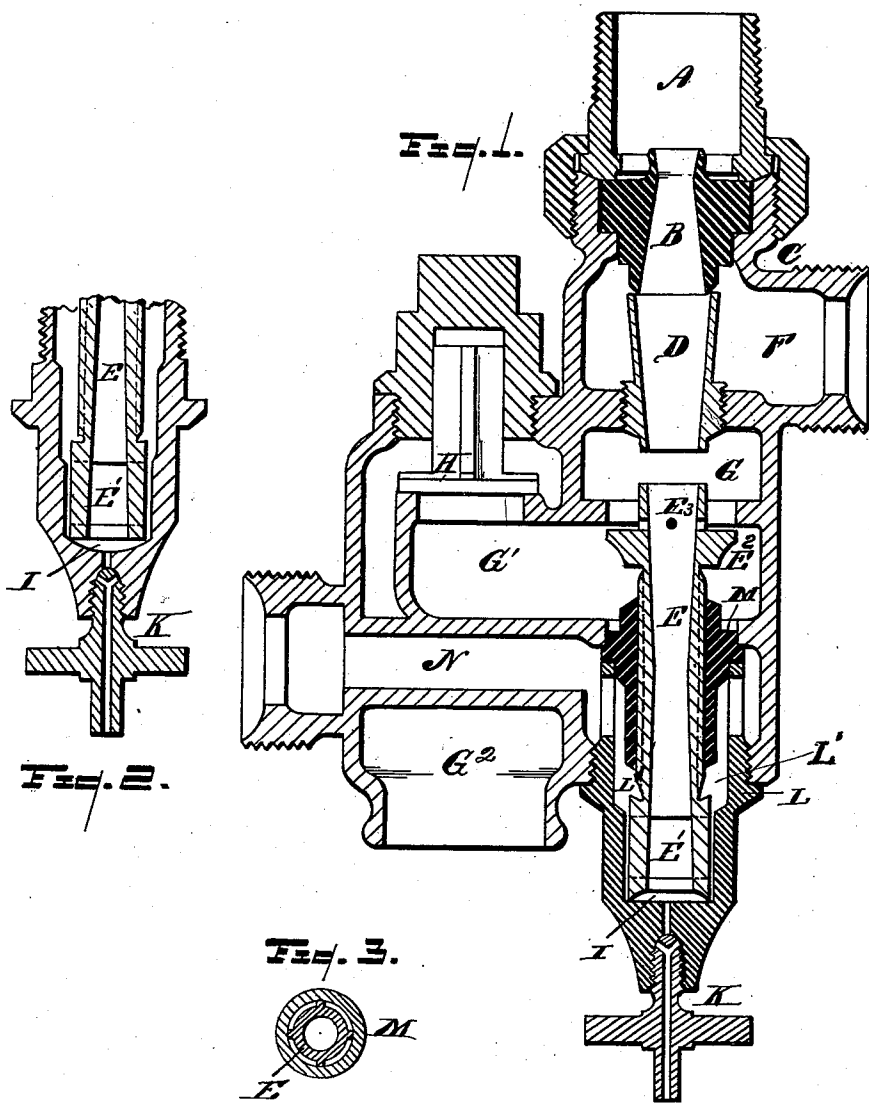


(Model.)

J. TRIX & J. DESMOND.  
INJECTOR.

No. 534,304.

Patented Feb. 19, 1895.



WITNESSES  
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# UNITED STATES PATENT OFFICE.

JOHN TRIX AND JOHN DESMOND, OF DETROIT, MICHIGAN, ASSIGNORS TO  
THE AMERICAN INJECTOR COMPANY, OF SAME PLACE.

## INJECTOR.

SPECIFICATION forming part of Letters Patent No. 534,304, dated February 19, 1895.

Application filed October 15, 1892. Serial No. 448,952. (Model.)

*To all whom it may concern:*

Be it known that we, JOHN TRIX and JOHN DESMOND, both of Detroit, in the county of Wayne and State of Michigan, have invented  
5 new and useful Improvements in Injectors, of which the following is a specification.

The invention which is the subject of this specification has for its object two things: first, to bring to bear an increased lifting  
10 pressure on the adjustable delivery tube of an injector at the moment when the current of water through the same is established and the tube is to be lifted to its proper working position; second, to so arrange the  
15 water discharge tube in relation to the overflow that they shall both be placed upon the front side of the injector, whereby the injector may be used in any position on a boiler, instead of requiring to be made with right  
20 and left arrangements of the parts, one of which injectors must be used when the attachment is on one side of the boiler, and another when the attachment is to be on the other side of the boiler, so that instead of  
25 making two styles of injectors we can accommodate any demand by making a single one.

In the annexed drawings making part of this specification, Figure 1—is a vertical central section of the injector showing the inlet  
30 and discharge pipes. Fig. 2—is a similar section of the lower end of the injector showing a slight modification therein. Fig. 3 is a view in cross section.

The same letters are employed in all the  
35 figures in the indication of identical parts.

A, is the steam pipe.

B, is a steam jet in the upper end of the casing C of the injector.

D, is the combining tube in which the steam  
40 and water mingle, and E is the delivery tube.

F, is the water induction pipe.

G, is the overflow which communicates with the chamber G', delivering water to the overflow-outlet pipe G<sup>2</sup>.

45 H, is the check valve in the overflow chamber.

E', is a cage at the lower end of the delivery tube, which is made with bars to afford a free outlet of the water into the outflow chamber L', which is within the cage-formed plug  
50 L, tapped into the lower end of the casing C,

and extended up into the same to the sleeve M which is supported thereon in the interior of the casing.

The external surface of the delivery tube 55 E, where it passes through the collar M, has ribs formed on its exterior surface to serve as guides in its vertical movement through the collar M. It is flanged at the upper end at E<sup>2</sup> to form a valve, and has holes E<sup>3</sup> by 60 which water may be delivered from the converging portion of the pipe into the overflow chamber in starting.

All of the foregoing portions are common and well known and need no detail description.

The collar M rests upon the upper end of the cage-formed plug L, the latter being secured in the external casing, as described. The normal position of the delivery tube E 70 is that shown in Fig. 1. Its weight is supported upon the bottom of the recess in which it stands. The ribs on the external surface of the tube, besides forming guides for confining it in place in the sleeve M, also leave 75 water channels formed by the surface of the tube, the sleeve M and the sides of the ribs. When the machine is at rest the upper ends of these channels extend above the top of the sleeve so as to leave a water passage upward 80 immediately below the flanges of the valve E<sup>2</sup>, as shown. As the water begins to run through the delivery tube E, it will pass outward between the bars, and up over the top into the space between the caged end E' of 85 the delivery tube and the lower end of the sleeve, and rise through the channels inside of the sleeve between the bars, and press against the lower face of the flange valve E<sup>2</sup>. When the current is fully established, that 90 tube will be forced upward, so that the top of the cage E' will bear against the lower end of the sleeve M, thus forming a valve which will shut off the water from rising through the channels between the ribs and out 95 through the overflow, forcing it to take its course through the outflow pipe N. At the same time that the water takes its course upward through the channels between the tube E and collar M, it will enter the chamber I 100 and exert a lifting pressure, so that the delivery tube is acted upon not only by a press-

ure at its upper end, but also by pressure at its lower end, thereby securing a more prompt action at the instant a current is formed.

In injectors as usually constructed, the water inlet is on one side, the water discharge on the opposite side, and the overflow chamber is arranged on the right or left side of the casing. This, as we have said, requires an injector to be selected which can be fitted onto a boiler in one position or the other. To avoid this, we have constructed the overflow chamber on the side opposite to the water inlet pipe, and where the water discharge pipe N is placed. We do not change the ordinary position of this water discharge pipe, but we enlarge the overflow chamber, and pass the water delivery pipe through it, as clearly shown in the drawings. The chamber extends around the water delivery pipe, having free exit for the overflow, but having no communication with the water discharge pipe.

The pet cock K is for drawing water from the interior, and is not claimed herein.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. In an injector, in combination with the automatically adjustable delivery tube E, provided with a cage at the lower end through which the water escapes laterally when the valve is open, and having also an opening in the lower end, and the recess which receives the same, a chamber I between the end of

said tube and the bottom of said recess, whereby a pressure of water against the lower end of the tube is effected at the starting of its current, substantially as set forth.

2. In combination with the casing of an injector, the sleeve M, cage-formed plug L, and the automatic reciprocating ribbed delivery tube E, formed with a flange valve E<sup>2</sup> at one end and a cage E' at the other, the construction and arrangement being such that when the injector is in action a free passage is left, outside the tube, from the top of the cage to the bottom of the flange and communicating with the overflow, which passage is automatically closed by the establishment of a water current, opening another passage to the water outlet pipe, substantially as set forth.

3. In an injector, in combination with the lifting and delivery elements, an overflow and a water discharge conduit arranged to pass one another in the same inclosing enlargement on one side of the casing, substantially as set forth.

In witness whereof we have hereunto subscribed our names in the presence of two attesting witnesses.

JOHN TRIX.  
JOHN DESMOND.

Witnesses:

R. MASON,  
M. A. HOWEY.