

(Model.)

J. DESMOND.
STEAM INJECTOR.

No. 356,682.

Patented Jan. 25, 1887.

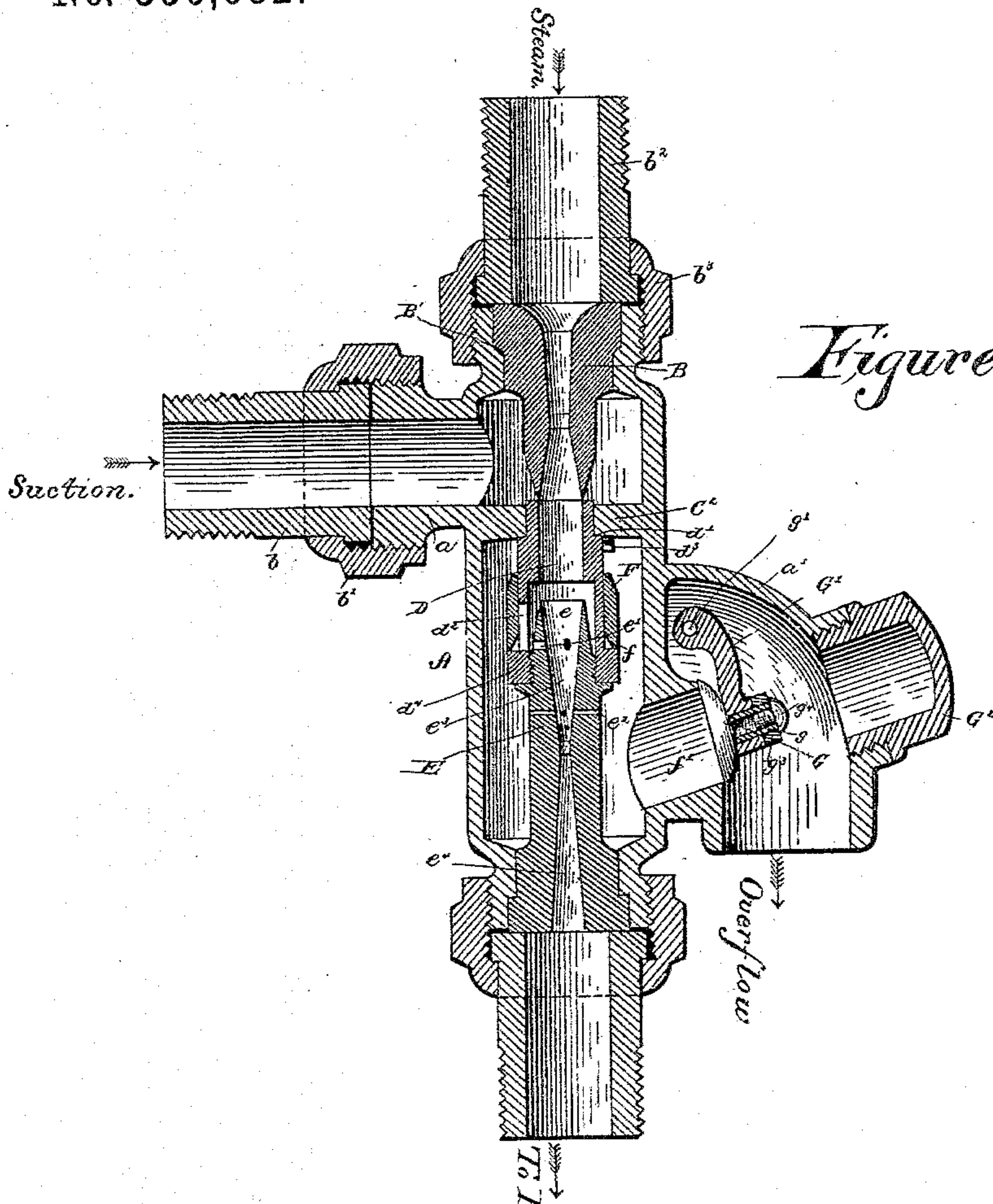


Figure 1.

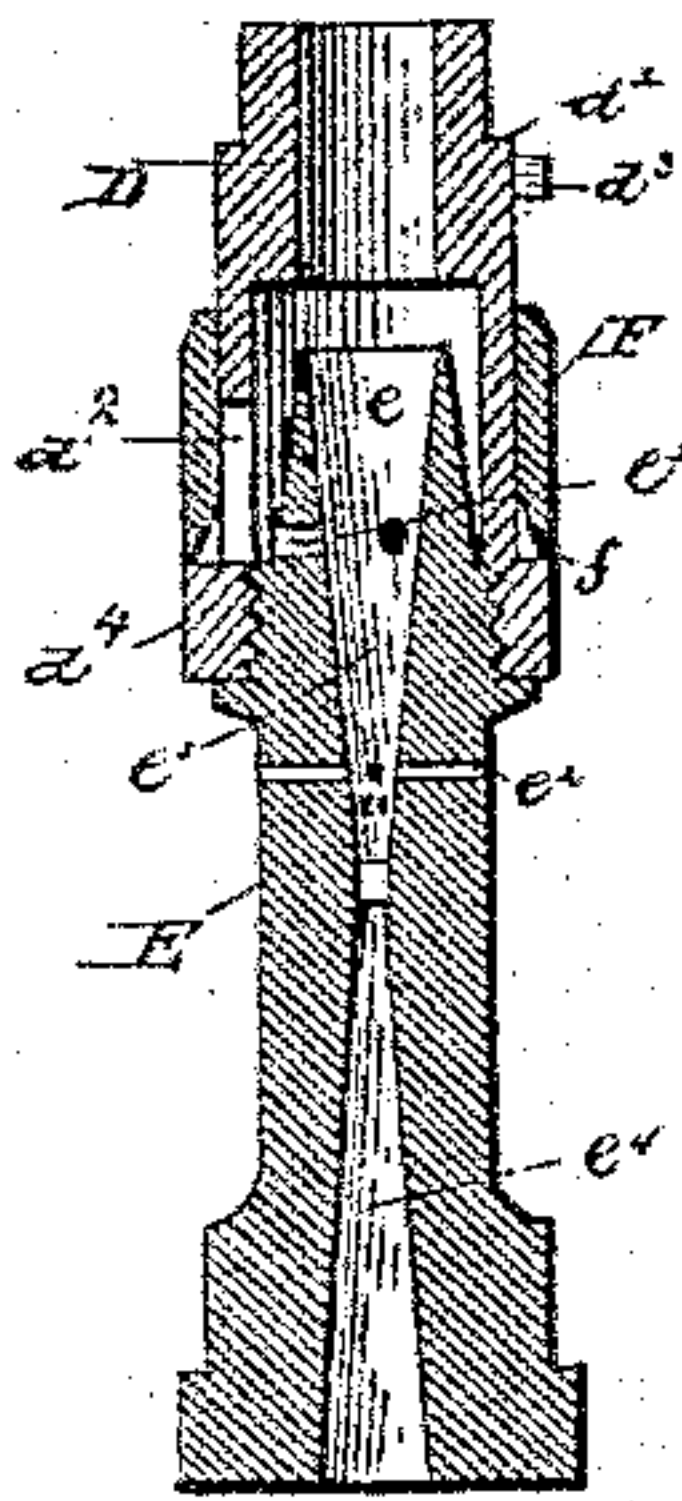
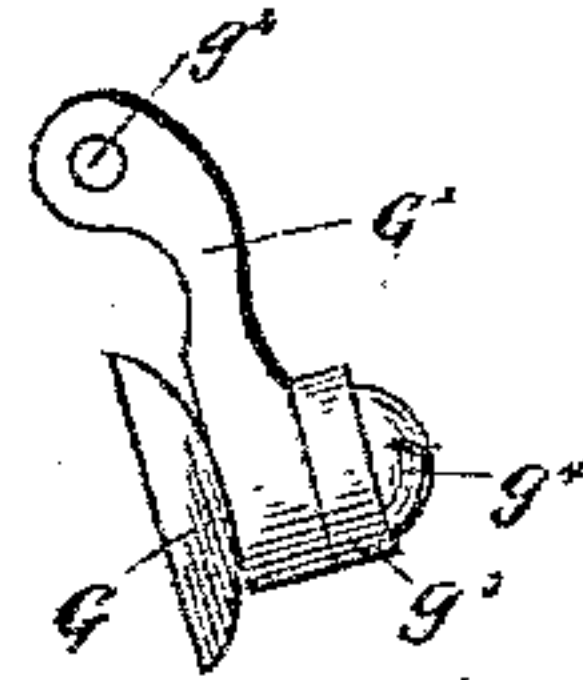


Figure 2.

Figure 3.



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UNITED STATES PATENT OFFICE.

JOHN DESMOND, OF DETROIT, MICHIGAN, ASSIGNOR TO THE PENBERTHY INJECTOR COMPANY, OF SAME PLACE.

STEAM-INJECTOR.

SPECIFICATION forming part of Letters Patent No. 356,682, dated January 25, 1887.

Application filed September 4, 1886. Serial No. 212,728. (Model.)

To all whom it may concern:

Be it known that I, JOHN DESMOND, a citizen of the United States of America, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Steam-Injectors, of which the following is a specification, reference being had therein to the accompanying drawings.

10 This invention pertains to certain new and useful improvements in steam-injectors, having for its object to provide means for the opening of the exhaust-ports of the lifting-tube on starting the injector, and the ready
15 closing of the same when a vacuum is formed around the inner inclosed end of the combining-tube; and my invention also embodies an improved overflow-valve; and it consists in the detailed construction, combination, and arrangement of the parts, substantially as hereinafter fully set forth, and particularly pointed
20 out in the claims.

In the accompanying drawings, Figure 1 is a vertical sectional view of an injector embodying my invention, and Figs. 2 and 3 are detail views thereof.

In carrying out my invention I employ a casting or tubular casing, A, having two lateral arms, a a' , the former, a , having in practice suitable connection by a separable screw-threaded pipe-section, b , with a water-pipe leading from the source or supply of water. The screw-threaded pipe-section is secured to the said arm a by an ordinary coupling-nut, b' .

35 Within the normally upper or steam-supply end of the casing A is secured the steam-jet pipe B, the same having a contracted or diminutive passage extending through it, and is provided on its outer surface with a stepped annular shoulder or disk, B' , fitting partly
40 within and partly against the receiving end of the casing, and is thus secured by an ordinary screw-threaded pipe-section, b^2 , and coupling-nut b^3 , similar in all respects to the before-described pipe-section and coupling-nut.

45 The casting or tubular casing A comprises a water-supply chamber, C, and an overflow water-chamber, C' , the same being separated by an apertured wall, C^2 , the purpose of which latter will soon appear.

D is an apertured lantern-shaped lifting-tube, the upper contracted end of which rests within the apertured wall C^2 , said end having a shoulder, d' , formed by the upper outer end of the apertured wall d^2 . The extreme lower
55 end of said apertured wall d^2 of the lifting-tube is made integral with a large flanged portion or disk, d^4 , the inner surface of which is screw-threaded for securing the lifting-tube on a correspondingly-threaded portion of the
60 inner tapered end, e , of the combining-tube E. This combining-tube is provided with a small flange or shoulder for fitting snugly against the outer surface of the flanged portion or
65 disk d^4 of the lifting-tube, and the tapered end e of the combining-tube, which projects up into the center of said lifting-tube, is provided with opposite lateral passages or apertures, e' , which, when the combining-tube is
70 screwed "home," are each directly opposite an aperture formed in the wall of the lifting-tube. The outer end of the combining-tube is made integral with the inner end of the delivery-tube E' , the point where said tubes
75 meet being provided with opposite lateral passages, e^2 ; but I do not make any claim to forming integral the combining and delivery tubes, as the same is shown and described in Letters Patent No. 343,139, granted to William Penberthy on June 1, 1886. The outer end of the
80 delivery-tube is fitted within the delivery end of the casting or casing by an ordinary pipe-section and coupling-nut. The combining and delivery tubes are of course provided with the usual tapered passages, e^3 e^4 , respectively.

Upon the outer surface of the apertured wall d^2 of the lantern-shaped lifting-tube is fitted so as to loosely slide thereon a wide ring or band, F, the movement thereof being limited
90 by a small stud or projection, d^3 , secured on the outer side of the combining-tube, near the shoulder d' . This ring or band has a portion of its inner surface removed near its lower end, forming an inclined circular shoulder or
95 flange, f , around its entire inner surface, the purpose of which will hereinafter appear.

Within the lateral curved arm a' is secured the overflow-valve G, the same consisting of a disk fitting over the overflow hole or opening
100

f' , formed in the wall of the casting or casing at that point, and this disk has a hollow sleeve or cylindric extension, g , projecting from its rear side, upon which is passed one end of an arm, G' , the other end of said arm being pivoted by a small cross bar or rod, g' , secured at its ends in apertured lugs formed on the upper portion of either side wall of the curved lateral arm a' . After passing the end of arm G' on the sleeve or extension g , a small washer, g^3 , is also passed or inserted thereon, and the same are secured in position by means of a small screw, g^4 , screwed into the outer open end of said sleeve or extension, the latter having for this purpose a female screw-thread formed on its inner surface.

The outer side of the wall or casing around the overflow hole or opening f' is so formed as to cause the valve, when in its normal position, to occupy a slanting or inclined position, thus always insuring the seating of the disk over the overflow hole or opening. The extension g is screw-threaded, so as to regulate its adjustment on the end of the pivoted arm G' . The curved lateral arm is provided on its outer curved portion with an ordinary screw-cap, G^2 , permitting easy access to the overflow-valve when desired.

The operation is as follows: Steam being admitted into the jet-pipe passes through the tapered passage thereof into the tapered projecting end of the lifting-tube, causing the lifting of the water into the water-supply chamber. The steam, first passing into the lantern-shaped portion of the lifting-tube, striking against the inclined circular shoulder f , formed on the inner surface of the ring or band, will force said ring or band upward out of its normal position, and passing out into the overflow-chamber (also out through the opposite lateral outlets between the combining and delivery tubes) will raise the overflow-valve from its seat, thus producing, by reason of its easy access to the atmosphere, a vacuum, causing suction, which immediately elevates the water through the passages in the lifting, combining, and delivery tubes. Immediately upon the formation of a vacuum around the inner inclosed end of the combining-tube, the ring or band closes down over the apertures in the lantern-shaped portion of the lifting-tube, assuming its normal position. The closing of the ring or band shuts off the overflow of any steam or water, and enables the injector to start automatically at any pressure at which it will cause the elevation and injection of the water.

From the foregoing it will be seen that the sliding ring or band, in connection with the lantern-shaped lifting-tube, serves the purpose

of a sliding tube, as heretofore used in this class of inventions, and the same is not liable to get out of order from frequent usage, as is the case with the sliding tube; also, that the overflow-valve is so disposed as to operate automatically, and is void of all spring-pressure.

Having thus fully described my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the casing having the overflow-chamber, the apertured lantern-shaped lifting-tube, and the combining and delivery tubes, of the ring or collar fitted to slide on said lifting-tube and having an inclined circular shoulder on its inner surface, substantially as shown and described.

2. The combination, with the combining and delivery tubes, of the lifting-tube provided with the lantern-shaped portion and the ring or band sliding on said lifting-tube, substantially as shown and described.

3. The combination, with the lifting-tube, of the ring or band having an inclined circular shoulder on its inner surface, substantially as shown, and for the purpose described.

4. The combination, with the delivery and combining tubes, the latter having opposite lateral passages, and the lifting-tube, of the sliding ring or band, substantially as shown and described.

5. The overflow-valve consisting of the disk having a sleeve or extension and the pivoted arm secured thereon, substantially as shown and described.

6. The combination, with the casing having a curved lateral arm, of the pivoted arm and the disk having an internally-threaded extension fitted in the free end of said arm, substantially as shown and described.

7. The combination, with the casing having its outer wall inclined around the overflow-opening and the lateral arm, of the overflow-valve pivoted in said arm and occupying the described relative position to said opening, substantially as shown and described.

8. The herein-described injector, comprising the casing, the water-supply and overflow chambers, the lifting, combining, and delivery tubes, the sliding ring or band, the curved lateral arm, and the overflow-valve consisting of the pivoted arm, and the disk having an extension secured by said arm, substantially as shown and described.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN DESMOND.

Witnesses:

JNO. B. CORLISS,
SOLIN JOHNSON.