

(Model.)

W. J. SHERRIFF.

INJECTOR.

No. 332,953.

Patented Dec. 22, 1885.

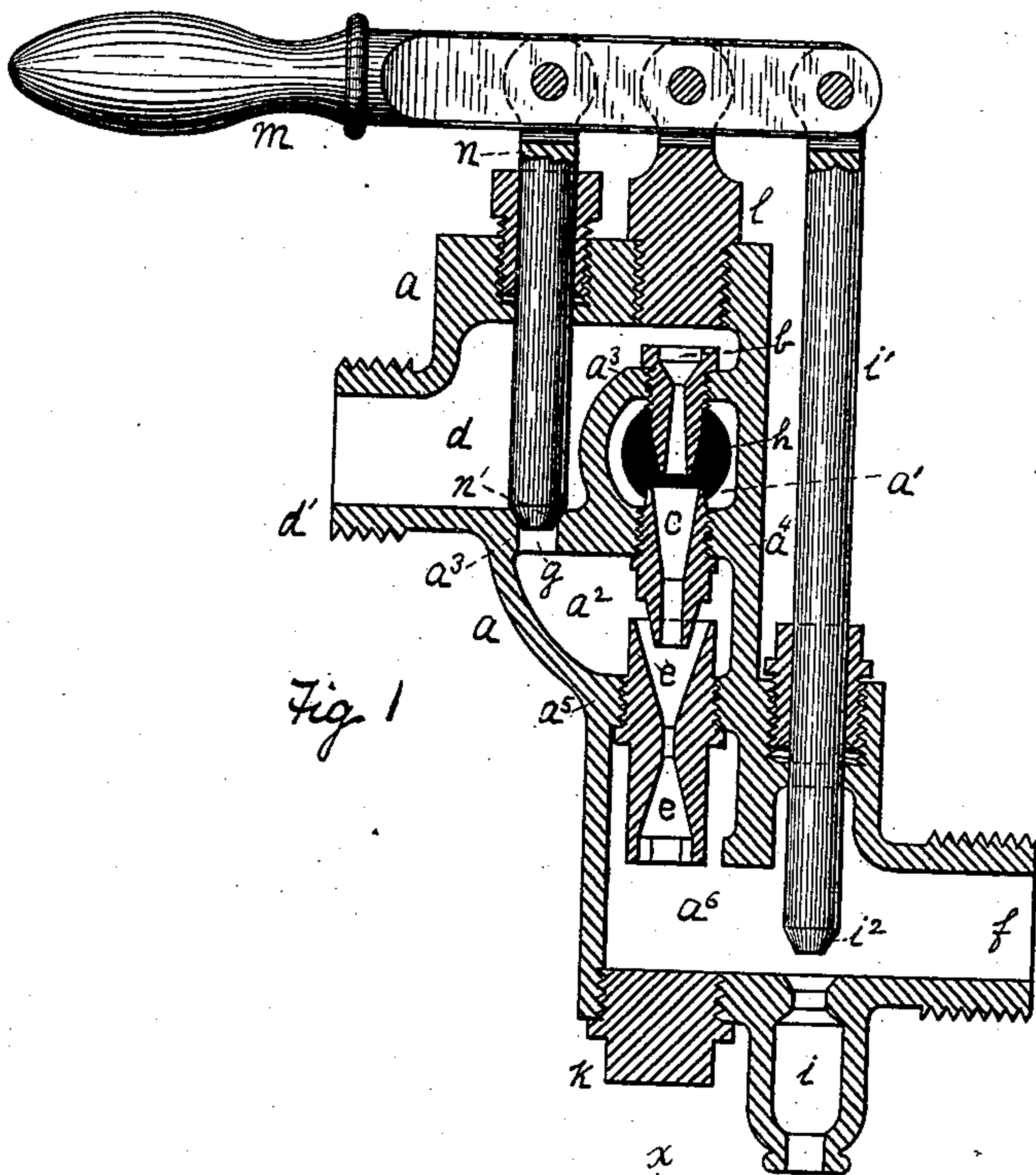


Fig. 1

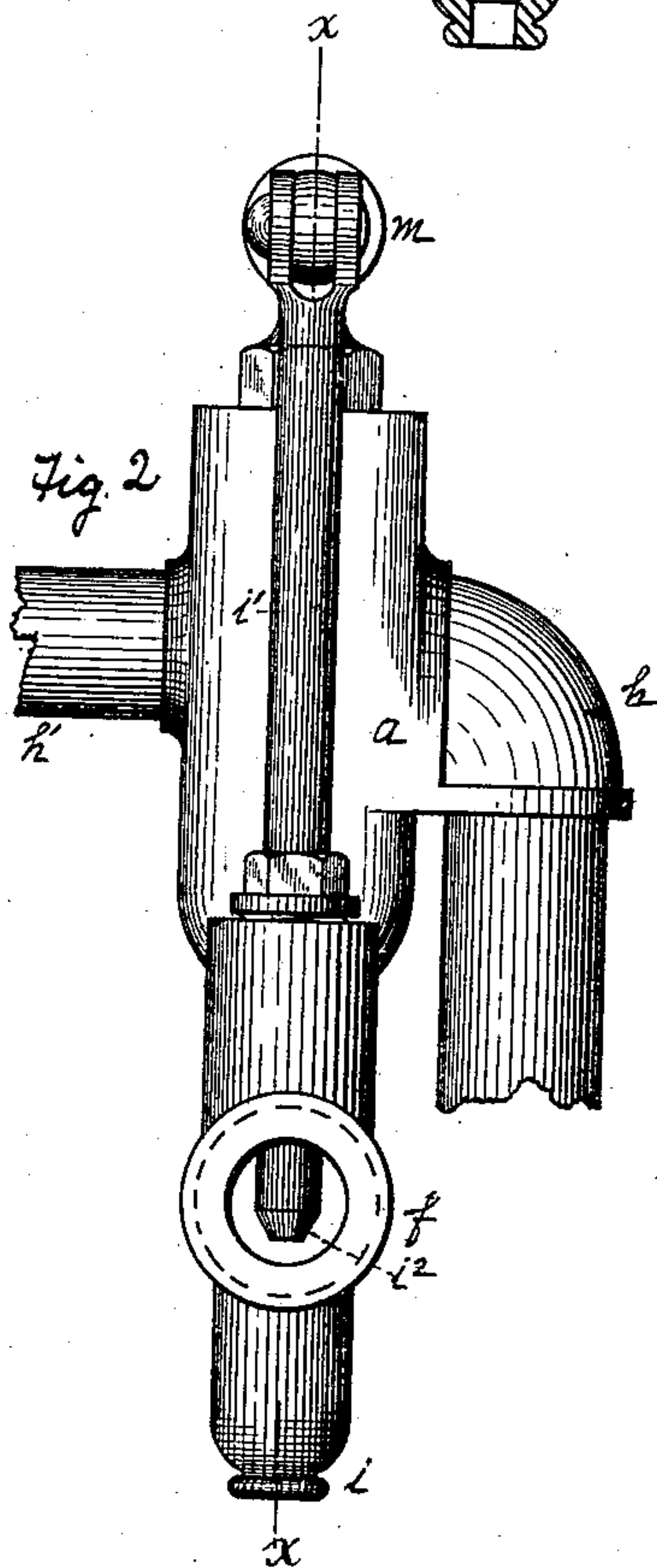


Fig. 2

Witnesses.
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UNITED STATES PATENT OFFICE.

WILLIAM J. SHERRIFF, OF ALLEGHENY CITY, PENNSYLVANIA.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 332,953, dated December 22, 1885.

Application filed December 10, 1884. Serial No. 149,943. (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, in which—

Figure 1 is a longitudinal sectional view of my improved injector on the line xx of Fig. 2. Fig. 2 is an edge view of the same.

Like letters of reference indicate like parts wherever they occur.

The object of my invention is to simplify, cheapen, and improve the construction of injectors.

In the drawings, a is the shell, having its body divided into three compartments, a' , a'' , and d , by diaphragms or partitions a^3 and a^4 . Within these partitions are two nozzles, b and c , the nozzle b being a steam-nozzle, and c a water ejecting or lifting nozzle. The nozzle b extends into the chamber a' from the steam-chamber d , and the nozzle c extends from the chamber a' into the chamber a'' through the diaphragm a^4 . A partition, a^5 , supports a third nozzle, e , which establishes communication between the chamber a'' and a chamber, a^6 . The nozzle e is in line with the other two nozzles, b and c . The chamber a^6 has a direct lateral communication with a discharge-pipe, f , which leads to the boiler. The shell a is provided with a steam-pipe, d' , leading into the steam-chamber d , and the latter chamber is separated from the other parts of the injector by the partition a^3 , except a steam-port, g , communicating with the steam-chamber and the chamber a' through the partition a^3 and the nozzle b , which admits steam from the chamber d into the chamber a' . The chamber a' is the induction-chamber, and the shell a is provided with two induction-pipes, h h' , which enter this chamber directly from opposite sides of the injector. At the base of the shell, and out of line with the nozzles b c e , is a waste or overflow port, i , which communicates with the chamber a^6 . The nozzles are put in place through openings in the upper and lower sides of the shell a , which are closed by screw-plugs k and l , these openings being in alignment with the nozzles. The upper plug, l ,

serves as a fulcrum for a lever, m , which is pivoted thereto. Connected with the lever m on one side of the fulcrum l is a stem, n , having a valve, n' , at its lower end, arranged to close the steam-port g by being seated in a conical seat at the upper end of the port. On the other side of the fulcrum l , and pivoted to the lever m , is another valve-stem, i' , having a valve, i'' , at its lower end, arranged to close the overflow-port i when depressed to its seat thereon. The valves n' and i'' are adjustable by changing the height of the fulcrum, which may be done by the screw-plug fitting into the shell a .

The operation of the device is as follows: To start the injector, the port g is closed by depressing the lever m , and the overflow-port i is opened by the same operation. Steam being admitted into the pipe d' passes from the chamber d through the nozzle b into and through the head c , producing a vacuum in the chamber a' , raising water into this chamber through the induction-pipes h h' , and discharging it through the head c into the nozzle e and chamber a^6 , whence it escapes through the overflow i . When the current is established, the lever m is slowly raised, thereby gradually opening the port g and closing the discharge-port i . Steam will then pass through the port g into the chamber a' and around the nozzles c and e , between which it forms an annular jet, which strikes the water in the nozzle e and impels it therethrough and through the chamber a^6 to the overflow-port i . When steam has ceased to come through the latter opening, and the chamber a^6 is well filled with water, the lever m is raised so as to open the steam-port g and to close the overflow-valve i completely, when the water will escape through the pipe f to the boiler. A slow regular lift of the lever-handle is all that is necessary to effect the whole of this operation, because the closing of the valve i and the opening of the valve g are simultaneously performed, and by the time when these parts are respectively opened and closed the current of water through the injector will have been well established. Cold water from a well or hydrant is drawn into the chamber a' through the induction-pipe h . The opposite pipe, h' , is connected with the condenser or waste-water chamber usual in boilers, and

heated water is drawn from thence. Care should be had that not enough hot water is induced into the chamber *a'* that when mingled with cold water from the pipe *h* the resultant
5 may be unduly hot and prevent the necessary condensation of steam in the ejector-head. The amount of hot water used can be conveniently regulated by a throttle or cock on the pipe *h'*. When the hot-water pipe *h'* is not de-
10 sired to be used, it may be uncoupled, and the hole in the injector-shell closed by a plug.

The advantages of the construction of the induction-pipes herein shown are that they introduce the water directly into the chamber
15 *a'* without allowing it first to come into contact with and chill the other parts of the injector, and by the use of two pipes I am enabled to utilize the heated water of the condensing-chamber in a manner unknown heretofore.
20

The construction of the valves *n'* and *i'*, in combination with the simple lever *m*, enables the valves to be opened and closed by a simultaneous and gradual movement of the
25 lever-handle, and as both valves seat downward in the direction of the impelling force of steam or water they will securely close their respective ports.

It will be observed that the plugs *l* and *k*

and nozzles *e*, *c*, and *b* are all in alignment, 30 and that by removing the plugs all the nozzles may be unscrewed and removed for the purpose of repairing without the necessity of detaching the injector from the boiler.

I am aware that injectors have been em- 35 ployed having a steam-valve and an overflow-valve arranged to be operated by the movement of the same lever, and I am also aware that nozzles and plugs have been arranged in an injector in a line with each other, and I do
40 not desire to claim these features, broadly.

Having thus described my improvement so that others skilled in the art to which it appertains may manufacture and use it, what I claim as my invention, and desire to secure by
45 Letters Patent, is—

The combination, in an injector, of a lifting or ejecting head or nozzle, a cold-water-induction pipe, and a hot-water-induction pipe, both of said pipes communicating with the
50 said lifting-head, substantially as and for the purposes described.

In testimony whereof I have hereunto set my hand this 2d day of December, A. D. 1884.

WILLIAM J. SHERRIFF.

Witnesses:

W. B. CORWIN,

THOMAS W. BAKEWELL.