(Model.)

H. F. COLVIN.

INJECTOR.

No. 302,543. Patented July 29, 1884.

Fig. 1.

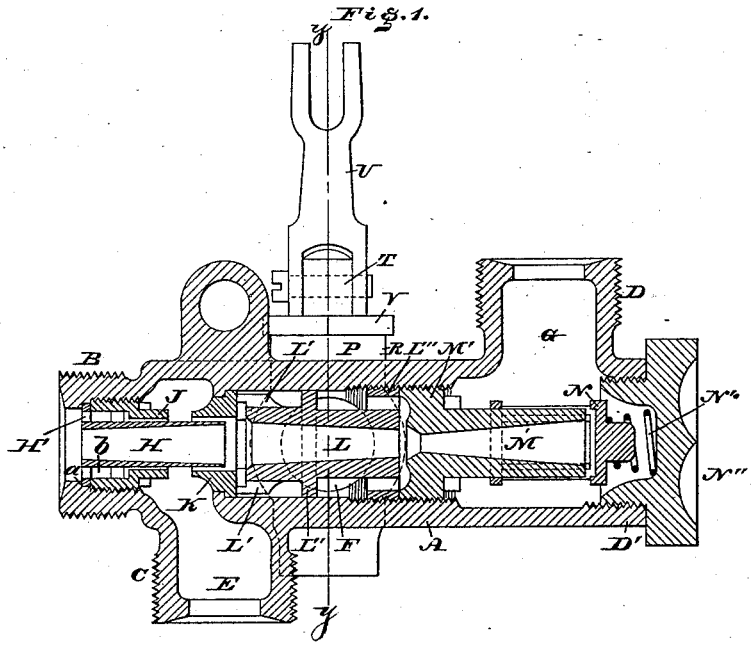


Fig. 2.

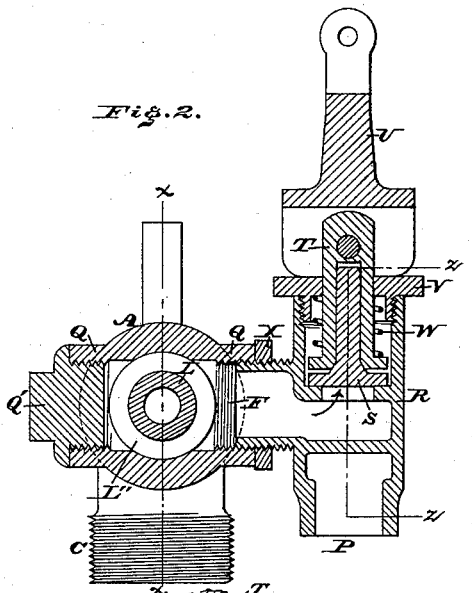
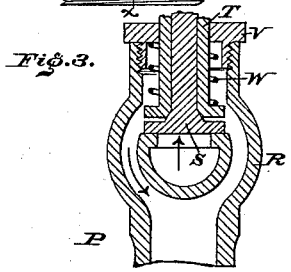


Fig. 3.



WITNESSES:

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HENRY F. COLVIN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE RUE MANUFACTURING COMPANY, OF SAME PLACE.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 302,543, dated July 29, 1884.

Application filed January 12, 1884. (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 longitudinal vertical section of an injector embodying my invention in line *x x*, Fig. 2. Fig. 2 is a transverse vertical section in line *y y*, Fig. 1. Fig. 3 is a vertical section of a portion in line *z z*, Fig. 2.

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

My invention consists, in the main, in making an injector self-adjusting, with fixed nozzles, by the means of a regulating-jet of steam surrounding the main steam-jet, and providing it with an automatic overflow-valve, said devices being constructed and combined substantially as will be hereinafter fully set forth.

Referring to the drawings, A represents the body or shell of an injector, which is formed with branches B C D D′, and contains the inlet-chamber E, overflow-chamber F, and discharge-chamber G.

H represents the main steam-tube, which abuts against the shoulder *a* within the branch B, and has its opening or bore extend its entire length, forming the main steam-jet. Surrounding the tube H is a regulating steam-tube, J, which is screwed to the branch B and abuts against the flange H′, formed on the receiving end of the tube H, said flange being perforated to admit steam therethrough, the perforations communicating with the space or passage *b*, existing between the tubes H J, forming a regulating steam-jet, said tube H having wings on its periphery to guide the tube J thereon. Instead of the passage *b* being continuous, it may be of the form of perforations on the inner periphery of the tube J, or on the exterior periphery of the tube H.

K represents the regulating-tube; L, the combining-tube; M, the discharge-tube; N, the check-valve, and N′ the closing-spring, which latter bears against said valve and the cap N″ on the branch D′. The regulating-tube K is fitted within a partition between the inlet-chamber E and overflow-chamber F, and held in place by wings L′ on the combining-tube L, the latter also having a flange, L‴, near its center, and a perforated flange, L″, at its discharge end, the flange L‴ being screwed to the shell within the overflow-chamber F, both ends of the combining-tube thus being open to the overflow or outlet of the same. The discharge-tube M is formed with a flange, M′, at its receiving end, the same being screwed to the shell, and the discharge end is made true, so as to guide the valve N, which is fitted thereon.

P represents the overflow-valve attachment, which is screwed to a branch, Q, on either side of the shell, the opposite branch being closed by a plug, Q′, said attachment consisting of a body, R, valve S, valve-holder T, pivoted lever U, cap V, and spring W, said valve having its stem loosely fitted to the holder T. When the holder is raised, the valve S is adapted to operate automatically, and when the holder is lowered the valve closes on its seat, and is held tightly thereagainst by the action of the spring W, thus making a stop-valve.

The operation of the injector is as follows: The water flows into the chamber E under pressure, (it is not lifted;) then the steam entering the tube J strikes the water in E and forces it into and through tube K, which brings the water to the mouth of the combining-tube, where the steam from the main jet H then strikes it, and forces it through the combining-tube and discharge-tube into the boiler, thus causing an acceleration of the flow of the water to the boiler, according to the steam-pressure employed to work the injector. The greater the pressure of steam the larger the amount of water required for the injector, this being accomplished by the varying pressure of steam in the jet J, said pressure equalizing that of the steam in the main tube C, and consequently adjusting the proper amount of water with the varying pressure of steam.

It will be seen that the main and regulating steam jets or tubes are in the same line of axis as the combining-tube, and the regulating-jet

surrounds the main one. It will also be seen that the main steam-tube opens into the overflow-chamber, thereby permitting steam and water to pass out of the overflow without going through the combining-tube. When the supply of steam or water, or both, is excessive, the excess escapes in this way. Under ordinary circumstances the pressure of steam suffices to carry the water through. Again, the combining-tube is wholly located in the overflow-chamber, and has its receiving and discharge ends open to the overflow or outlet of the same.

In order to hold the overflow-valve attachment at any angle, I employ a lock-nut, X, which is screwed to the inlet-branch, and adapted to tighten against the edge of the branch Q of the injector, said nut being necessarily screwed in or out the proper extent in order to tighten against said branch when the valve attachment reaches the desired angle.

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

1. In an injector, a stationary main steam tube or nozzle, H, and a stationary regulating steam tube or nozzle, J, in combination with the regulating-tube K, both the main steam-jet and the regulating steam-jet being discharged parallel to the axial line of the injector, substantially as set forth.

2. In an injector, a stationary main steam tube or nozzle, H, and the surrounding stationary regulating steam-tube J, in combination with the regulating-tube K, the main steam-jet and the regulating steam-jet being discharged on lines parallel to the axial line of the injector, and the latter jet being exterior to the former, substantially as set forth.

3. In an injector, the main steam-tube H, opening into the overflow-chamber, in combination with the surrounding regulating steam-tubes J K, the latter discharging within the overflow-chamber, whereby a portion of the steam or water from both may escape without entering the combining-tube, substantially as described.

4. In combination with a main steam-tube, H, and regulating steam-tubes J K, discharging in lines parallel to the line of discharge of the main tube and the axial line of the injector, a combining-tube, L, which is arranged wholly in the overflow-chamber, substantially as set forth.

5. In an injector, an overflow-valve having its stem loosely fitted in a spring-pressed holder, in combination with said holder and a device for raising the latter at will, so that the spring-pressure will not operate to hold the valve on its seat.

6. An injector having an overflow-valve attachment connected with a branch thereon, and adapted to be held at any desired angle thereon by a lock-nut, substantially as and for the purpose set forth.

H. F. COLVIN.

Witnesses:
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