

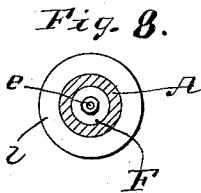
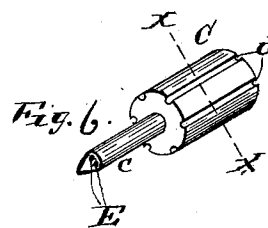
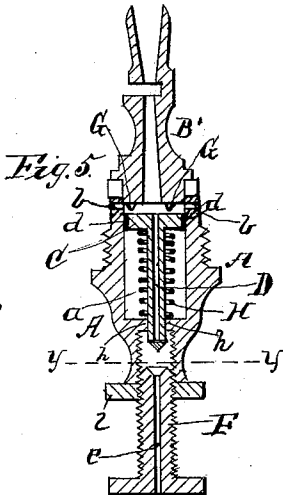
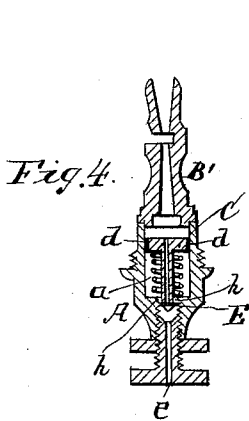
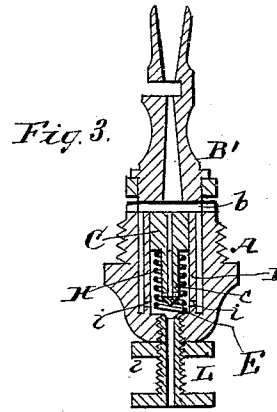
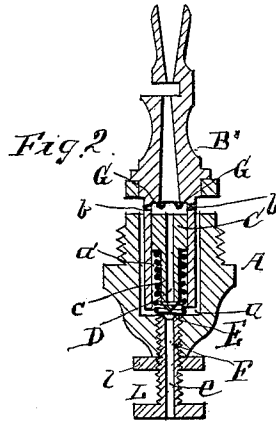
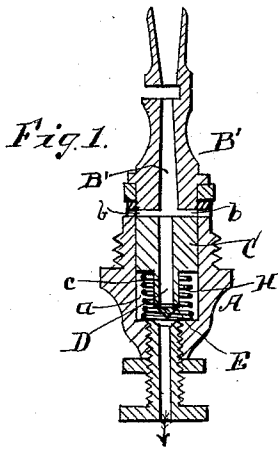
(No Model.)

2 Sheets—Sheet 1.

O. L. HALLBECK.
INJECTOR.

No. 479,214.

Patented July 19, 1892.



Witnesses
J. M. Baldwin.
M. E. Perry

Inventor
Otto L. Hallbeck.
By his Attorney
C. J. Bell

(No Model.)

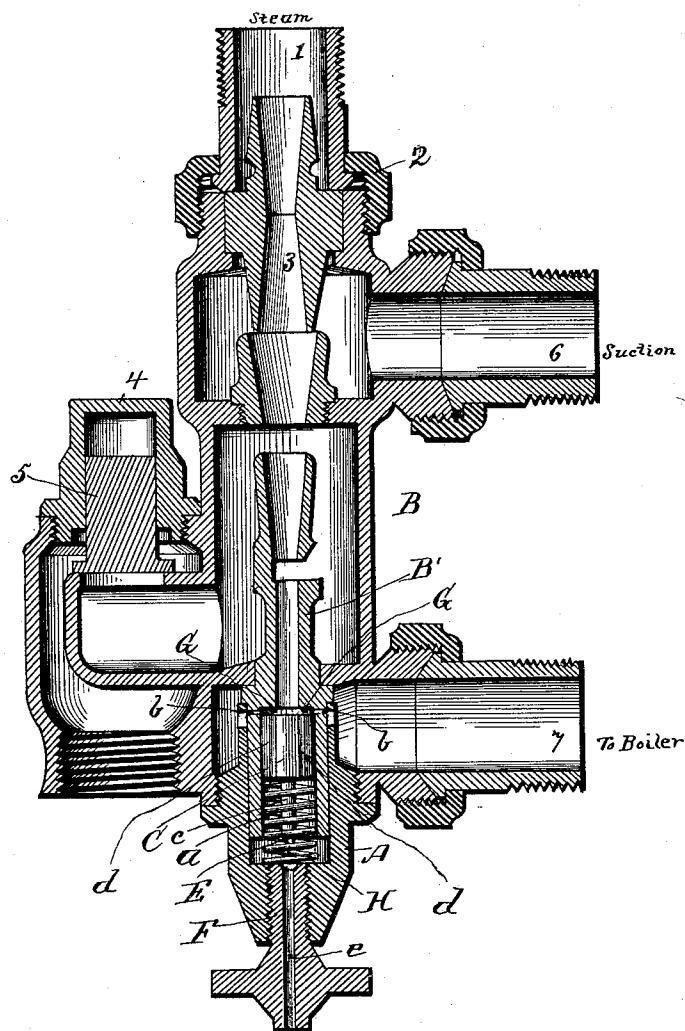
2 Sheets—Sheet 2.

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Fig. 9.



Witnesses—

L. Chalmers
B. A. Slater

Inventor—

Otto L. Hallbeck

By

C. J. Belk
Atty.

UNITED STATES PATENT OFFICE.

OTTO L. HALLBECK, OF WEST SALEM, ILLINOIS.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 479,214, dated July 19, 1892.

Application filed June 4, 1891. Serial No. 395,140. (No model.)

To all whom it may concern:

Be it known that I, OTTO L. HALLBECK, a citizen of the United States, residing at West Salem, in the county of Edwards and State of Illinois, have invented certain new and useful Improvements in Injectors, of which the following is a specification.

This invention relates to automatic drip-cocks to be employed on injectors, ejectors, &c.

The object of the invention is to provide injectors, ejectors, and similar devices with a valve or drip-cock which is operated by the water or fluid passing through such device.

A further object of the invention is to construct a valve or drip-cock for injectors, &c., with small apertures or openings, so that it may be operated by a weak current of water or fluid, and to increase the size of said apertures or openings, according to the strength of the current or size of the injector.

In the accompanying drawings, making part of this specification, Figure 1 is a sectional view of an injector with my improved valve located in the cap of the injector. Fig. 2 is a similar view with the valve or cock located in an extension of the delivery-tube of the injector. Fig. 3 shows my drip-cock or valve secured in a chamber formed in the injector-cap. Figs. 4 and 5 show the valve-stem extended through the lower portion of the injector-cap. Fig. 6 is a detached perspective view of the valve. Fig. 7 is a cross-section thereof, taken on the plane indicated by the dotted line *x x*, Fig. 6. Fig. 8 is a cross-section of the cap, taken on the plane indicated by the dotted line *y y*, Fig. 5. Fig. 9 is an enlarged sectional view of an injector with my valve in position.

The same letters and numerals of reference denote the same parts throughout the several figures.

In the cap A of the injector B is formed a valve-chamber *a*, in which is located the valve C below the vents or openings *b* of the injector, which openings allow part of the water to escape in case the pressure of the water on the valve C is too great to be carried off by the channels in the said valve, hereinafter described. The valve is provided with a projection or stem *c*, having a central bore or

hole D, which extends entirely through the valve and its stem. The valve C is provided with vertical grooves *d*, extending from the top thereof to its bottom, so that the valve C will close gradually by the fluid passing from the delivery-tube B' through the grooves *d*, through passage or bore D in the valve-stem *c*, and from thence through the apertures E, and finally out through the passage *e*. This will allow the injector to be thoroughly drained after steam is shut off and the injector stopped. These grooves *d* are graduated in size according to the strength of the current of water, steam, or liquid in the injector—that is, if the current is very weak the grooves should be small, so as to insure the certain closing of the valve; but where the current is very strong the grooves are enlarged, so that the valve will not close too quickly or suddenly. The lower extremity of the valve-stem *c* is conical-shaped, with a series of apertures E formed at right angles to the central bore D, so as to allow the fluid to pass from the said bore D through the apertures E and out through the passage *e* in the screw-threaded stem F when the valve C is raised. Prongs or projections G are formed upon the delivery-tube B', which extend downward to the vents *b*, so as to prevent the valve C from closing the vents when it is moved upward, as the top of the said valve strikes the projections and leaves a clear communication between the passage D and the vents, thereby draining the device.

Located in the valve-chamber *a* and surrounding the stem *c* is a coil-spring H, having its bearing upon the bottom of the said chamber and against the bottom of the valve C. By means of this spring the valve is lifted after the injector is stopped and the injector is thoroughly drained.

Referring to Fig. 2, the delivery-tube may project down into the chamber *a* and form a second chamber *a'*, in which is located the spring, or, as shown in Fig. 3, this second chamber *a'* may be formed by a wall I, having openings *i* formed in the cap A.

The lower portion of the injector, as shown in Fig. 2, is provided with a screw-threaded extension L, having a lock-nut *l*. This extension can be screwed up and down in the

injector and locked, so as to increase or diminish the pressure of the spring on the valve.

The valve-stem C may be made to extend down into the lower portion of the cap A, where is formed a guide *h*, the top or grooved portion of the valve, together with its stem, being T-shaped in cross-section, as shown in Figs. 4 and 5.

Referring now particularly to Fig. 9, the numeral 1 represents the tail or steam pipe connection; 2, the tail-pipe nut; 3, the steam-jet; 4, the overflow-cap; 5, the overflow-valve; 6, the suction supply-pipe connection; 7, the steam-pipe connection to a steam-boiler.

The operation of the injector, as above described, and the co-operation of the waste or drain valve C as applied in the delivery-tube B' thereof are as follows: After water is turned on the steam which is next admitted passes partly through the overflow-valve 5 and partially through the central bore D and the grooves *d* in the waste-valve C. The steam has not force enough to move the said valve down to its seat; but when the water comes in contact with the steam of course the steam is condensed and the water receives the velocity of the steam, and in passing through the small opening in the delivery-tube the velocity is still further augmented until it reaches the valve C, against which the current of water strikes and forces it down to its seat. It will therefore be observed that this valve is operated by exactly the same means that enables the injector to force water into a boiler against a pressure. It has been found by experience that the drip-cocks upon such injectors allow the water to flow too freely therefrom before the injector has commenced to operate, and therefore one purpose of the valve constructed as shown is to prevent so much water from flowing out of the injector through the drip-cock and at the same time to close the valve upon its seat not quickly or suddenly, but gradually, until the injector is well under operation. Therefore the grooves *d* and the hole D are provided, so as to let part of the force of the current pass through the valve and retard its downward movement. The water is discharged from the valve at right angles to the main current, thus still further checking the downward movement of the said valve.

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

1. An automatic drip cock or valve having a series of vertical grooves and a depending stem having a bore or hole extending throughout the valve and stem, substantially as shown and described, and for the purpose set forth.

2. The combination, with an injector having the vents *b*, of a valve having vertical grooves and located in the cap of the injector and a coil-spring surrounding the stem of the valve and situated in the chamber of the cap, whereby the injector is drained after it is stopped, substantially as described.

3. An automatic drip-cock operated by a current of water, steam, or fluid, having a grooved valve, and a stem having a central bore which extends through the valve, said stem being provided with a conical lower end having apertures formed at right angles to said central bore, in combination with the injector-cap and the coil-spring surrounding the valve-stem, having its bearing upon the valve and bottom of the said cap, substantially as shown and described, and for the purpose set forth.

4. The combination, with an injector having a delivery-tube provided with prongs or projections G, of a valve having vertical grooves and located in the cap of the injector, the valve-stem having a conical end provided with a series of apertures which open into a central opening in the valve-stem, a coil-spring surrounding the stem, whereby the valve is forced up against the said prongs or projections, and the screw-threaded extension having the lock-nut, substantially as and for the purpose set forth.

5. A drip-valve for injectors, &c., having vertical grooves and the valve-stem having a conical end provided with a series of apertures, in combination with the coil-spring and a regulating device therefor consisting of the screw-threaded extension L and its lock-nut *l*, substantially as set forth.

In witness whereof I hereunto set my hand in the presence of two witnesses.

OTTO L. HALLBECK.

Witnesses:

D. SEIBERT,
L. M. BLAND.