

(Model.)

2 Sheets—Sheet 1.

W. J. SHERRIFF.

INJECTOR.

No. 304,572.

Patented Sept. 2, 1884.

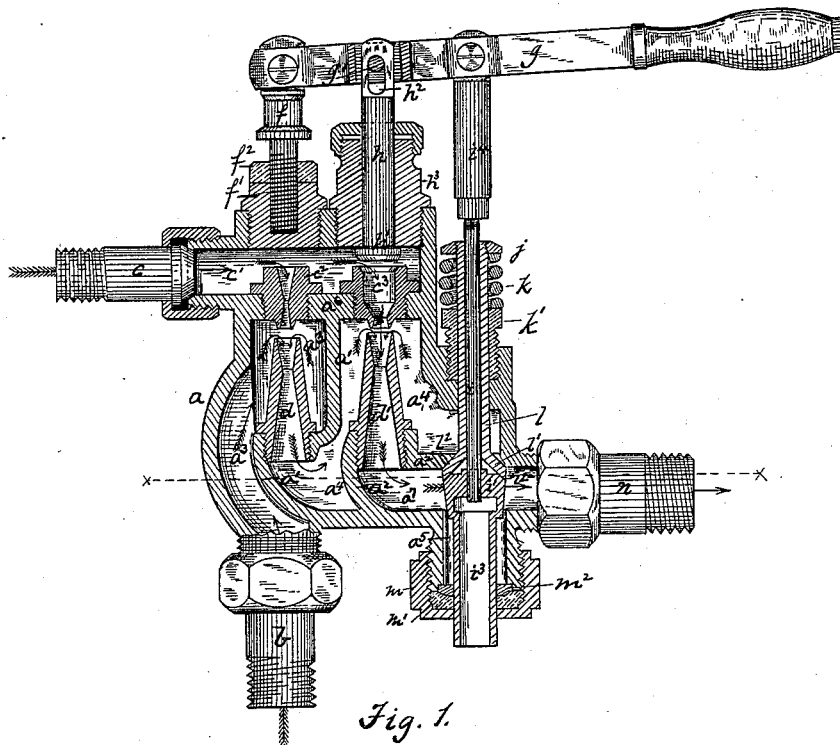


Fig. 1.

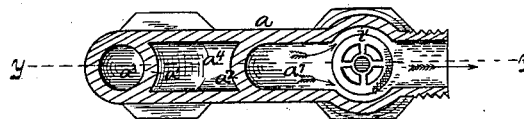


Fig. 2.

Witnesses.

W. D. Cowin
J. K. Smith

Inventor

William J. Sherriff
by his attys
Bakewell & Ross

(Model.)

2 Sheets—Sheet 2.

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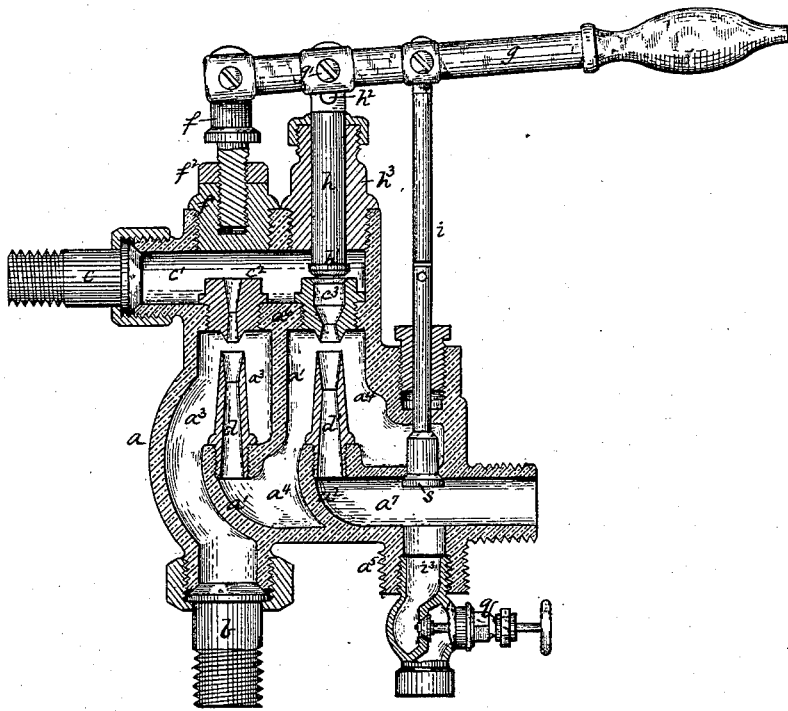


Fig. 3.

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UNITED STATES PATENT OFFICE.

WILLIAM J. SHERRIFF, OF ALLEGHENY CITY, PENNSYLVANIA.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 304,572, dated September 2, 1884.

Application filed May 2, 1884. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM J. SHERRIFF, of Allegheny City, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Injectors; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a longitudinal sectional view of my improved injector on the line *yy*, Fig. 2. Fig. 2 is a section on the line *xx*, Fig. 1. Fig. 3 is a longitudinal section of a modification.

Like letters of reference indicate like parts.

My invention is directed to simplifying, cheapening, and improving the construction of injectors.

In the drawings, *a* is the shell, having a central chamber divided into two compartments, *a³* *a⁴*, by a diaphragm, *a¹*. In the diaphragm *a¹* is a nozzle, *d*. Another diaphragm or partition, *a²*, supports a second nozzle, *d¹*. The chambers *a³* *a⁴* are separated from the steam-chambers *c¹* by a wall or partition, *a⁵*, in which are threaded openings for receiving the steam-jet pipes or nozzles *c²* *c³*. The shell is provided with a steam-pipe, *e*, communicating with the chamber *c¹*, induction-pipe *b*, communicating with the chamber *a³*, and discharge-pipe *n*, communicating with the nozzle *d* and chamber *a⁴*. The nozzles *c²* *c³* are put in place through openings in the upper side of the shell *a*, which are closed by the screw-plugs *f¹* *h³*. In the plug *f¹* is screwed a pin or fulcrum, *f*, to which is pivoted a lever, *g*. Extending through the plug *h³* is a stem, *h*, having a valve, *h¹*, at its lower end, which is arranged to close the nozzle *c³*, by being seated in the conical seat in the upper end of the same. The valve *h¹* is adjustable by means of the screw-stem *f*, which is provided with an adjusting-nut, *f²*. The stem *h* is secured to the lever *g*, by which it is operated by means of a pin, *g¹*, extending through the slot *h²*, which construction allows of a considerable movement of the lever *g* without operating the valve *h¹*. Near the exit or discharge end of the shell is a double-valve arrangement, composed of a stem, *i*, which is connected to the lever *g* by a link, *i¹*, and is provided at its lower end with a valve, *i²*, which seats against the conical skirt *l¹* of a hollow rod, *l*, which encircles the stem *i*. The up-

per end of the hollow rod *l* is provided with a collar, *j*, between which and a screw-collar, *k*, is a spiral spring, *k*, for raising the valve *l¹* when relieved of the pressure of the lever *g*. At the lower end of the hollow rod *l* is a conical skirt, *l¹*, which constitutes a valve seating against the seat *l²* in the diaphragm or partition *a²*. Extending down from the valve *i²* is a tube, *i³*, which projects through a stuffing-box, *m*, formed between the screw-nut *m* and the lower end of a screw nozzle or coupling, *a⁵*, which is formed on the lower side of the case *a*. A collar, *m²*, is provided, between which and the flanged end of the nut *m* the packing material is placed. The operation of this part of the device is as follows: The valve *i²*, being moved directly by the stem *i*, is unseated immediately upon the downward movement of the handle *g*, so as to leave an opening between the skirt *l¹* and the seat *i²*. When the handle *g* is sufficiently depressed to cause the lower end of the connecting-link *i¹* to come in contact with the nut or collar *j*, it forces the hollow rod *l* downward, so as to cause the skirt *l¹* to leave its seat *l²* and to open communication between the chamber *a⁴* and the chamber *a³*.

The operation of my improved device is as follows: To start the injector, the valve *h¹* is closed and the valves *l¹* *i²* opened by depressing the handle *g*. Steam being admitted to the chamber *c¹* through the pipe *e* passes from the nozzle *c²* into and through the head *d*, producing a vacuum or partial vacuum in the chamber *a³* and raising water through the pipe *b* and chamber *a³* and discharging it from the head *d* into the chamber *a⁴*, whence it passes through the valves *l¹* and *i²* to the waste or leakage pipe *i³*. When the current is fully established, the handle *g* is raised, so as to close the valves *l¹* *i²* and open the valve *h¹*. The steam then passes from the chamber *c¹* through the nozzle *c³*, as well as through the nozzle *c²*, and, acting upon the water in the head *d*, induces a current from the chamber *a⁴* and drives it through the head *d*, chamber *a⁴*, and discharge-pipe *n* into the boiler. The function of the valve *l¹* is to cause communication between the chambers *a⁴* and *a³*, and thus to fill every part of the chamber *a⁴* with water before steam is admitted through the nozzles *c²*. The stem *i* may be connected directly to the

lever *g*, and a shoulder or collar may be placed thereon to operate the hollow rod *l* instead of the part *i*⁴, if desired.

The construction and operation just described have many advantages. The use of the adjustable fulcrum *f* enables the throw of the operating-lever *g* to be so adjusted that the operation of the injector can be regulated to a nicety. To the same end is the use of the slot *h*², which permits a long movement of the lever *g*, to operate the valves *l* *i*¹ without opening or closing the valve *h*¹. The construction of the devices for operating by a single lever the injector and overflow valves makes the device simple, efficient, easily operated, and not liable to get out of order.

Fig. 3 shows a construction similar to Figs. 1 and 2, except that a globe-valve, *g*, placed at the lower end of the pipe *i*³ and operated by hand, is substituted for the valve *i*¹, which closes the upper end of the overflow-pipe *i*³, and a plain disk-valve, *s*, is substituted for the valve *l*, which controls the passage of the initial current from the chamber *a*⁴ to the chamber *a*¹ and overflow-pipe *i*³. In this case the valve *g* is closed by hand when the valve *h*¹ is opened and the valve *s* is closed by the lever *g*. In this case the pipe *i*³ is stationary, being screwed into the nozzle or coupling *i*², instead of sliding in it, as shown in Fig. 1. The valve *l* in Figs. 1 and 2 or the valve *s* in Fig. 3 constitutes a starting or overflow valve, for the reason that thereby the water is permitted to pass or overflow from the chamber *a*⁴ to the overflow-pipe *i*³ until the current through

chambers *a*³ and *a*⁴ is fully established, and such valve is therefore denominated by me as an "overflow-valve." On the other hand, the valve *l* or globe-valve *g* is used merely as a stop-cock to close the pipe *i*³ when it is no longer needed.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in an injector, of the steam-valve of the injecting-head and the overflow-valve *l* with a lever, having an adjustable fulcrum, and a loose connection between the stem of said steam-valve and said lever, substantially as and for the purposes described.

2. The combination, in an injector, of the steam-injector valve connected to an operating-lever with an overflow-valve, and a valve for closing the waste-pipe, also connected to and operated by said lever, so that when the latter valves are opened to start the injector the first-named valve is closed, and when the first is opened to force water into the boiler the latter valves are closed, substantially as and for the purposes described.

3. The combination of the stem *i*, valve *i*¹, and lever *g* with the rod *l*, valve *l*, and seats *z*¹ and *z*², substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 29th day of April, A. D. 1884.

WILLIAM J. SHERRIFF.

Witnesses:

W. B. CORWIN,
J. K. SMITH.