

(Model.)

H. F. COLVIN.

INJECTOR.

No. 284,614.

Patented Sept. 11, 1883.

Fig. 1.

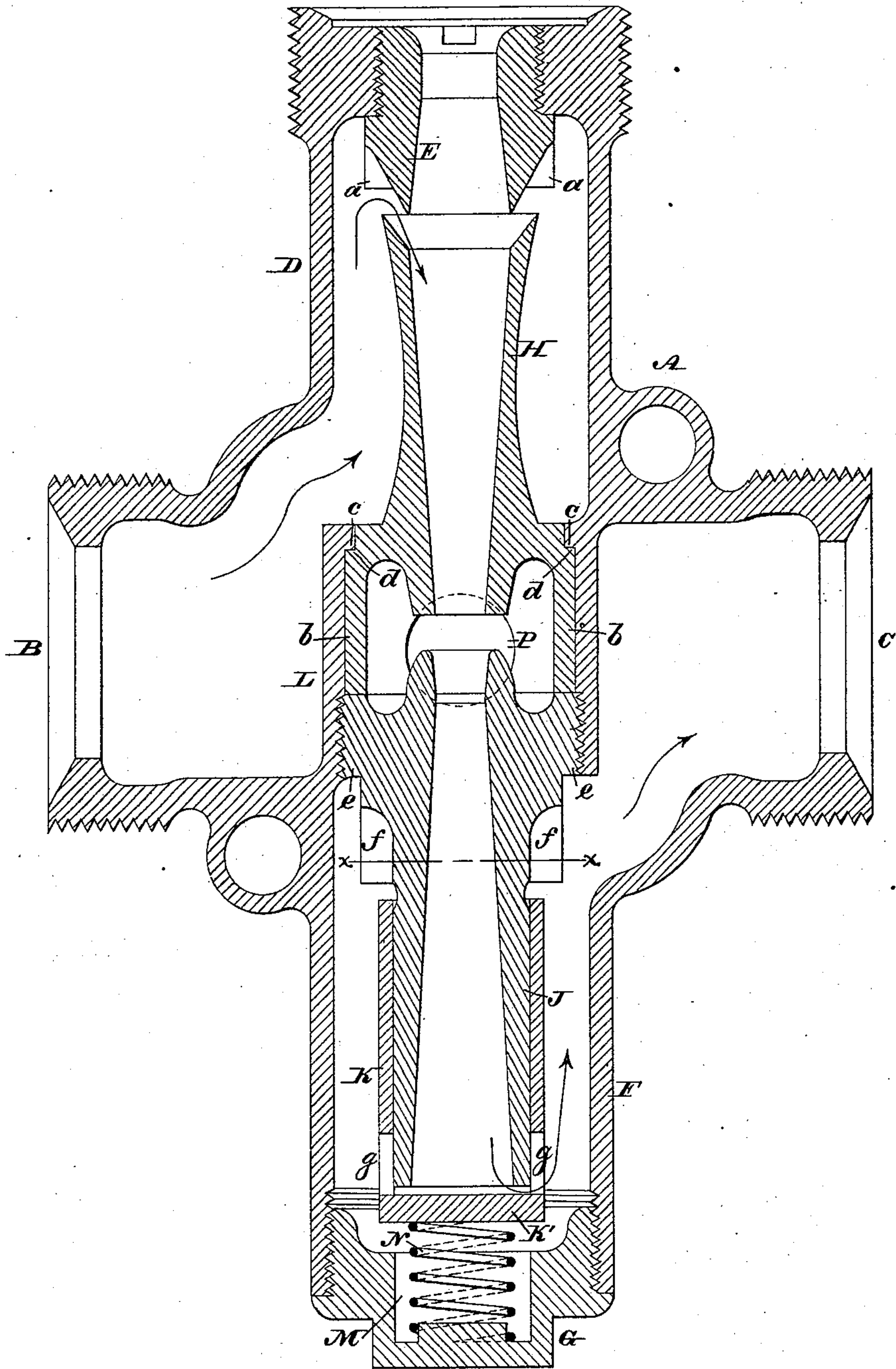
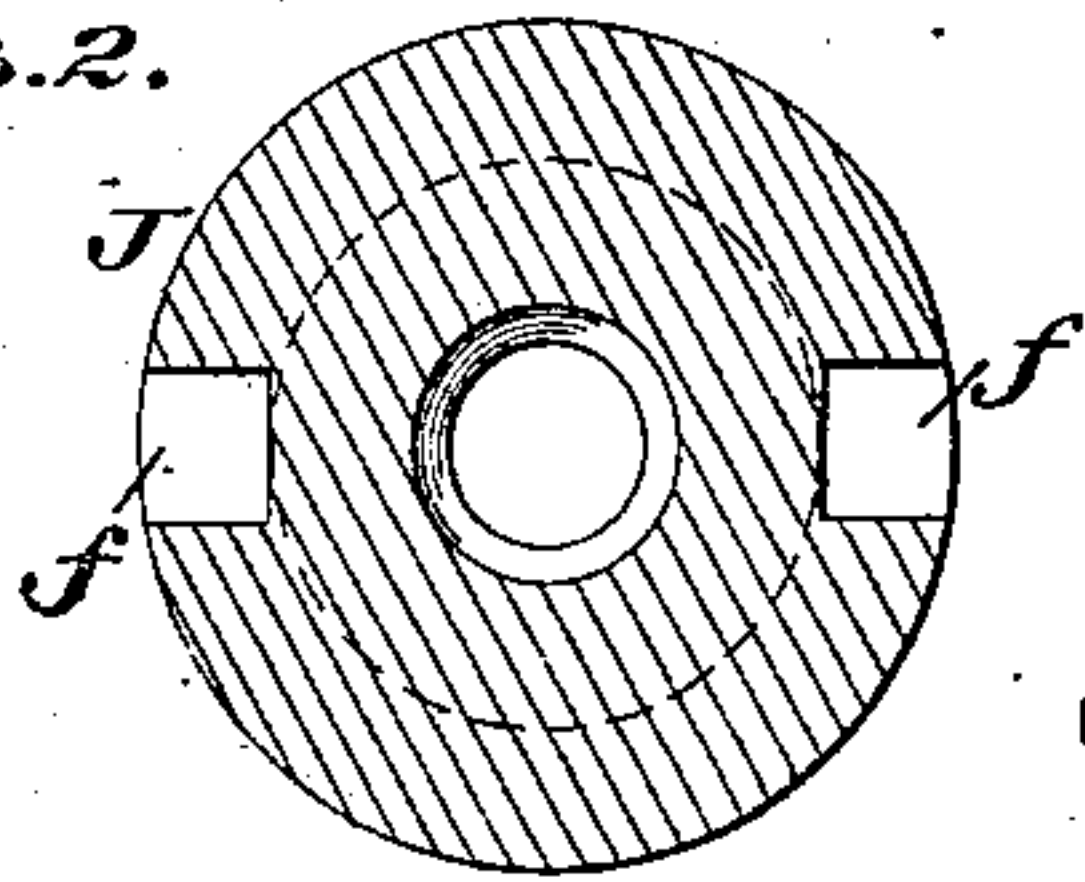


Fig. 2.



WITNESSES:

*R. P. Grant,*  
*H. F. Kirchen*

INVENTOR:

*Henry F. Colvin,*  
BY *John A. Sidersheim* ATTORNEY.



# UNITED STATES PATENT OFFICE.

HENRY F. COLVIN, OF PHILADELPHIA, PENNSYLVANIA.

## INJECTOR.

SPECIFICATION forming part of Letters Patent No. 284,614, dated September 11, 1883.

Application filed November 17, 1882. (Model.)

*To all whom it may concern:*

Be it known that I, HENRY F. COLVIN, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Injectors, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a central longitudinal vertical section of the injector embodying my invention. Fig. 2 is a section of the portion in the line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts in the two figures.

My invention relates to improvements in injectors for feeding steam-boilers, and has for its object the adaptability of removing and replacing the inner tubes without disturbing any of the couplings or pipe-connections.

A further object is the disposition of the check-valve in the injector in such manner that the injector may be used either vertically, horizontally, or at any angle, as most desired or required.

Referring to the drawings, A represents the body or shell of the injector, the same having an inlet branch, B, a discharge branch, C, a branch, D, within which is screwed the steam tube or plug E, and a branch, F, which is closed by a cap, G, it being noticed that the branches B C are opposite each other. The branches D F are opposite each other, the branches B C being at or about a right angle to the branches D F.

H represents the combining-tube, J the discharge-tube, and K the check-valve, of the injector, it being noticed that the steam-tube E, combining-tube H, discharge-tube J, check-valve K, and cap G extend in the same right line in the direction from the branch D to the branch F.

The steam-tube E is screwed to the inner wall of the end of the branch D, and formed on its inner end with recesses *a a*, which admit of the application of a suitable wrench to the tube for rotating the same, in order to apply it to and remove it from position.

The combining-tube H has, at the end opposite to the tube E, a flange, *b b*, which is fitted snugly within the annular partition L, the latter being formed with the body of the

injector between the inlet and discharge branches B C, and the inner face of said partition has a shoulder, *c*, against which abuts a shoulder, *d*, formed on the exterior face of the flange *b* of the combining-tube.

The discharge-tube J has, at the end adjacent to the combining-tube, a flange, *e*, which is threaded and engages with threads on the inner face of the annular partition L, said discharge-tube J thus abutting and tightening against the combining-tube H and holding it firmly in position, forming tight joints between the parts. On the exterior of the tube J, outside of the partition L, are recesses *f*, which are so disposed that they may be engaged by a suitable wrench in order to rotate said tube and apply it in and remove it from position.

The check-valve K encircles the end of the discharge-tube J opposite to the flange *e*, said end being exteriorly of cylindrical form to accord with the interior cylindrical form of the body of the check-valve, the latter being closed by its base-plate K', which abuts against the end of the tube J as a seat for the valve, the side of the body adjacent to the base-plate being perforated or having ports *g*, which are uncovered when the valve moves from its normal position. The cap G is recessed or hollow, forming a chamber, M, which receives a spring, N, which bears against the valve K and forces it against its seat on the tube J.

P represents the overflow, which is formed by coincident openings in the wall of the shell A, the partition L and flange *b* of the combining-tube H thus leading to the space between the combining and discharge tubes.

By removing the cap G, the spring N and check-valve K may be withdrawn and a wrench applied through the branch F to the discharge-tube, so as to unscrew and remove the same. The combining-tube is then slipped from position and the wrench applied to the steam-tube E, so as to unscrew and remove the same, whereby the shell or body A is cleared of all removable parts.

To fit together the injector, the tube G is screwed into position, the combining-tube fitted in the partition L against the shoulder *c*, the discharge-tube J screwed to said partition, the check-valve placed over the discharge-tube, the spring N located, and the cap G



screwed to the branch F, it being noticed that in both cases the parts, excepting the cap G, are applied and removed through the branch F, and said cap, when in position, closes said branch, the operations being accomplished without disturbing any of the couplings or pipe-connections.

As the check-valve is held on its seat by the spring N, it is evident that said valve is operative in any position of the injector.

In lieu of the recesses *a f*, lugs may be cast with or connected to the plug E and discharge-tube J, respectively, for forming means of engagement of the wrench or tool employed to rotate said parts.

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

1. An injector-body provided with inlet branch B and discharge branch C, said branches being on opposite sides, and partition L, which closes their inner ends, except the necessary passages, in combination with a combining-tube, H, and discharge-tube J, which are attached to said partition, and form a continuous passage at an angle to said branches, and extending above and below them, substantially as shown.

2. In an injector, the body or shell and the annular partition having a shoulder on its inner face, in combination with a combining-tube having a shoulder on its exterior face,

and the discharge-tube which tightens against the combining-tube and forms a continuous passage therewith, extending above and below the inlet and discharge branches of the injector-body, substantially as and for the purpose set forth.

3. An injector having a check-valve guided by the outside of the discharge, and having its seat thereon, substantially as and for the purpose set forth.

4. In an injector, the discharge-tube and a check-valve fitted thereon, in combination with a spring bearing against said valve, substantially as and for the purpose set forth.

5. In an injector, a cap closing one of the branches, and formed with a chamber which receives the spring which closes the check-valve, in combination with the discharge-tube, substantially as and for the purpose set forth.

6. An injector having a tubular branch, D, a removable steam-plug, E, with recesses *a*, a removable combining-tube, H, a partition, L, a removable discharge-tube, J, with recesses *f*, a removable check-valve, K, and a removable cap, G, said parts being arranged in the same right line, and combined and operating substantially as and for the purpose set forth.

H. F. COLVIN.

Witnesses:

JOHN A. WIEDERSHEIM,  
A. P. GRANT.