

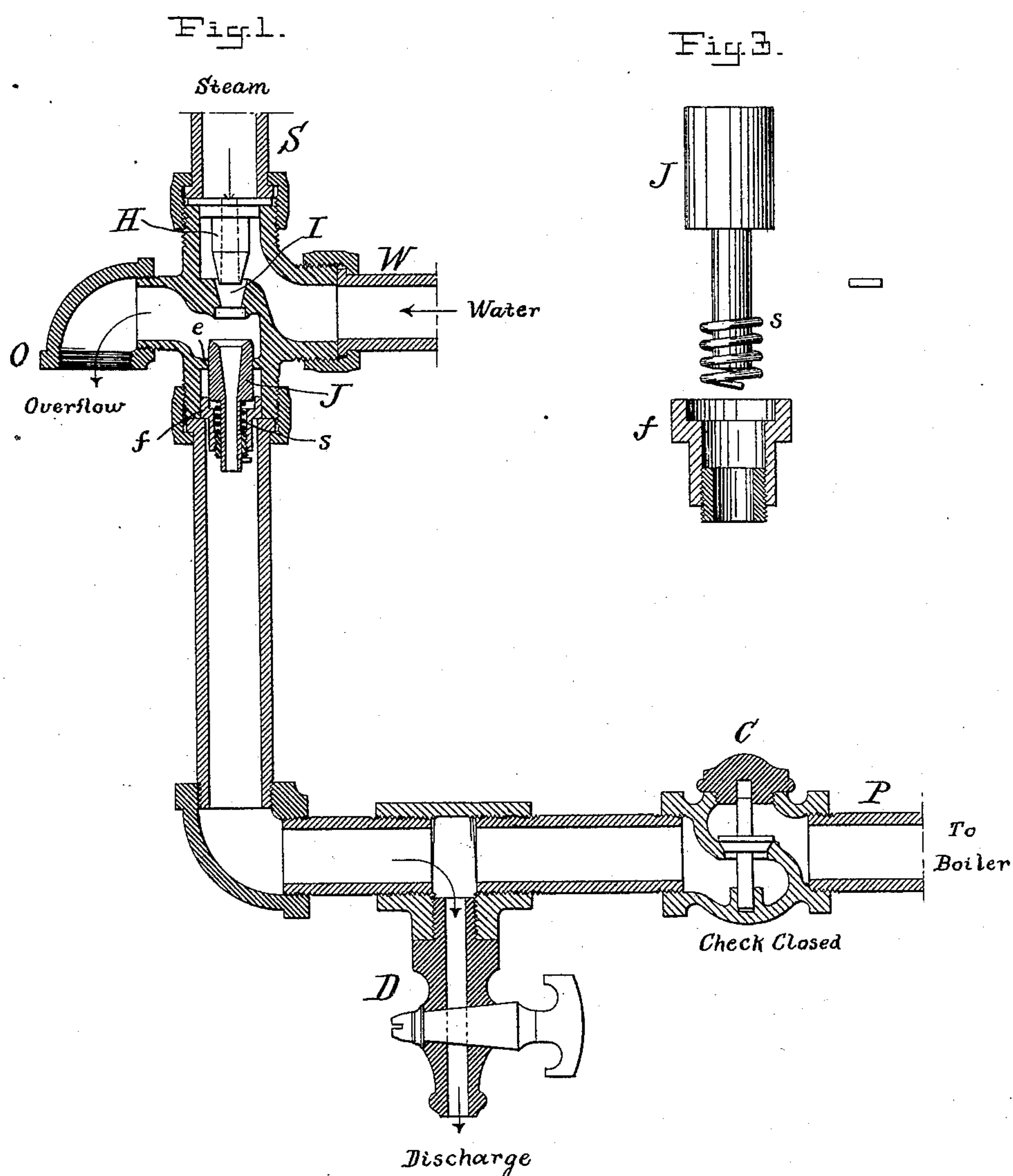
(Model.)

2 Sheets—Sheet 1.

L. E. HOGUE.
INJECTOR.

No. 430,023.

Patented June 10, 1890.



WITNESSES:

E. J. Griswold
John Revell

INVENTOR

Lozen E. Hogue
BY
Howden and Howden
his ATTORNEYS

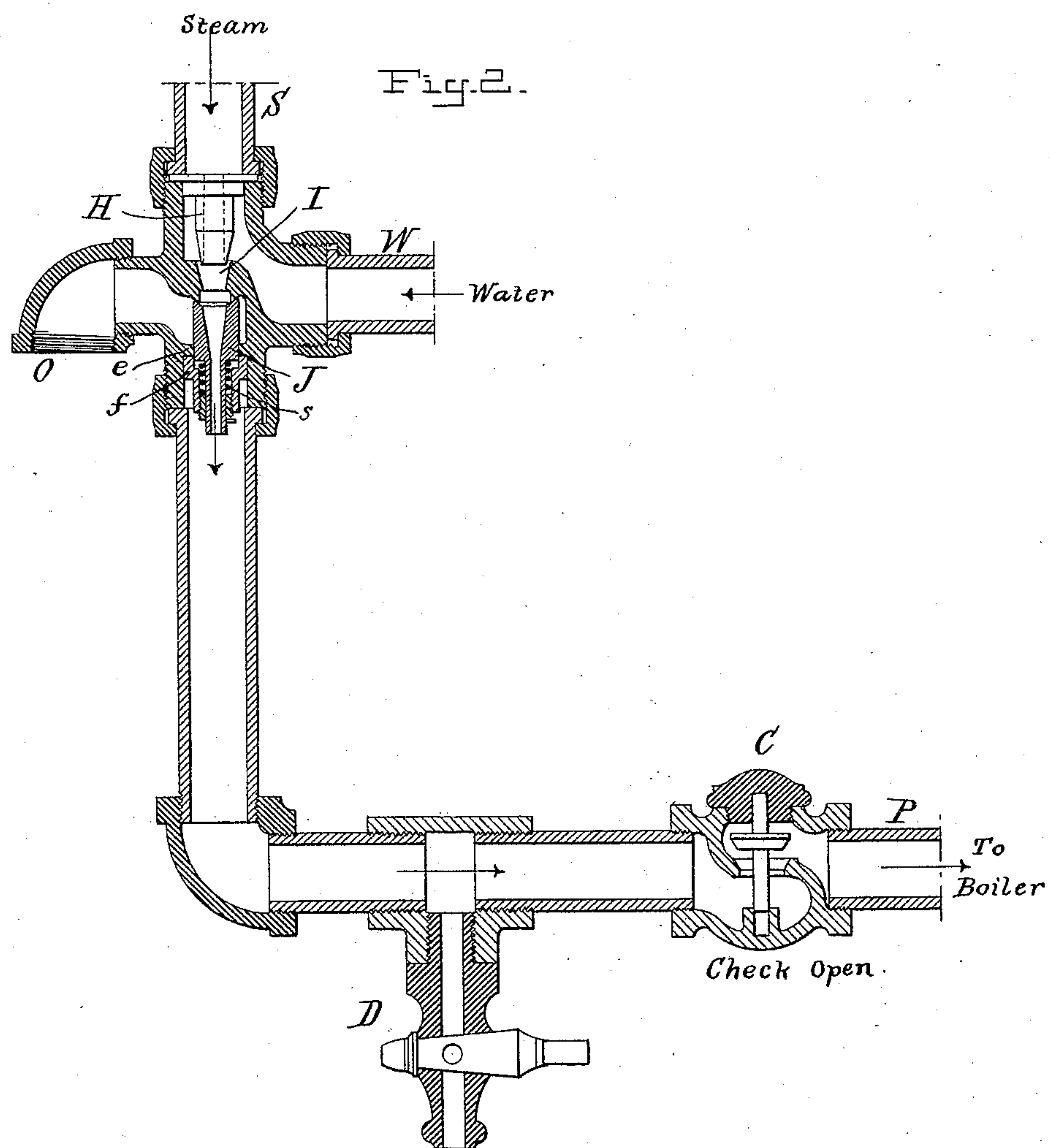
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2 Sheets—Sheet 2.

L. E. HOGUE.
INJECTOR.

No. 430,023.

Patented June 10, 1890.



WITNESSES:

C. J. Griswold
John Revell

INVENTOR

Loren E. Hogue

BY

Horsman and Hawley
his ATTORNEYS

UNITED STATES PATENT OFFICE.

LOVREN E. HOGUE, OF GREENVILLE, PENNSYLVANIA, ASSIGNOR TO THE
HODGE MANUFACTURING COMPANY, OF SAME PLACE.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 430,023, dated June 10, 1890.

Application filed March 17, 1890. Serial No. 344,102. (Model.)

To all whom it may concern:

Be it known that I, LOVREN E. HOGUE, a citizen of the United States, and a resident of Greenville, Mercer county, State of Pennsylvania, have invented an Improved Injector, of which the following is a specification.

The object of my invention is to construct a simple form of lifting and forcing injector for steam-boiler and other uses.

In the accompanying drawings, Figure 1 is a sectional view of my improved injector, showing the parts during the lifting operation. Fig. 2 is a corresponding view showing the movable parts in position during the forcing operation. Fig. 3 is an enlarged view of the combining-tube detached and with its component parts separated from each other.

The injector of my present invention embodies some of the features of the double-barreled injector of my patent, No. 408,714, dated August 13, 1889.

The shell of the injector has the usual four openings, to which are severally connected the steam-supply pipe S, the water-supply pipe W, the overflow-pipe O, and the pipe P, leading to the boiler. In this pipe P, leading to the boiler, and between the combining-tube J and the boiler, are provided a discharge-cock or petcock D and a check-valve C.

It is the steam-nozzle, whose tapered end projects a short distance into the tapered lifting-tube I. This lifting-tube is shown as cast in one with the shell of the injector; but it may be made of a separate piece. Below this lifting-tube and immediately in line therewith and with the steam-nozzle is the movable combining-tube J of my former patent. This combining-tube can slide longitudinally to the limited extent, illustrated in Figs. 1 and 2, which show it in its two extreme positions. In Fig. 1 the combining-tube is illustrated as moved back from the lifting-tube, so that there is a free outlet for the water to the overflow-opening O, while in Fig. 2 the combining-tube is moved up toward the lifting-tube, so that it closes entirely communication between the lifting-tube and the overflow. For this purpose the upper end of the combining-tube comes to a suitable seat in the shell of the injector or upon the lower end of the lifting-tube. The sliding combining-tube is provided

with a collar *f*, which fits snugly, but so as to slide freely in the shell by which it is guided, so that the water cannot pass around the tube. The shell has an annular shoulder *e*, against which this collar *f* can abut when the tube J is moved up to close the opening to the overflow.

In order to allow for variations in the construction and manufacture of the injectors and for variations arising from expansion and contraction, I make this collar *f* loose or movable to a limited extent upon the tube. I also preferably introduce a spiral spring *s* between the lower end of the collar *f* and the shoulder on the tube, so that the upper end of the combining-tube may, when the latter is moved forward, make contact with the seat in the casing. If the spring were not introduced, the upper end of the tube might not come up to the seat at the lower end of the lifting-tube when the collar *f* comes up to the shoulder *e*.

The operation of this apparatus is as follows: The steam is turned on and the discharge-cock D is opened, which has the effect of causing the check-valve C to close and shut off communication with the boiler, and at the same time the combining-tube J automatically moves away from the lifting-tube and opens the communication to the overflow O. When a head of water has been obtained, the discharge-cock D is closed, and the check-valve then opens and the sliding combining-tube J automatically moves up to close communication with the overflow, and the forcing operation then goes on as long as the supplies of steam and water continue.

In this specification I have used the terms "upper" and "lower" and "above" and "below" as applied to the positions of the parts merely in a descriptive sense, for it will be readily understood that the injector may be arranged in a horizontal or in any other position instead of the vertical one illustrated.

I claim as my invention—

1. The combination of the shell, steam-nozzle, and lifting-tube of an injector having an overflow with a sliding combining-tube adjacent to and in line with the steam-nozzle and lifting-tube, a discharge-cock, and a check-valve, both of them between the combining-tube and the boiler, the said combining-tube being adapted to automatically open the over-

flow when the discharge-cock is opened and close the overflow when the discharge-cock is closed, all substantially as described.

2. The combination of the shell, steam-noz-
5 zle, and lifting-tube of an injector having an
overflow with a sliding combining-tube in
line with the lifting-tube and a seat in the
shell for the end of the combining-tube, a dis-
charge-cock, and a check-valve, both of them
10 between the combining-tube and the boiler,
the said combining-tube being adapted to au-
tomatically open the overflow when the dis-
charge-cock is opened and come up to the said
seat to shut off the overflow when the dis-
15 charge-cock is closed, all substantially as de-
scribed.

3. The combination of the shell, steam-noz-
zle, and lifting-tube of an injector with a
sliding combining-tube adapted to open and
20 close communication with the overflow, a

shoulder on the shell, and a loose collar on the
combining-tube to abut against such shoulder,
all substantially as and for the purposes set
forth.

4. The combination of the shell, steam-noz- 25
zle, and lifting-tube of an injector with a
sliding combining-tube adapted to open and
close communication with the overflow, a
shoulder on the shell, a loose collar on the
combining-tube to abut against such shoulder, 30
and a spring between the collar and tube, as
and for the purposes set forth.

In testimony whereof I have signed my
name to this specification in the presence of
two subscribing witnesses.

LOVREN E. HOGUE.

Witnesses:

DANIEL P. PACKARD,
ALEXANDER J. GILLESPIE.