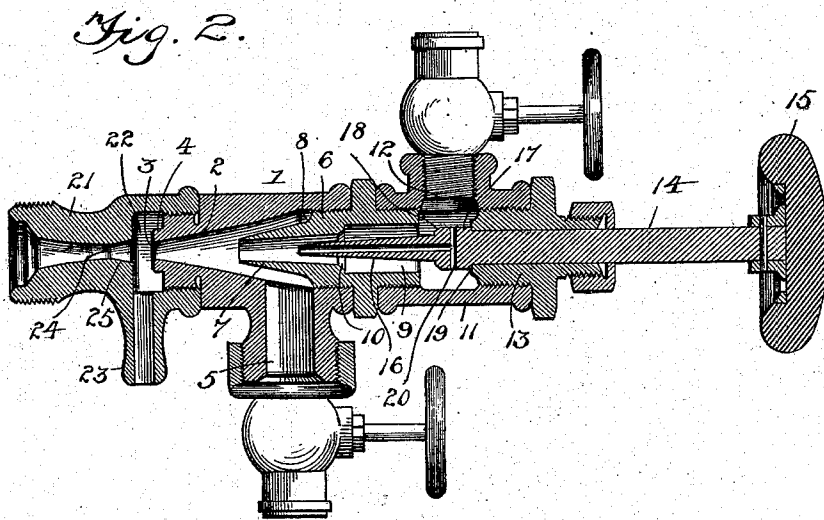
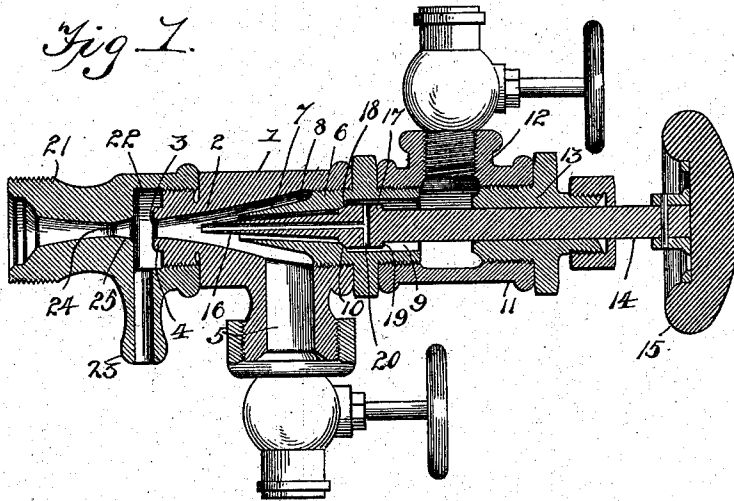


(Model.)

# C. W. UMHOLTZ. INJECTOR.

No. 559,067.

Patented Apr. 28, 1896.



Inventor

*Charles W. Umholtz*

Witnesses

*E. S. Moore*  
*S. C. Schaeffer*

By *his* Attorneys.

*C. A. Snow & Co.*

# UNITED STATES PATENT OFFICE.

CHARLES W. UMHOLTZ, OF BRISTOL, VIRGINIA.

## INJECTOR.

SPECIFICATION forming part of Letters Patent No. 559,067, dated April 28, 1896.

Application filed November 9, 1895. Serial No. 568,477. (Model.)

*To all whom it may concern:*

Be it known that I, CHARLES W. UMHOLTZ, a citizen of the United States, residing at Bristol, in the county of Washington and State of Virginia, have invented a new and useful Injector, of which the following is a specification.

This invention relates to injectors for steam-boilers; and it has for its object to effect certain improvements in injectors of this character, whereby their simplicity and efficiency shall be greatly increased.

To this end the main and primary object of the present invention is to construct an injector of as few working parts as possible, so that the same can be readily assembled and taken apart, while at the same time providing a construction in which the water shall have a free and uninterrupted circulation, thereby positively preventing the accumulation of sediment at any point, which is a very great objection to many of the injectors now in use. In addition to these objects the invention also contemplates a very desirable improvement in the priming device for the injector to lift a volume of water at the commencement of the operation, and in this connection the invention also contemplates an improved construction whereby an even and gradual flow of steam will be introduced through the steam-cone while the priming device is being adjusted to an inoperative position after having started the flow of water through the main body of the injector.

With these and other objects in view, which will readily appear as the nature of the invention is better understood, the same consists in the novel construction, combination, and arrangement of parts hereinafter more fully described, illustrated, and claimed.

In the drawings, Figure 1 is a longitudinal sectional view of an injector constructed in accordance with this invention, showing the priming device set for use. Fig. 2 is a similar view of the injector, showing the priming device adjusted to its inoperative position.

Referring to the accompanying drawings, the numeral 1 designates the main body of the injector, provided with a tapered bore 2, which tapers on regularly-converging lines toward one end of the body, where the bore terminates in a narrowed jet-orifice 3, which

extends through a short nipple 4, formed on one end of the said body 1. The main body 1 is further provided at one side with the water-inlet 5, through which the water is lifted to the interior of the body, and detachably fitted within the end of the body 1, opposite the jet-orifice 3, is a steam-plug 6, provided at one end with an exteriorly-tapered steam-cone 7, having an elongated straight bore, and which projects within the flared end of the tapered bore 2 and extends to a point within said bore beyond and at one side of the water-inlet 5. By reason of the taper of the bore 2 and the disposition of the cone 7 within the flared end of said bore an annular water clearance-space 8 entirely surrounds the cone 7, so that the water entering the inlet 5 has a free and uninterrupted agitation or circulation around the cone 7, and thereby positively prevents the accumulation of sediment at the point within the main body where the steam-cone is located.

The steam-plug 6 is provided within the end opposite the cone 7 with a narrowed valve-passage 9, at the inner end of which is formed a beveled valve-seat 10, which is substantially located at one end of the bore of the cone 7, and the said steam-plug 6 has suitably attached thereto at the end opposite the cone 7 the steam-casing 11, provided with the steam-inlet 12, through which the steam is introduced into the casing 11 for use in working the injector. The said steam-casing 11 is provided at the end opposite the plug 6 with a stuffing-box 13, in which is slidably mounted the plunger-stem 14.

The sliding plunger-stem 14 has fitted to its outer end a hand-wheel 15 and is provided at its inner end with a narrow priming-tube extension 16, which is of a smaller diameter than the elongated straight interior bore of the cone 7 and is adapted to project through said cone and to a point beyond the same within the contracted portion of the bore 2 to provide for the proper suction necessary to lift the water through the inlet 5 in starting or priming the injector. At the inner end of the priming-tube extension 16 the plunger-stem 14 is provided with a valve-collar or enlargement 17, having a beveled side 18, adapted to register in the valve-seat 10 at the inner end of the valve-passage 9, and at the

side opposite the beveled portion 18 the said valve-collar is formed with the impact-shoulder 19, against which the steam presses when the valve-collar is closed on its seat 10. The valve-collar 17 is of a smaller diameter than the bore of the passage 9 and is provided with a transverse steam-port 20, which communicates with said passage 9, and also with the inner end of the bore of the priming-tube extension 16.

The main body 1 has fitted on the end opposite the plug 6 a discharge-cap 21. The discharge-cap 21 is suitably connected with the inlet of the boiler in the usual manner and incloses at the end of the body 1, directly beyond and surrounding the nipple 4, an overflow-chamber 22, from the lower side of which extends the overflow-nipple 23, through which the water flows in priming or commencing the operation of the injector. The cap 21 is provided with a contracted bore 24, which is narrower at an intermediate point between the ends of the cap than the jet-orifice 3; but the inner end of the bore 24, directly opposite the said orifice 3, is provided with an enlarged or flared mouth 25 to insure the catching of the entire discharge from the orifice 3 when the injector is working to feed the water into the steam-boiler.

When it is desired to start the injector, the plunger-stem 14 is moved inward to carry the valve 17 against the valve-seat 10 and to completely cut off communication between the steam-cone 7 and the steam-casing 11, and when thus adjusted the priming device, including the stem 14 and the parts carried thereby, is disposed in the position illustrated in Fig. 1. A suitable pressure of steam is now admitted into the casing 11, and this steam finds its way through the valve-passage 9, the steam-port 20 of the valve-collar, and into the priming-tube. The steam discharges out of the priming-tube into the contracted end of the bore 2 with a sufficient force to lift the water through the inlet 5, so as to entirely fill the interior of the main body. In this operation the water cannot raise the ordinary check and pass into the boiler, but circulates in the overflow-chamber 22 and discharges out of the overflow-nipple 23, and in this circulation the water keeps all of the parts within the overflow-chamber perfectly clean, so as to prevent corrosion by the accumulation of lime sediment. When the injector has been thus primed and the flow of water started, the stem 14 is drawn outward; but by reason of the valve-collar 17 passing through the valve-passage 9 the full pressure of steam cannot pass into the cone 7 until the tube 16 is practically entirely withdrawn from the cone to the position illustrated in Fig. 2, and

consequently a gentle and gradual flow of steam is passed through the elongated straight bore of the steam-cone 7, so that when the steam comes in contact with the water the latter will not be violently driven forward by a sudden pressure of steam and thereby materially interfere with the proper working of the injector.

It will of course be understood that when the injector is working under a full pressure of steam through the cone 7 an increased body of water will be drawn through the inlet 5 and discharged through the bore of the cap 21 into the boiler without wasting at all through the overflow 23.

From the above it is thought that the construction, operation, and many advantages of the herein-described injector will be readily apparent to those skilled in the art without further description, and it will be understood that changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed, and desired to be secured by Letters Patent, is—

An injector comprising a main body provided with a tapered bore and at one side with a water-inlet, a steam-plug fitted to one end of the body and provided at one end with a steam-cone projected within the body and having an elongated straight bore, said plug being provided within the end opposite the cone with a narrow valve-passage 9, at the inner end of which passage is formed a valve-seat, a steam-casing fitted to the outer end of the plug and provided with an unthreaded stuffing-box, and a plunger-stem mounted to slide longitudinally in said stuffing-box and provided at its inner end with a priming-tube extension smaller than and adapted to work in the elongated straight bore of the cone, and at the inner end of said tube extension with a valve-collar arranged to work within the valve-passage 9, and of a less diameter than the same, said valve-collar being provided with a transverse steam-port and at one side with a steam-impact shoulder 19, against which the steam exerts a pressure to hold the valve-collar closed on its seat, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHARLES W. UMHOLTZ.

Witnesses:

H. PEYTON GRAY,  
D. F. BAILEY.