(Model.) 2 Sheets—Sheet 1.

L. A. CONORD.

EJECTOR FOR RAISING LIQUIDS.

No. 265,246. Patented Oct. 3, 1882.

Fig. 5.

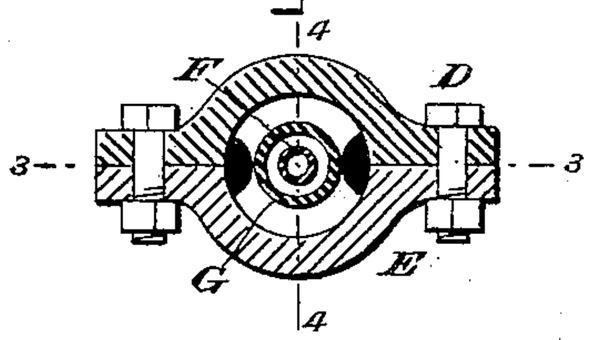


Fig. 1.

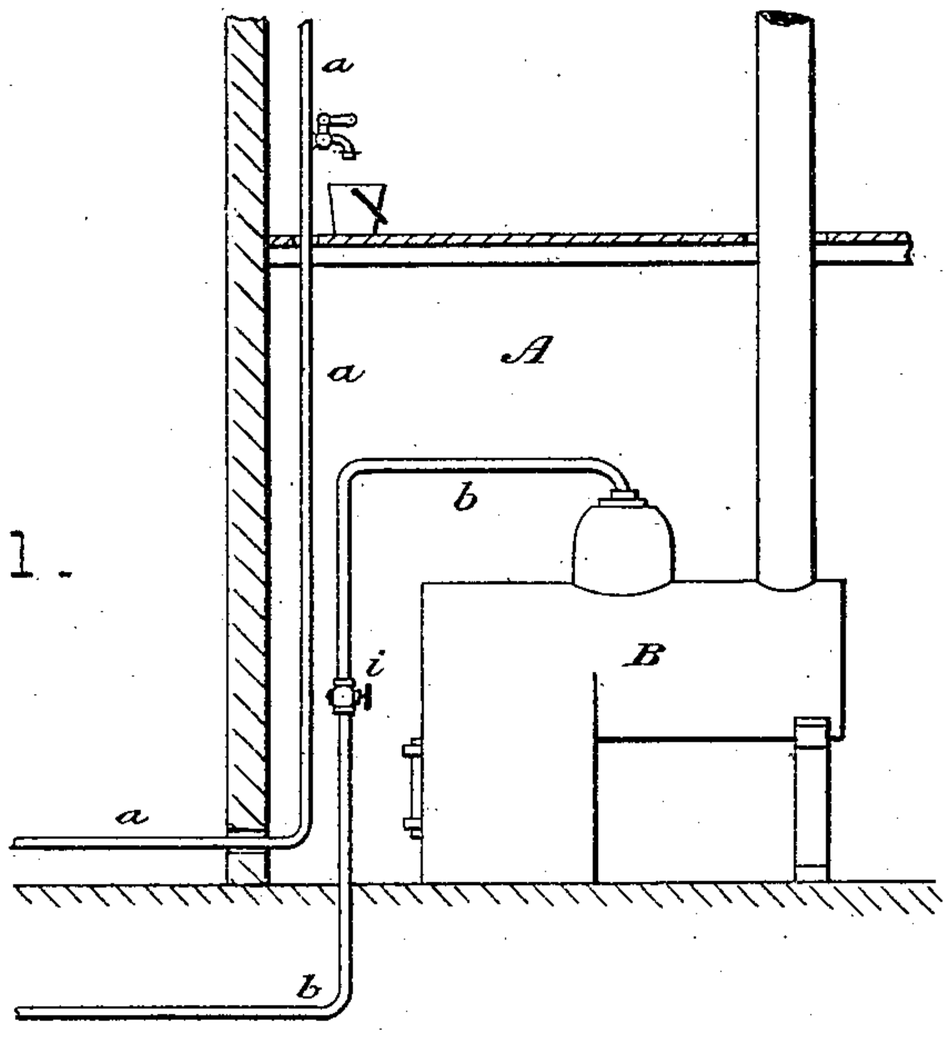


Fig. 2.

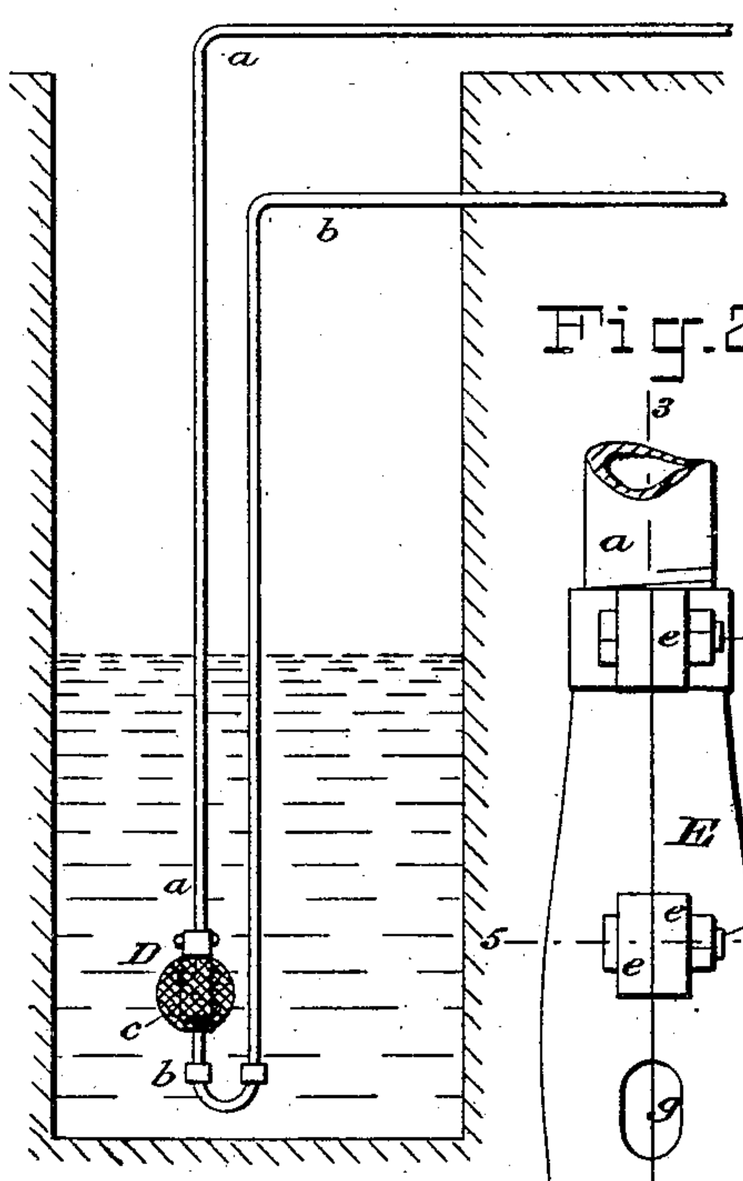


Fig. 3.

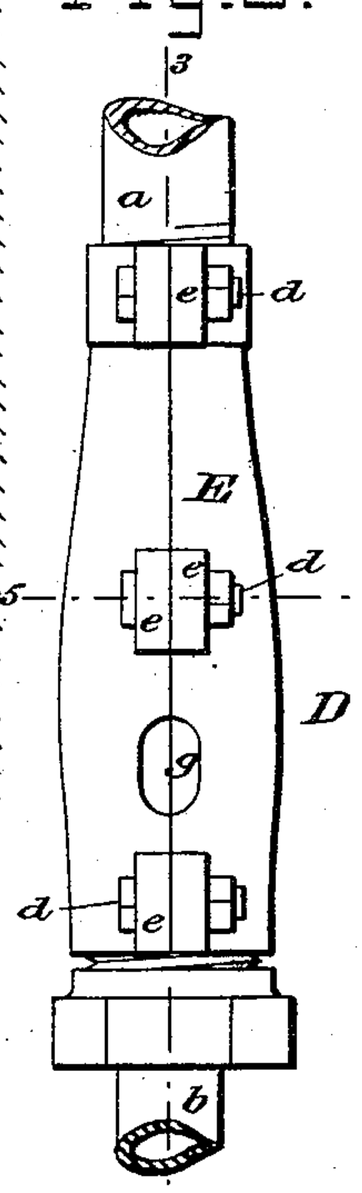
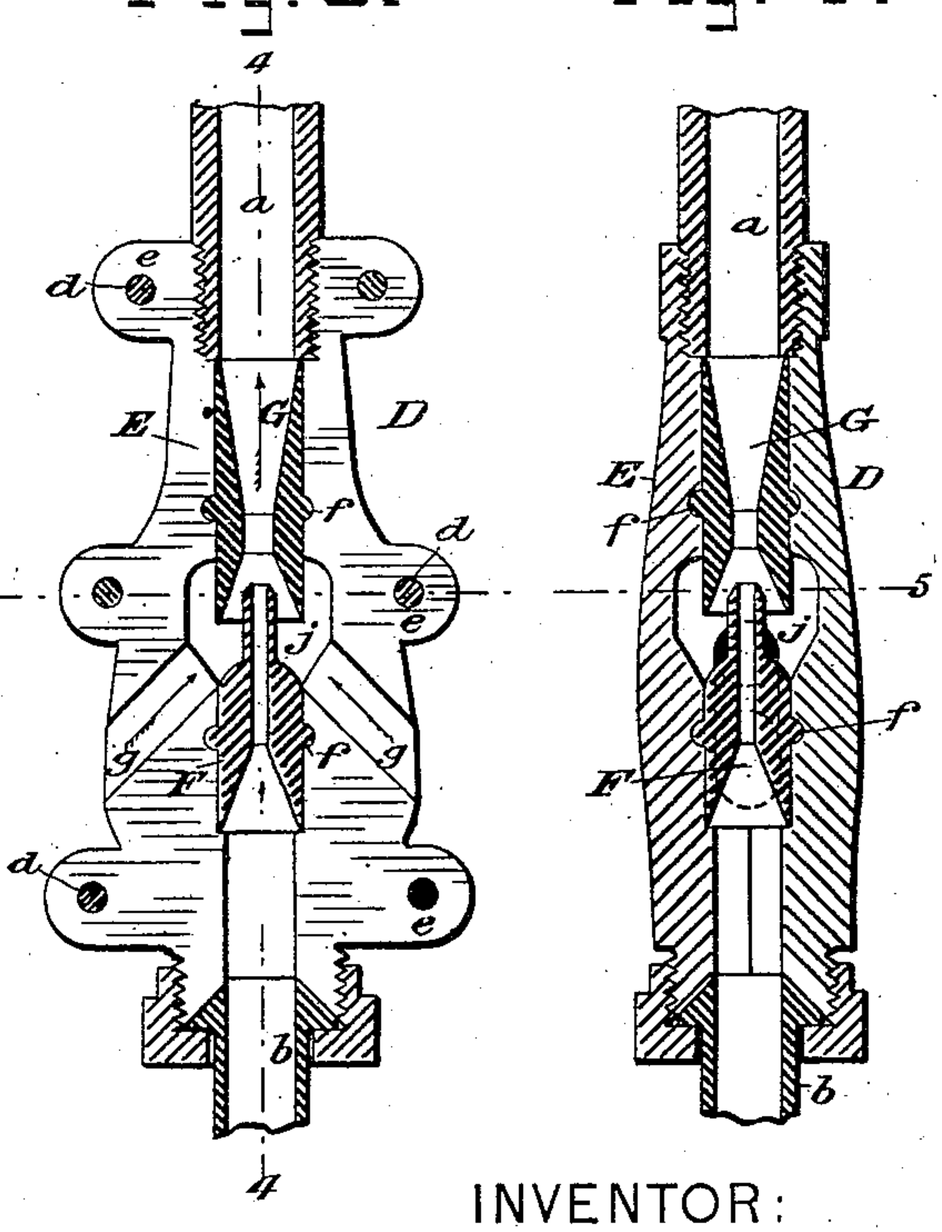


Fig. 4.



WITNESSES:

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(Model.) 2 Sheets—Sheet 2.

L. A. CONORD.

EJECTOR FOR RAISING LIQUIDS

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Fig. 6.

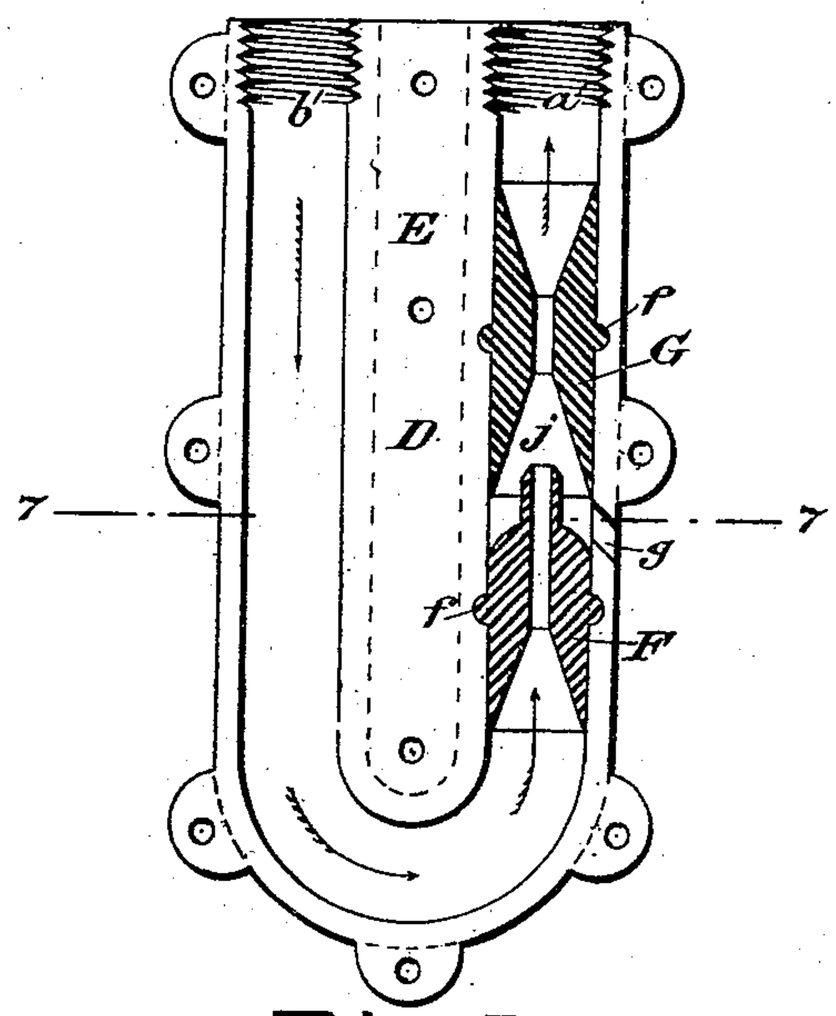
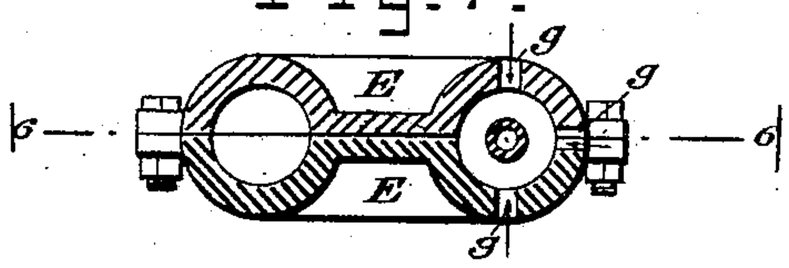


Fig. 7.



WITNESSES:

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UNITED STATES PATENT OFFICE.

LEON A. CONORD, OF ELIZABETH, NEW JERSEY.

EJECTOR FOR RAISING LIQUIDS.

SPECIFICATION forming part of Letters Patent No. 265,246, dated October 3, 1882.

Application filed June 21, 1882. (Model.)

To all whom it may concern:

Be it known that I, LEON A. CONORD, of Elizabeth, in the county of Union and State of New Jersey, have invented certain Improvements in Ejectors for Raising Liquids, of which the following is a specification.

My invention provides a simple device to be immersed in a liquid to be lifted and connected with two pipes, one conveying steam to it under pressure, the other leading from it and conducting the liquid to the point to which it is desired to lift it. This device operates on the injector principle, and in this specification I will refer to it as an "injector."

In the accompanying drawings, Figure 1 is a vertical section of a well and part of a building, showing the application of my invention to lifting the water from the well to the upper floor of the building. Fig. 2 is a side elevation of the preferred form of my injector. Fig. 3 is a longitudinal section thereof cut along the lines 3 3 in Figs. 2 and 5. Fig. 4 is a longitudinal section thereof cut on the lines 4 4 in Figs. 3 and 5. Fig. 5 is a transverse section thereof cut on the lines 5 5 in Figs. 2, 3, and 4. Fig. 6 is a longitudinal section of a modification cut along the line 6 6 in Fig. 7, and Fig. 7 is a transverse section of Fig. 6 cut on the line 7 7.

In Fig. 1, A is the building or other structure into which it is desired to force water through a pipe, *a*.

B is a steam-boiler of any good construction.

b is a steam-pipe leading therefrom, and which should or may be wrapped with a non-conducting covering to avoid condensation.

C is a well of water, and D is my improved injector, shown as covered by a wire cage or strainer, *c*. The steam-pipe *b* enters this injector at the bottom thereof, and the water-pipe *a* leaves it at the top. The injector D is made of an external shell or body portion, E, formed in two halves, and clamped together by bolts *d d* passing through flanges or ears *e e*. The shell E is formed with a bore or tubular channel passing longitudinally through it, and into this are set two tubular pieces, F and G.

F is a steam-nozzle common to injectors, which is fixed into the shell nearest the lower end of its bore, and G is the contracted throat, also common to injectors, which is set into the bore above the steam-nozzle, but with the tip of the latter preferably entering its lower end, as shown. These tubular pieces F and G should be made of hard metal, are exteriorly conformed to the bore of the shell, and are retained in place therein longitudinally by having concentric ribs *f f* formed on them and entering corresponding grooves cast in the opposite halves of the shell E. The bore in the shell is enlarged around the lower end of the throat-tube G and upper end of the nozzle-tube F to form the usual suction-chamber, *j*, into which the water from the well flows through two tubular channels or apertures, *g g*, cast half in each half of the shell. When at rest the water will rise through the injector and fill the pipe *a* to about the same level as in the well, it being thus always in the throat G and in readiness at starting to be immediately acted on by the steam. When the steam is turned on, by opening a cock, *i*, in the pipe *b* it passes through the pipe *b* and enters the nozzle F, where its stream is contracted and its velocity correspondingly increased, so that in entering the throat G it encounters the column of water and sets it in motion, whereupon a stream of water is drawn in through the passages *g g*, and is constantly added to the upwardly-moving column, which continually receives the upward pressure of the steam. By this means I have succeeded in lifting water, either hot or cold, to a height of over eighty feet, and with sufficient steam-pressure it may be lifted to almost any height. Other liquids—as oils, sirups, extracts, &c.—may be lifted as readily, my invention being inapplicable only to those that suffer deterioration from contact with steam or from having the water of condensation mingled with them, or which are too dense to be readily moved by a steam-current.

Instead of steam, compressed air may be used with good effect, an air-compressor or tank of compressed air being substituted for the boiler B.

My form of injector D has the merit of being cheap and simple in its construction and entirely devoid of valves, stop-cocks, vents, dips, and other accessories commonly used on injectors as heretofore made. It is not liable to disarrangement or to become inoperative, ex-

cept by the entrance of dirt, stones, &c., into it with the water, and this is readily prevented by inclosing it in the strainer *c*. The cheapness of construction of my injector constitutes one of its chief merits, rendering it applicable in many circumstances where the expense of a steam-pump would preclude its use. Its compactness, lightness, and durability also contribute largely to its utility, the former making it readily applicable to locomotives for filling their tanks from wells, ponds, rivers, and the like in case of emergency. For this purpose the injector will be fixed to the ends of two parallel pipes, flexible or jointed, so as to permit the injector to be lowered into the water. The only portions of the injector liable to wear are the tubular pieces F and G, and these can be readily renewed at any time by separating the half-shells E E, pulling them out, and putting new ones in their places. The seam where the half-shells join may be packed in any suitable way to prevent undue leakage; but a slight leakage will do no harm, as the injector is immersed in the liquid to be pumped.

Figs. 6 and 7 show a modified construction of the injector. The channel or bore in the shell E extends from the top downward, curves to one side, and extends thence upward, as denoted by the arrows. The tubular pieces F and G are inserted in the upward or right-hand portion of this bore, as shown, the water-pipe *a* being screwed into it at *a'* and the steam-pipe *b* being screwed into the other portion at *b'*. There are three water-inlet passages, *g g*, as shown in Fig. 7. This construction saves the necessity of fitting the steam-pipe *b* with a U-coupling, as in Fig. 1.

I am aware that it is not new to raise water by means of an injector or ejector immersed in the water and employing a jet of steam, and I make no claim thereto.

I claim as my invention—

1. The combination, to form an injector-pump, of a shell, E, formed of two halves divided longitudinally, having a channel in each, forming a longitudinal bore when they are united, and having lateral openings into said bore, with a nozzle-tube, F, and throat-tube G, fitting said bore and fixed in place therein, substantially as set forth.

2. The combination of shell E, made in two separable halves, divided longitudinally, with a longitudinal channel through each, forming a bore or passage when they are united, with nozzle-tube F and throat-tube G, fitting said bore, and having each a rib or shoulder, *f*, entering corresponding grooves in said bore, and with inlet-apertures *g g*, substantially as set forth.

In witness whereof I have hereunto signed my name in presence of two subscribing witnesses.

LEON A. CONORD.

Witnesses:

ARTHUR C. FRASER,

HENRY CONNETT.