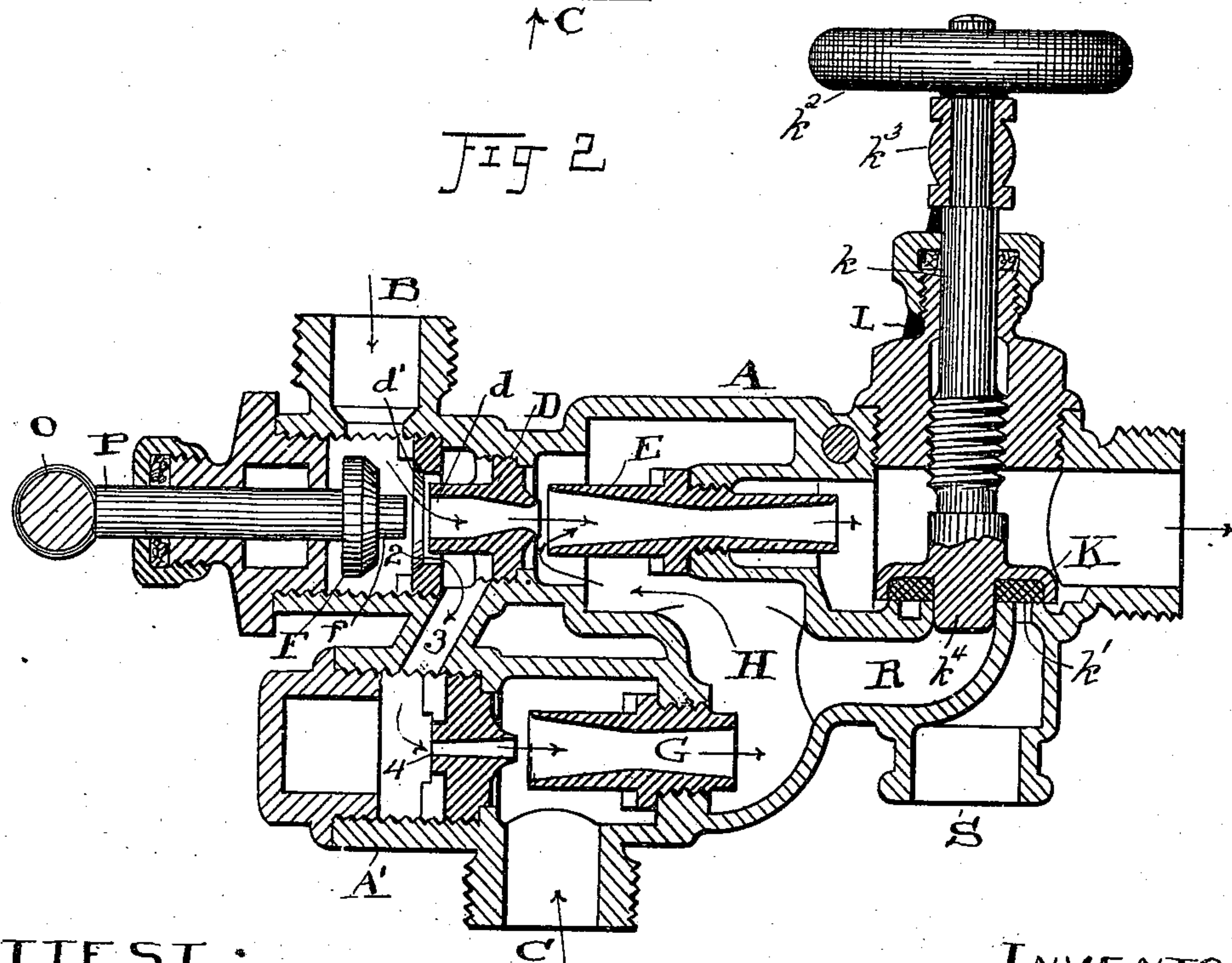
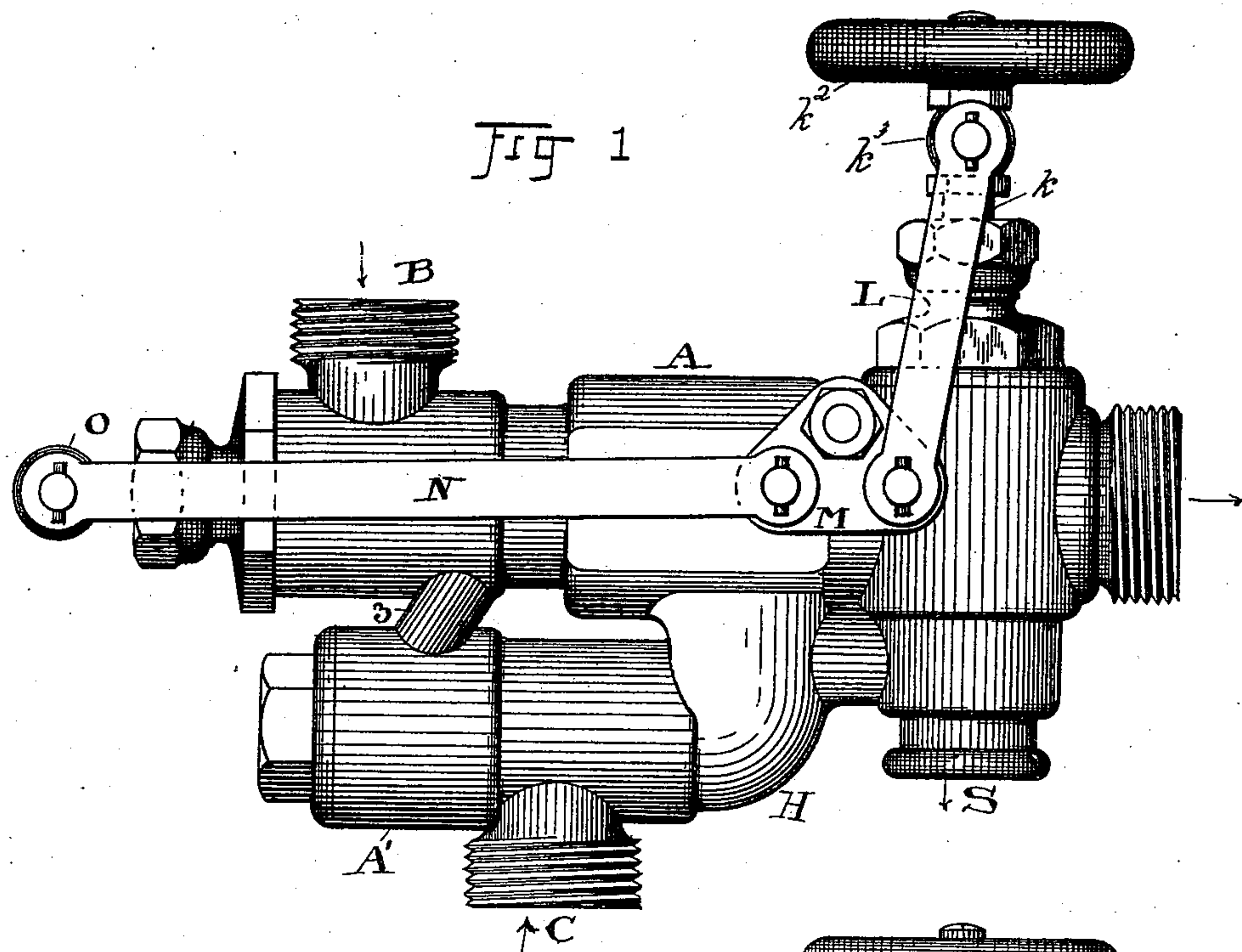


(Model.)

I. R. LAUX.
INJECTOR.

No. 501,569.

Patented July 18, 1893.



ATTEST.
R.B. Moser.

G. S. Schaeffer

INVENTOR

By *H. J. Fisher* *Isaac R. Sanx*
ATTORNEY

UNITED STATES PATENT OFFICE.

ISAAC R. LAUX, OF WADSWORTH, OHIO.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 501,569, dated July 18, 1893.

Application filed January 13, 1893. Serial No. 458,226. (Model.)

To all whom it may concern:

Be it known that I, ISAAC R. LAUX, a citizen of the United States, residing at Wadsworth, in the county of Medina and State of Ohio, have invented certain new and useful Improvements in Injectors for Boilers; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to

which it appertains to make and use the same.

My invention relates to injectors for boilers, and it consists in the construction, combination, and arrangement of parts, substantially as shown, described, and particularly pointed out in the claim, whereby the construction and operation of the device as a whole will be greatly improved.

In the accompanying drawings, Figure 1 is a side elevation of my injector. Fig. 2 is a vertical central longitudinal section of the injector, showing an overflow valve stem of the parts in the position of full operation.

A represents the shell of my injector, shown here as constructed in a single piece, but, obviously, of such character as to be constructed in several separate pieces, and as many of such pieces as may be desired.

The steam and the water inlets are indicated by B and C, respectively, and the steam forcing jet by D, and the forcing tube by E. The forcing jet D is tubular in cross section at its mouth *d* and constructed to receive the cylindrical short inner projection *f* of the valve F, which is seated at *d'*.

Between the valve seat *d'* and the extremity *d* there is an annular passage, as indicated by the arrow 2, through which steam is adapted to travel by the passage 3 into and through the lifting jet 4, located almost directly beneath the forcing jet, and, in this instance, in a separate branch or arm of the shell A, as indicated, for convenience, by A'. This lifting jet discharges into a lifting tube G, corresponding to the forcing tube E, and discharging into what I term the lifting chamber H. The idea of this construction is to have the steam enter at B and pass in a divided form partly through the forcing jet D and partly by the passage and channel 3 through the annular opening 2 into and through the lifting jet and the lifting tube into the chamber H. In this latter channel

the steam is made to assist in producing the necessary vacuum for the lifting of the water into the injector and to carry it up in position to be acted upon in and through the forcing tube E. The two jets D and 4, and the two tubes E and G are thus made to assist one another and to contribute to the common purpose of raising the water from its source and conveying it into the boiler under the pressure introduced as here described. Now, in order that the injector may be advantageously started and operated, I employ an overflow valve K, having a threaded stem *k* extending above and out of the casing A, and adapted to be operated from the outside. This overflow valve is provided with a suitable seat within the casing A, and preferably has soft seating material *k'* adapted to the seat thereof and is suitably packed about its stem to prevent leakage. When the injector is started, and in order that a start may be obtained without encountering the back pressure of the steam in the boiler, I have arranged to have this valve K more or less open, and then, when the injector is in good operating condition and ready to force the water into the boiler, the said valve K is closed and the forcing operation begins. As here shown, the said valve is provided with a hand wheel *k²* by which it may be turned to open or close, and has a sleeve or spool *k³* provided with ears on opposite sides, and links L pivoted on said ears. These links are likewise pivoted at their lower ends on the quadrant M, each on opposite sides of the main case. Connected with this quadrant are bars or rods or links N, extending to the rear of the casing and connected at their rear ends by cross heads O, which in turn are connected with the stem P of the valve F. By this construction it will be seen that when the valve stem K is turned in its threaded bearing, the said valve will be raised or lowered to or from its seat, and at the same time through the said quadrant and link mechanism the valve F will be correspondingly opened or closed. This link mechanism and the connection with the respective valve stems or spindles are such that when the valve K is closed, the valve F will be opened as seen in Fig. 2, and, on the other hand, the valve F will be closed when the valve K is opened. Likewise, when the valve K is more

or less opened, the valve F will be correspondingly opened, but not wholly, as in Fig. 2. It will occur, therefore, that when the said valve F is, say, half way open, the cylindrical projection *f* on its inside will be just emerging from the mouth of the forcing jet *d*, so that there will then be a small volume of steam entering said jet.

In starting the machine, the projection *f* will remain in the mouth of the forcing jet D until the water appears at the overflow, the steam in this case entering about the valve F and passing down through the channel 3 into the lifting channel below. Then, as the overflow valve is screwed down or lowered to its seat, the projection *f* on the valve F will be gradually withdrawn from the mouth of the forcing jet, and steam will be admitted through this passage as well, and thereby create a vacuum and current with sufficient velocity to force the water through into the boiler. It will be noticed furthermore that the overflow valve K really controls two passage ways, one from above or over the valve and the other from beneath through the elbow R, which opens into the lifting chamber H. Both these overflow channels are controlled by the valve K, and both are opened or closed at the same time. When the said valve is opened, the water will pass from the lifting chamber directly through the elbow R and out through the exhaust S into the waste. But when said valve K is closed, the water will then be forced up through the forcing tube and over the valve K into the boiler.

It will be observed that there is a cylindrical projection *k*⁴ on the overflow valve, the same as the projection *f* on the steam valve, and the mechanism in the links is so adjusted that when the overflow valve is lowered, either by the screw or handle, only a trifling move

will open the steam valve enough to give steam to the lifting jet, and at this point both overflows are yet fully open. When the water appears at the overflows the overflow valve is slowly lowered and the projection *k*⁴ will enter the mouth of the overflow passage just before the projection on the steam valve is fully withdrawn from the steam jet, thereby forcing the water up to and through the forcing tube ready to be acted on by the steam directly. When the forcing jet is opened, the overflow to the forcing tube is still somewhat open, but by the time the valve K gets down to its seat, the current will be sufficiently established to force the water through to the boiler. The projection *k*⁴ on the overflow valve does not necessarily have to close the opening of the lifting overflow tight, but enough to cause most of the water to go to the forcing tube.

Having thus described my invention, what I claim is—

In an injector, the main casing A having, to wit, the steam passages D, 3, 4, the steam and water tubes E, G, the chamber H, and the overflow passage R, in combination with the steam controlling valve F, the reciprocating valve K for the overflow passage having a screw-threaded stem, the spool *k*³ loose on said stem, quadrant M pivoted on the casing, link L connecting the spool and quadrant, and the link N connecting the steam valve and quadrant, all constructed, arranged, and operating substantially as shown and described.

Witness my hand to the foregoing specification this 31st day of December, 1892.

ISAAC R. LAUX.

Witnesses:

E. S. PARDEE,
J. H. SANTSCHI.