nozzle and adapted to deflect the water forward or toward the discharge-aperture of the device in the operation of the same, so as to prevent as much as possible the contact of the water with the nozzle and the consequent cooling or condensation of the steam within the nozzle.

I claim—

In a pumping apparatus, the combination of a shell open at its ends and having a vacuum-chamber, a curved branch constructed at the rear part of the shell and connecting with the vacuum-chamber at the forward part of the shell, a removable bushing fitted in the outlet-orifice of the shell, a coupling screwing in the rear open end of the shell and provided with a shoulder to engage the rear end of the shell, and a steam-nozzle screwing in said coupling in alinement with said bushing and adapted for lengthwise adjustment in said vacuum-chamber, said steam-nozzle having its discharge end externally tapered and provided with a straight bore contracted at the said discharge end of the nozzle forming a shoulder, substantially as set forth.

In testimony of which invention I have hereunto set my hand.

THOMAS E. JONES.

Witnesses:
JOHN ELIAS JONES,
L. M. JONES.