(Model.)

W. T. MESSINGER.

EJECTOR.

No. 316,804. Patented Apr. 28, 1885.

Fig: 1.

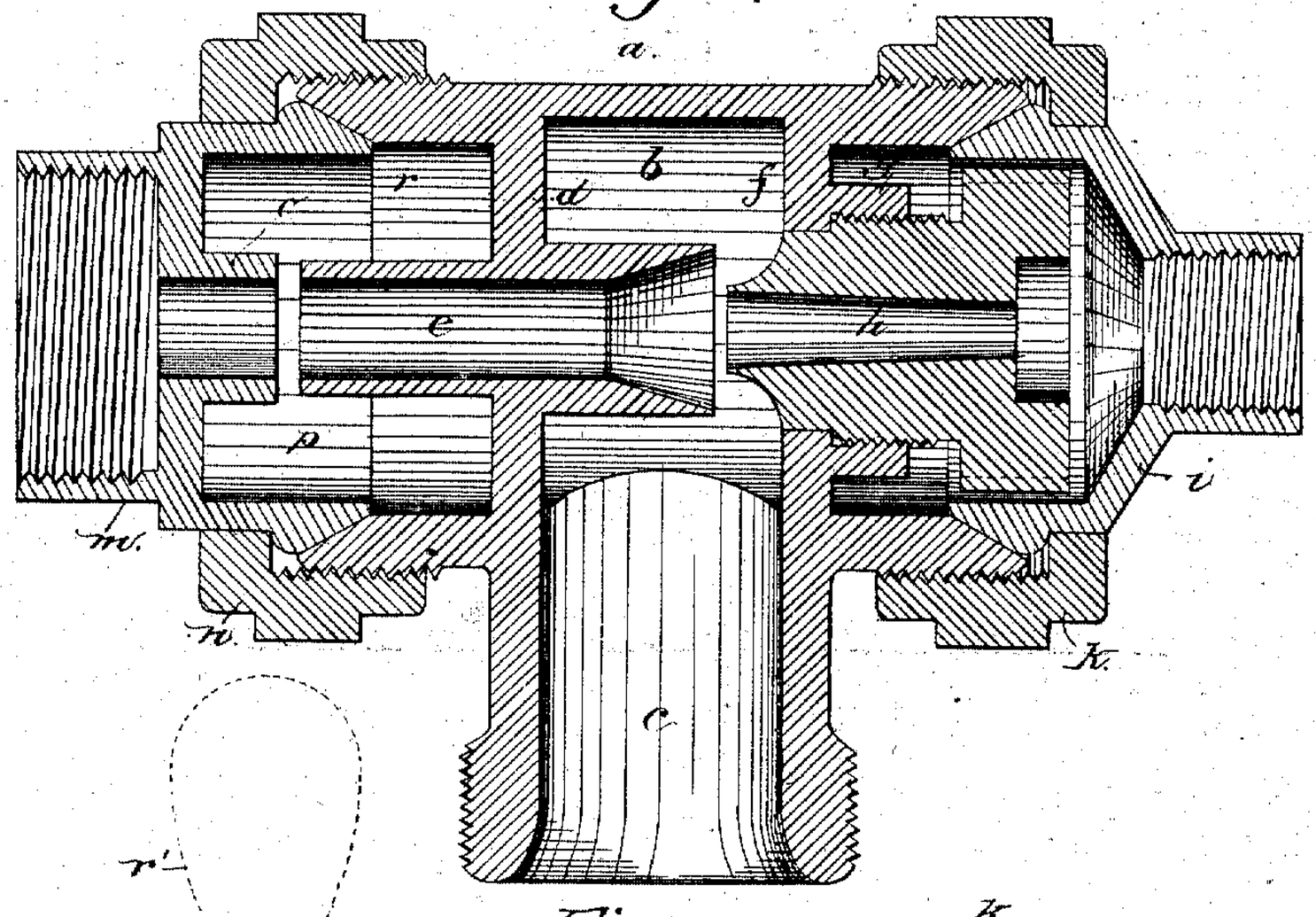
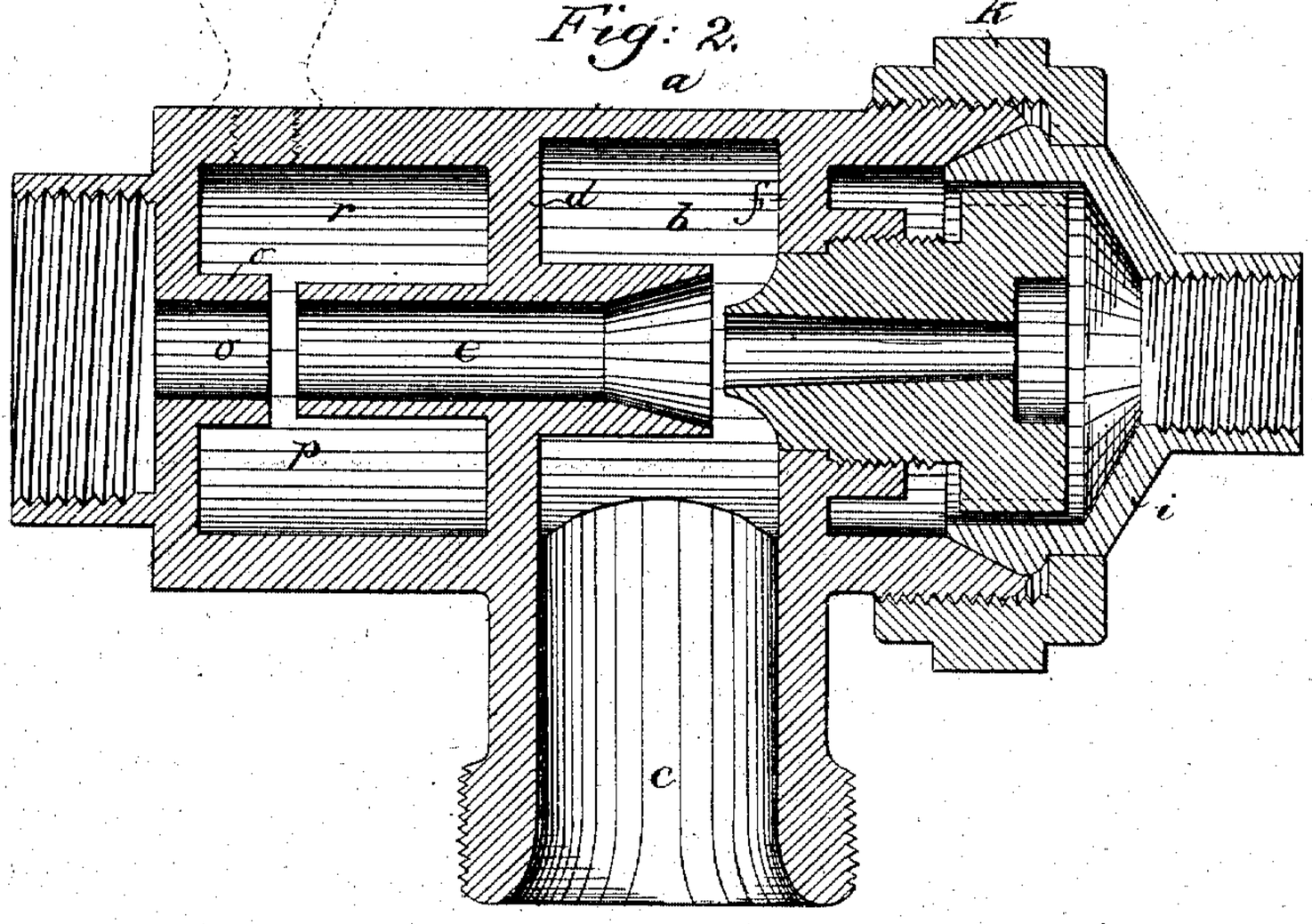


Fig: 2.



Witnesses,
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UNITED STATES PATENT OFFICE.

WILLIAM T. MESSINGER, OF CAMBRIDGE, MASSACHUSETTS.

EJECTOR.

SPECIFICATION forming part of Letters Patent No. 316,804, dated April 28, 1885.

Application filed July 28, 1884. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM T. MESSINGER, of Cambridge, county of Middlesex, State of Massachusetts, have invented an Improvement in Ejectors, of which the following description, in connection with accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention relates to ejectors or steam-jet pumps such as commonly employed for lifting a liquid from a level below the ejector and delivering the same at a higher level.

Apparatus of this class is usually intended to produce a vacuum, so that the liquid is lifted by atmospheric pressure, and the ejectors generally do not have very great forcing power, so that the liquid is not commonly delivered at a level much above the ejector itself or against any considerable back-pressure. It results from such construction of the ejector that in case there is a momentary back-pressure or obstacle to the delivery of the fluid the flow of the latter ceases, and the jet of steam is diverted into the suction or liquid-supplying pipe, thus destroying the vacuum and preventing the subsequent operation of the ejector, making it necessary to stop the flow of steam and cool the apparatus before a vacuum can again be created and the pumping operation started.

The object of my invention is to overcome such objections and to produce an ejector the operation of which will not be stopped by a momentary back-pressure or obstacle to the flow of the liquid being delivered.

The invention consists in an ejector having the usual steam-jet nozzle, water-inlet chamber, and combining-tube, combined with a vacuum-chamber and an auxiliary delivering tube or nozzle, the inlet end of which is opposite the delivery or outlet end of the combining-tube, there being a small space between them, forming an annular passage communicating with the vacuum-chamber. The flow of the fluid through the combining and delivering tubes will remove the fluid contents from the vacuum-chamber, producing a vacuum therein, and in case an obstruction should arise to the delivery of the liquid in its proper channel the liquid will be received in the vacuum-chamber until the obstruction is removed, when the liquid will pursue its proper course from the delivery-tube, and the vacuum-chamber will again be emptied ready to receive the liquid if its flow should be again interrupted.

Figure 1 is a longitudinal section of an ejector embodying this invention, and Fig. 2 a similar section showing a modified construction.

The ejector consists, essentially, of a main piece or casting, *a*, having an internal chamber, *b*, provided with an inlet-passage, *c*, for the liquid to be raised, the partition *d* at one side of the said chamber supporting the combining-tube *e*, shown in this instance as a portion of the same casting. The partition *f* at the other side of the said chamber is provided with a threaded neck, *g*, which receives and supports the steam-jet nozzle *h*, which is tightly screwed into the said neck, being thus held rigidly with relation to the main casting *a*, with a perfectly-tight joint between the said nozzle and casting.

The main casting *a* is preferably threaded at both ends, as shown in Fig. 1, and at the end adjacent to the steam-nozzle *h* has a steam-inlet piece, *i*, connected with the main casting *a* by a coupling-nut, *k*. A liquid-delivery piece, *m*, is connected with the other end of the said main casting *a* by a coupling-nut, *n*, similar to the one *k*, the said piece *m* having an auxiliary delivery-tube, *o*, in line with the combining-tube *e*, but separated therefrom by a small space constituting an annular passage, *p*.

The portion of the casting *a* surrounding the delivery end of the combining-tube *e* and portion of the casting or delivery-piece *m* surrounding the delivery-tube *o* constitute a tight chamber, *r*, communicating through the passage *p* with the interior of the tubes *e o*, and when the ejector is in operation the jet passing through the nozzle *h* and then through the combining-tube *e* creates a vacuum in the chamber *b*, causing a liquid to be received from a lower level through a conduit connected with the inlet *c*, and the combined jet or stream passing through the combining-tube *e* and into the delivery-tube *o* operates to remove the contents from the chamber *r*, producing a vacuum therein, and in case a momentary ob-

struction should occur, interrupting or retarding the flow of fluid through the delivery-passage *o* and pipe leading therefrom, the liquid will still continue to flow through the combining-tube *e*, entering the vacuum-chamber *r*, which thus relieves the combining-tube and chamber *b* from back-pressure until the obstruction is removed, when the flow will continue through the delivery-passage, as before, emptying the vacuum-chamber, which will thus be ready to receive the liquid again in the event of another obstruction.

In the modification shown in Fig. 2 the vacuum-chamber *r* and the delivery-tube *o* are made in the main casting *a* by suitable coring, and it is obvious that the invention is not limited to any particular shape or size of the said vacuum-chamber.

If it is found desirable to increase the space in the vacuum-chamber beyond what is convenient to provide for in the main casting or ejector proper, an auxiliary chamber, as shown at *r'*, Fig. 2, may be connected with the main portion of the injector, so as to communicate with or form part of the vacuum-chamber *r*, care being taken that the said auxiliary chamber and the joint between it and the main portion of the ejector is perfectly air-tight, so that when the ejector is operating properly the entire space within the said chamber *r r'* will be emptied, producing a vacuum therein.

I claim—

1. In an ejector, the combination of the steam-nozzle, water-inlet chamber, and combining-tube with a vacuum-chamber in the body of the ejector communicating with the said combining-tube at its delivery end and an auxiliary vacuum-chamber extended to the ejector, substantially as and for the purpose set forth.

2. In an ejector, the main casting threaded at both ends and comprising a water-inlet chamber and combining-tube, combined with a steam-nozzle, a steam-inlet piece coupled upon one end of the main casting, and an outlet-piece having a liquid-delivery tube in line with the combining-tube coupled to the other end of the main casting, with which it forms a vacuum-chamber communicating with the combining-tube, substantially as described.

3. In an ejector, the main casting having a water-inlet chamber and combining and delivery tube integral therewith, combined with a diverging steam-nozzle connected with the said main casting at one side of the water-inlet chamber, an auxiliary delivery-tube arranged in line with the delivery end of the combining-tube, but separated therefrom by a small space, and a tight vacuum-chamber surrounding the delivery end of the combining-tube and the receiving end of the auxiliary delivery-tube, substantially as and for the purpose described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WM. T. MESSINGER.

Witnesses:
JOS. P. LIVERMORE,
B. J. NOYES.

Corrections in Letters Patent No. 316,804.

It is hereby certified that in Letters Patent No. 316,804, granted April 28, 1885, upon the application of William T. Messinger, of Cambridge, Massachusetts, for an improvement in "Ejectors," an error appears in the printed specification requiring correction, as follows: In line 24, page 2, the word "injector" should read *ejector;* and that the Letters Patent should be read with this correction therein to make it conform to the record of the case in the Patent Office.

Signed, countersigned, and sealed this 30th day of June, A. D. 1885.

[SEAL.]

H. L. MULDROW,
Acting Secretary of the Interior.

Countersigned:

M. V. MONTGOMERY,
Commissioner of Patents.