W. P. PATTON.

Injector.

No. 164,027. Patented June 1, 1875.

FIG. I.

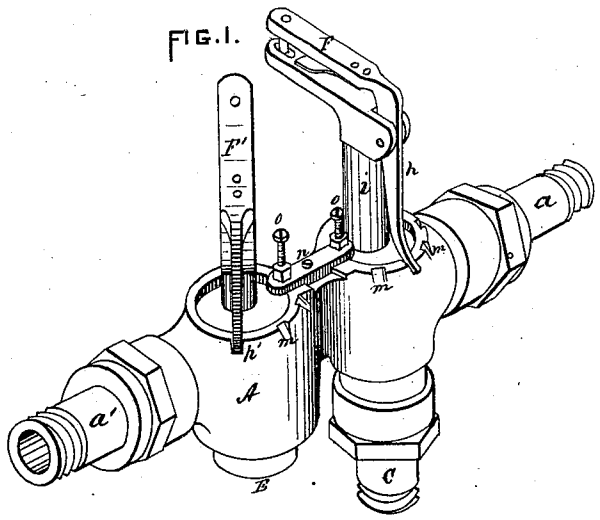


FIG. II.

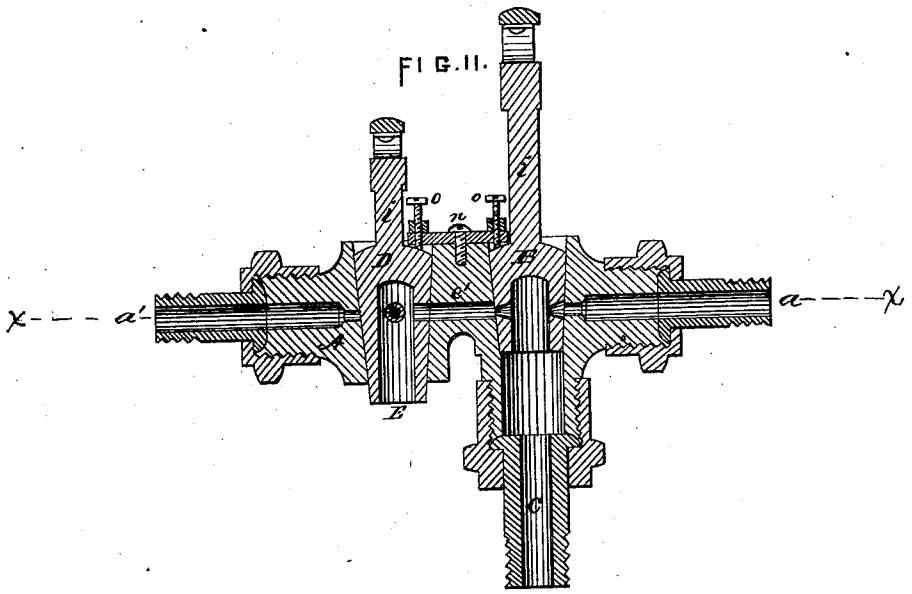
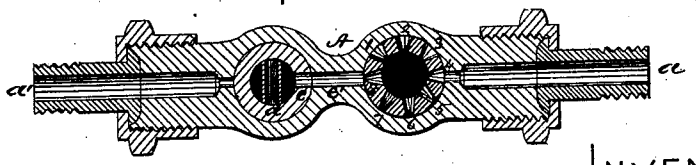


FIG. III.



WITNESSES.

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UNITED STATES PATENT OFFICE.

WILLIAM P. PATTON, OF HARRISBURG, PENNSYLVANIA, ASSIGNOR TO HIMSELF AND SULLIVAN S. CHILD, OF SAME PLACE.

IMPROVEMENT IN INJECTORS.

Specification forming part of Letters Patent No. **164,027**, dated June 1, 1875; application filed April 27, 1875.

To all whom it may concern:

Be it known that I, WILLIAM P. PATTON, of Harrisburg, Pennsylvania, have invented certain new and useful Improvements in Injectors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making a part of this specification, in which—

Figure 1 is a perspective view of an injector with my improvements attached. Fig. 2 is a longitudinal vertical section of same. Fig. 3 is a horizontal section through *x x*.

My invention relates to that class of injectors used as a feed-water for steam-boilers; and it consists in the arrangement of adjustable nozzles of different sizes in the sides of a removable hollow plug slightly conical in form. It also consists in the location and arrangement of an adjustable "overflow" between the injector and the check-valve on the boiler; and, lastly, it consists in the novel means for securing the plugs in their seats.

To enable others skilled in the art to make and use my invention, I will proceed to describe the exact manner in which I have carried it out.

In the drawings, A represents the body of my injector, with the inlet steam-pipe *a* and the exit-pipe *a'*, leading to the boiler. These pipes have the usual screw-connections, as shown in Fig. 1. Fitting in a seat in the body A is the hollow cylindrical plug B, slightly in the form of an inverted cone, and perforated with different-sized funnel-shaped holes or nozzles, that may be brought into position at pleasure on an axial line between the pipes *a* and *a'*. These holes or nozzles in the cylindrical plug B, being of different sizes, afford a ready and certain means of a speedy adjustment of the injector; and those which are brought opposite to the steam-pipe *a* are numbered 1, 2, 3, and 4, while those which open toward the boiler are numbered 5, 6, 7, and 8. It is evident that these nozzles may be given a wide latitude of adjustment. It is evident, also, that the set, either of steam-nozzles or of delivery-nozzles, may be dispensed with, leaving an open section of the plug in place thereof, so limiting the adjustment to the remaining set without departing from the spirit of my invention. The feed-water is supplied immediately below and through the plug B by means of the pipe C, as shown in Fig. 2. Another hollow cylindrical plug, D, also slightly in the form of an inverted cone, is fitted in a seat in the body A of the injector, and on a line longitudinally with the plug B, as shown in Fig. 3. This plug forms the overflow. When the injector is intended to "lift" its supply of water from a lower level it must be provided with a means of ridding the jet of the air that fills the supply-pipe C above the water-level. The plug D not only accomplishes this object, but also serves as a stop-cock between the body of the injector proper and the "check-valve" on the boiler. Across the body of the overflow-plug D is secured the transverse tube or pipe *d*, the said plug D being hollow up to a point just above the axial perforation of the body A from *a* to *a'*, so that the hollow-tube *d*, passing through the opposite walls of the plug D, forms a close passage for water across the hollow in the plug when it is turned in a line with the axis *a a'*. An orifice, *e*, made through the side of the wall or body of the plug D, midway between the ends of the pipe *d*, is brought in a line with the bore *e'* of the injector, as shown in Fig. 3, whenever the pipe *d* is at right angles to the same. The operation of the plug D is as follows: The steam and water being turned on, the largest nozzle is first used, so as to exhaust the air quickly, and consequently raise the water. As soon as it is perceived that water and steam together are escaping from the orifice E, the smallest nozzle is to be immediately adjusted in position, which checks or retards the flow of water, and consequently causes a rapid condensation of the steam-jet, and soon water only will be found escaping from the orifice E. The connecting-tube *d* is now brought into line with the nozzles by turning the plug D, and thus communication is established between the injector-nozzle and the boiler. If it be desired to cut off communication with the boiler it is only necessary to turn the overflow-plug D to a point between the overflow-orifice *e* and the ends of the connecting-pipe *d*, which brings a blank portion

of the wall of the plug D over the axial orifice *e'*, and completely shuts off the injector and overflow from the boiler.

The stems or shanks *i i* are cast with the plugs B D, and sustain the spring-handles F F', by which the plugs are operated. These handles are supplied with the locking-arms *h h'*, the lower ends of which catch into notches *m m*, formed on the edge of the body of the injector.

It is evident that the different-sized nozzles can be brought into action by turning the handle F and adjusting the arm *h* in the notch that represents the sized nozzle required. The sizes of the nozzles are indicated by the figures on the top surface of the plug B, and a mark or notch made on the front edge of the body A will be directly opposite the figures that indicate the sized nozzle in working position; for instance, if one-eighth-inch nozzles are in line with the longitudinal or axial perforations of the injector, the same figure or number, one-eighth, will be opposite the indicating-point on the edge of the body.

It is evident that the form and construction of the handles and arms may be varied without departing from the spirit of my invention.

The clamping-bar *n* is of novel construction, as it not only permits adjustment to compensate for wear of parts by means of the screws *o o*, but by slackening the center screw the bar may be turned transversely to the body A, which allows the plugs B and D to be removed from their seats and taken out, for the removal of dirt or obstructions from the nozzles, without having to disconnect the injector from the steam and water pipes *a a'*.

The plug D is operated similar to plug B, by the handle F' and arm *h'*, as shown in Figs. 1 and 2.

If desired, the handles F F' can be dispensed with. In case that should prove desirable, I propose to construct the plugs B D flat on their top surfaces, and form square recesses or holes in their centers, so as to permit of the insertion of a removable handle, the lower end of the shank of which is squared to fit either recess. This will afford a means of turning the plugs B D, and adjusting them to any desired position in regard to each other and to the bore of the injector-body.

It is evident that the binding-screw will retain said plugs in any desired place by turning them down so as to bear upon their top surfaces; the jam-nuts will prevent said screws from changing their position.

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

1. The cylindrical hollow plug B, perforated as described, in combination with the steam-pipe *a*, exit-pipe *e'*, and inlet or supply pipe C, constructed to operate substantially as and for the purpose set forth.

2. The cylindrical hollow plug D, provided with the transverse tube *d*, orifice *e*, and escape-pipe E, in combination with the pipe or bore *e'* and exit-pipe *a'*, all constructed to operate substantially as and for the purpose set forth.

3. The plug B, provided with the perforations or nozzles of different sizes, in combination with the steam-pipe *a*, inlet or supply pipe C, the pipe or bore *e'*, plug D, provided with the transverse tube *d*, orifice *e*, and escape-pipe E, and the exit-pipe *a*, all constructed to operate substantially as and for the purpose set forth.

4. The clamping-bar *n*, provided with the screws *o o*, in combination with the plugs B and D, substantially as and for the purpose set forth.

WM. P. PATTON.

Witnesses:
CASPER S. BIGLER,
EUGENE SNYDER.