

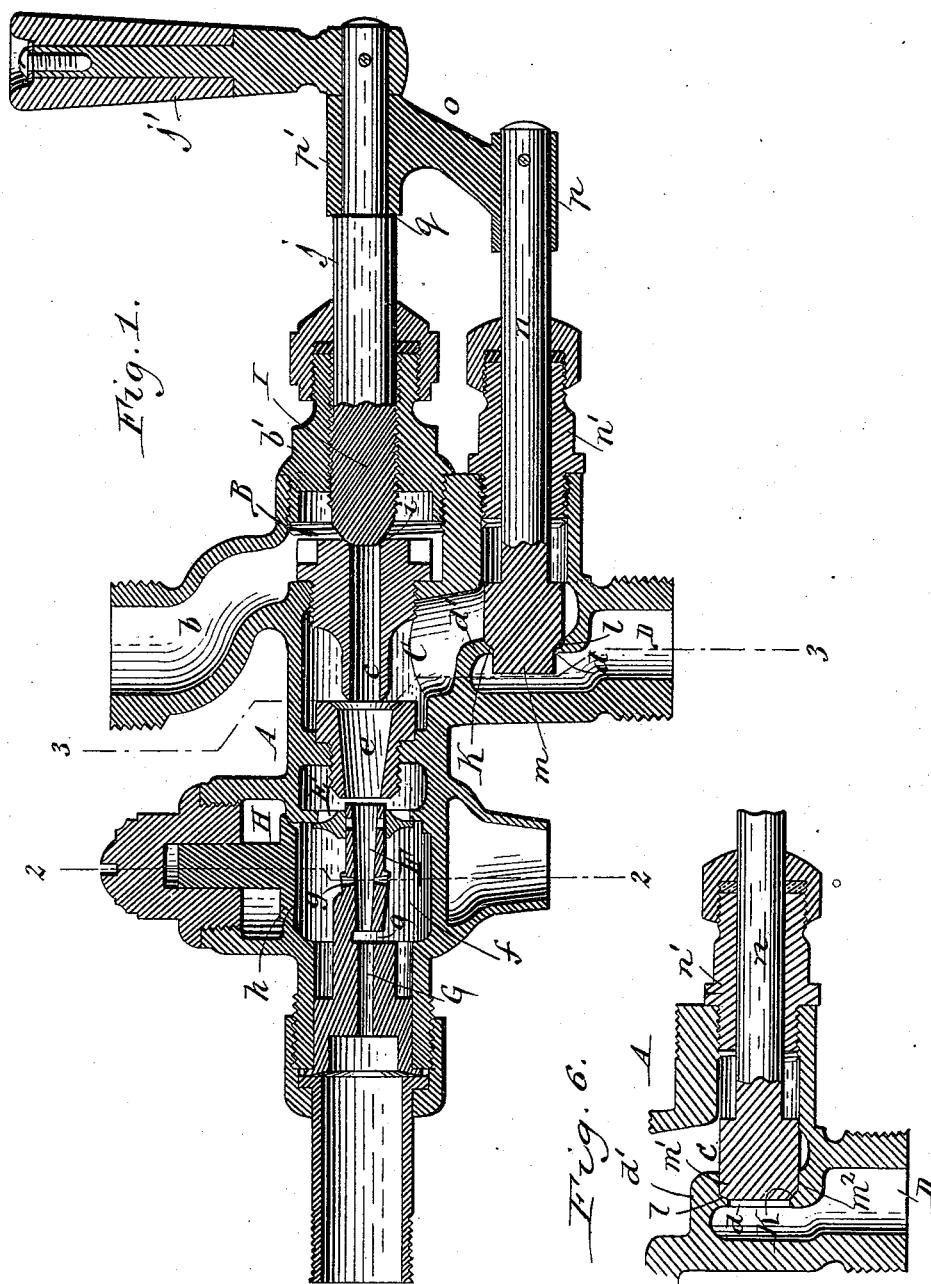
(Model.)

2 Sheets—Sheet 1.

T. J. HART.
INJECTOR.

No. 492,921.

Patented Mar. 7, 1893.



Witnesses:
F. Gustav Wilhelm.
Thos. L. Propp.

Thos. J. Hart Inventor.
By Wilhelm Rounet
Attorneys.

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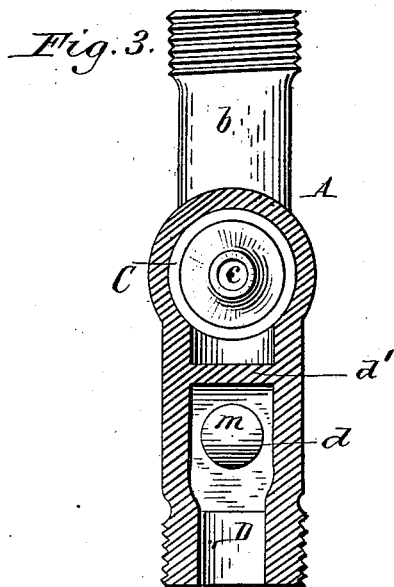
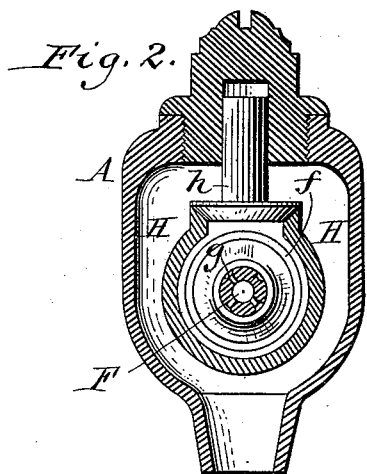


Fig. 4.

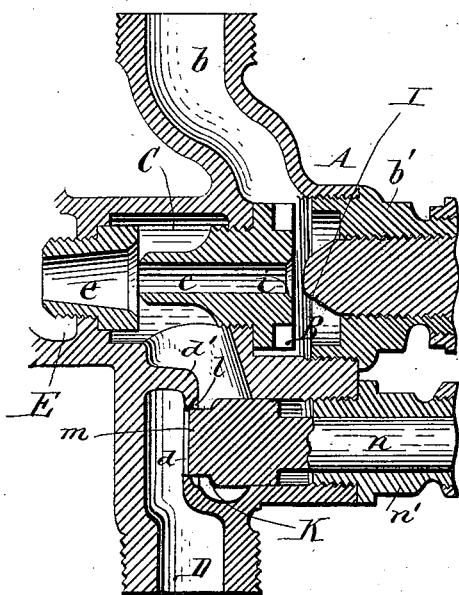
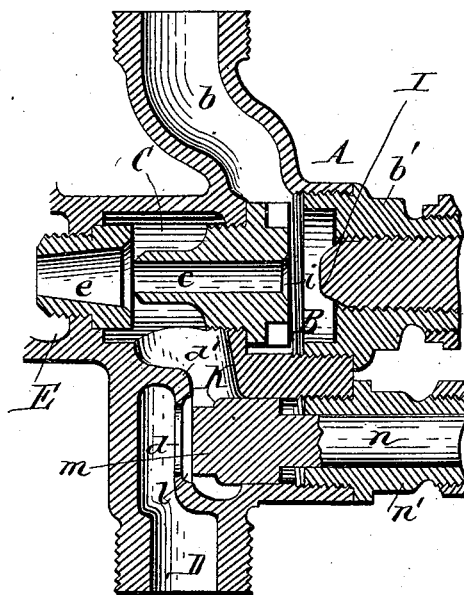


Fig. 5.



Witnesses:

F. Gustav Wilhelm.

Theo. L. Popp

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UNITED STATES PATENT OFFICE.

THOMAS J. HART, OF BUFFALO, NEW YORK, ASSIGNOR TO THE SHERWOOD MANUFACTURING COMPANY, OF SAME PLACE.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 492,921, dated March 7, 1893.

Application filed January 3, 1893. Serial No. 456,986. (Model.)

To all whom it may concern:

Be it known that I, THOMAS J. HART, a citizen of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented new and useful Improvements in Injectors, of which the following is a specification.

This invention relates to that class of injectors in which the water valve is moved simultaneously with the steam valve, as for instance in Letters Patent No. 461,197, granted to me October 13, 1891.

The objects of my invention are to provide more satisfactory means for operating the water valve from the steam valve, and to provide means whereby the waste of water incident to starting the injector is reduced.

In the accompanying drawings consisting of two sheets;—Figure 1 is a longitudinal sectional elevation of an injector provided with my improvements. Figs. 2 and 3 are vertical transverse sections in lines 2—2, and 3—3, Fig. 1 respectively. Figs. 4 and 5 are fragmentary longitudinal sections showing different positions of the steam and water valves. Fig. 6 is a fragmentary longitudinal section showing a slightly modified construction of the water valve.

Like letters of reference refer to like parts in the several figures.

A represents the shell of the injector; B the steam chamber provided with a steam inlet pipe *b*, and *b'* a screw plug closing the front end of the steam chamber.

C represents the water chamber formed behind the steam chamber and *c* the steam nozzle projecting from the steam chamber into the water chamber.

D represents the water inlet pipe which communicates with the water chamber by a passage *d* formed in a diaphragm *d'* which latter separates the water inlet pipe from the water chamber.

E represents the vacuum chamber, and *e* the suction tube leading from the water chamber to the vacuum chamber and arranged in line with the steam nozzle.

F represents the combining tube and G the delivery tube, both arranged in rear of the suction tube, and *g* represents the overflow

openings communicating with the overflow chamber *f*.

H represents the overflow passage and *h* the overflow valve.

I represents the steam valve arranged in the steam chamber and adapted to close against a seat *i* formed in the front end of the steam nozzle, whereby the supply of steam to the nozzle is controlled. This valve is formed on the inner end of a screw-threaded stem *j* which latter is arranged longitudinally with reference to the casing and passes through the screw plug *b'*. The stem is provided at its outer end with a handle *j'* for turning it when it is desired to move the steam valve toward or from its seat.

K represents the water inlet valve arranged in the water chamber and adapted to close against a valve seat *l* formed in the diaphragm *d'* around the front end of the passage *d*, which connects the water inlet pipe with the water chamber. The water valve is provided on its rear end with a cylindrical plug *m* which obstructs the passage *d* when the water valve is closed. When the water valve bears against its seat, as represented in Fig. 1, the supply of water to the water chamber is shut off. In the position of the water valve represented in Fig. 4, the water valve is opened, but its plug is still arranged in the passage *d*, whereby the flow of water is obstructed. As represented in Fig. 5, the water valve and its plug are wholly removed from the seat and passage, which permits of a full supply of water to the water chamber. The water valve is secured to the inner end of a valve rod or stem *n* which is arranged parallel with the stem of the steam valve and slides lengthwise through a screw plug *n'* closing the lower front portion of the water chamber.

o represents a yoke whereby the rod of the water valve is connected with the stem of the steam valve. This yoke is provided with a lower sleeve *p* which is secured to the outer end of the valve rod and an upper sleeve *p'* which embraces the stem of the steam valve. This stem is capable of turning in the upper sleeve *p'*, but the latter is held against lengthwise movement on the stem by the handle *j'* bearing against the outer end of

the upper sleeve and a shoulder *q* formed on the stem and bearing against the inner end of the upper sleeve. By this means the turning of the handle causes the steam and water, valves to simultaneously recede from or approach their respective seats.

In the position of the parts represented in Fig. 1, the steam and water valves are both closed. Upon turning the handle in the proper direction, both the steam and water valves recede from their seats. During the initial opening movement of both valves only steam is admitted to the nozzle, because the flow of the water into the water chamber is obstructed by the plug which is still arranged in the passage *d*, as represented in Fig. 4. When the steam valve has been opened sufficiently to admit of a full supply of steam, the plug of the water valve is wholly removed from the water passage, as represented in Fig. 5, which permits of an unobstructed flow of water to the water chamber. If water were admitted to the water chamber at the same time that the steam valve is opened, the steam pressure would be insufficient to force the water into the boiler and the water would be discharged through the overflow until the steam valve was opened far enough to obtain the amount of pressure necessary to carry the water to the boiler. By connecting the water valve with the steam valve so that they move together and constructing the water valve so that the passage controlled by it remains obstructed during the initial position of the opening movement of the steam valve, the latter is opened to the proper extent for forcing the water into the boiler before water is admitted into the water chamber, thereby reducing the waste of water attending the starting of the injector.

Instead of arranging the plug or extension *m* of the water valve on that side of the valve which is turned toward the water inlet pipe, a cylindrical extension *m'* may be arranged on that side of the valve which is turned to-

ward the water chamber, which extension moves in an extension *m²* of the water passage made of such length that the extension *m'* of the valve does not clear the extension *m²* of the passage until the steam valve has been sufficiently opened. This construction is represented in Fig. 6.

I claim as my invention—

1. The combination with the steam nozzle, the steam valve provided with a screw threaded stem capable of rotative and longitudinal movement, the water chamber, the water inlet pipe and the diaphragm arranged between the water inlet pipe and the water chamber and provided with a water passage, of a water inlet valve adapted to close said passage and provided with a stem capable of longitudinal movement, and a yoke secured to the stem of the water valve and provided with a sleeve in which the stem of the steam valve turns and which is held against longitudinal movement on said stem, substantially as set forth.

2. The combination with the steam nozzle, the steam valve and the water chamber provided with a water inlet passage, of a water inlet valve provided with an extension which obstructs the water passage during the initial portion of the opening movement of the water valve, and connecting mechanism whereby both valves are operated simultaneously, substantially as set forth.

3. The combination with the steam nozzle and the steam valve, of a water chamber provided with a water inlet passage, a water valve provided with a cylindrical plug projecting into said passage, and connecting mechanism whereby both valves are operated simultaneously, substantially as set forth.

Witness my hand this 30th day of December, 1892.

THOMAS J. HART.

Witnesses:

THEO. L. POPP,
F. E. GEYER.