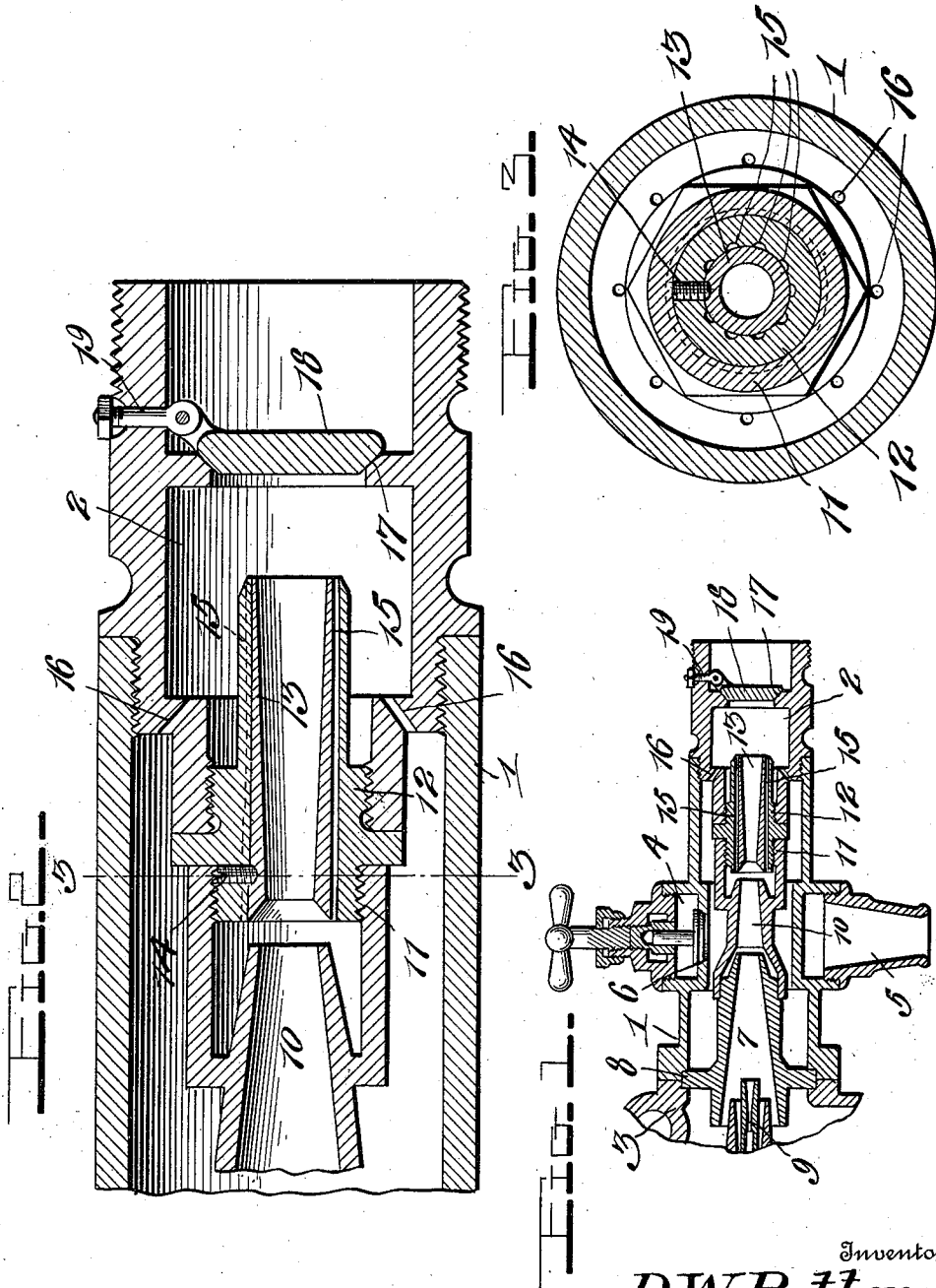


D. W. PATTON.
 INJECTOR.
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1,000,548.

Patented Aug. 15, 1911.



Witnesses

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INJECTOR.

1,000,548.

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To all whom it may concern:

Be it known that I, DAVID WILLIAMSON PATTON, a citizen of the United States, residing at Moberly, in the county of Randolph and State of Missouri, have invented certain new and useful Improvements in Injectors; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in injectors.

One object of the invention is to provide an improved construction of injector having means whereby the air or steam in the injector may readily escape or be forced out to the atmosphere without retarding or interfering with the flow of the water injected into the boiler.

Another object is to provide means whereby the delivery and other tubes of the injector may be protected from wear and corrosion thus greatly prolonging the life and saving the expense of frequently renewing the tube as is necessary in the present form of injectors.

Another object is to provide an improved construction of valve for the delivery end of the injector, said valve being arranged and supported in such manner as to prevent the same from interfering with the free passage of the water through the injector.

With these and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings: Figure 1 is a longitudinal sectional view of a portion of an injector showing my improvements applied thereto; Fig. 2 is a similar view on a large scale of the delivery end of the injector; Fig. 3 is a cross sectional view on the line 3—3 of Fig. 2.

Referring more particularly to the drawing, 1 denotes the front portion of the tubular body of the injector in the outer end of

which is arranged the delivery end connection 2 whereby the injector is connected to the boiler. The front body portion of the injector is detachably connected with the rear body portion 3, a part of which is shown in Fig. 1 of the drawing. Arranged in the body of the injector is an over-flow chamber 4 with which is connected an overflow nozzle 5 and in which is arranged an overflow valve 6. These parts may be of the usual or any suitable construction.

Arranged in the rear end of the body 1 of the injector is a lifting tube 7, said tube being held in position by a flange 8 which is clamped between the engaging ends of the front and rear portion of the injector tube as shown. With the rear end of the tube 7 is engaged the forward end of a steam nozzle 9. The forward end of the injector tube 7 projects into and is operatively connected with the rear end of the combining tube 10, on the forward end of which is formed an interiorly threaded socket 11 into which is screwed the inner or rear end of a delivery tube 12. The forward end of the delivery tube 12 projects into and has a threaded connection with the reduced inner end of the delivery end connection 2 of the injector as shown.

In connection with the delivery tube and, if desired, with the lifting and combining tubes I employ a protective lining in the form of a metal tube 13 which is adapted to be inserted in and to closely fit the tubes with which the same is engaged and which serves to protect the tubes from wear and corrosion and saves the expense of frequently renewing the tubes as is necessary in the forms of injectors now in use. By providing the tubular linings 13 the latter may be readily removed when worn and new linings engaged with the tubes thus quickly and inexpensively restoring the same to their proper working conditions. The tubular linings 13 are preferably held in the tubes of the injector by set screws 14. If desired the inner surfaces of the tubes with which the linings are engaged may be provided with longitudinally disposed grooves

or channel 15 which form a series of passages between the lining and the inner surfaces of the tubes. The grooves or channels 15 may project straight through the tube or said grooves may be arranged spirally or at any desired angle and they are provided to permit the rapid discharge or evacuation of any air or steam which may be in the body of the injector without interfering with the passage or flow of water through the tubes. This discharge or evacuation of the air or steam in the delivery end connection of the injector is also facilitated by means of an annular series of discharge passages 16 arranged in the juncture of the reduced inner portion of the delivery end section 2 of the injector and the enlarged outer portion of said section as shown. In the forms of the injectors now in use a pocket is provided to receive the air in the body portion of the injector or said air is obliged to pass out through the same passage through which the injected water and steam is flowing, thus interfering with or retarding the free flow of the water through the tubes. By means of the air discharge grooves in the inner walls of the tube and between said walls and the lining tubes 13 and the discharge passages 16 this air may readily escape from the body portion of the injector or will be forced out by the passage of the steam and water through the tubes without in any manner interfering with the free flow of the water.

Formed in the delivery end connection of the injector is a valve seat 17 with which is engaged a check valve 18, said valve being hingedly connected at its upper side to the upper portion of the delivery end section 2 by means of an eye bolt 19 or other suitable hinge member whereby the valve will swing loosely out of engagement with its seat when engaged by the pressure of the steam and water being injected through the tubes and which will immediately close by gravity as soon as the flow of steam and water has been stopped, thus preventing any water or steam from the boiler entering the injector. By arranging the valve as herein shown and described it will be seen that the same will swing clear of its seat and will not interfere with or present any obstruction to the flow of the water passing through the injector.

In the present instance the lining tube 13 is shown as being applied only to the delivery tube 12. It is obvious however that the lining may be applied to all of the tubes of the injector as hereinbefore described. The delivery tube is also here shown as having arranged therein the discharging or evacuating grooves which act in connection with the passages 16 to permit the quick discharge of the air from the delivery section

of the injector but it will be understood that I may employ the lining tubes in connection with the injector tubes without forming the discharge grooves in the latter.

From the foregoing description taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

Various 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 the invention as defined in the appended claims.

Having thus described my invention, what I claim is:

1. In an injector, a tubular body, a delivery tube operatively mounted in said tubular body, said tube having formed in its inner surface a series of grooves forming discharge passages and a removable lining adapted to be engaged with the grooved inner surface of said delivery tube.

2. In an injector, a tubular body portion, a delivery end connecting section arranged in the outer end of said body portion, said section having a reduced inner end, and a series of discharge passages formed therein adapted to permit the escape of the air in said section.

3. In an injector of the character described, a tubular body portion, a delivery end connecting section arranged in the outer end of said body portion, a series of discharge passages formed therein, a hinged check valve arranged in said body portion and adapted to swing out of the path of the inflowing water passing therethrough, and an eye-bolt through the wall of the body portion, said eye-bolt forming a hinge for said check valve.

4. In an injector of the character described, a tubular body portion, a delivery end connecting section having a reduced inner end provided with a series of air discharging passages, a delivery tube inserted in and engaged with the reduced inner end of said end connecting section, a combining tube operatively connected to said delivery tube, a lifting tube having an operative engagement with said combining tube, said delivery tube having formed therein a series of grooves and lining tubes adapted to be detachably engaged with said delivery, combining and lifting tubes whereby the same are prevented from wear and corrosion.

5. In an injector of the character described, a tubular body portion, a delivery end connecting section arranged in the outer end of said body portion, said connection having formed therein a series of air discharge passages, a delivery tube secured in the inner end of said end section, said tube

having formed therein a series of spiral
grooves adapted to form air discharge pas-
sages, a removable lining adapted to be en-
gaged with the grooved inner surfaces of
5 said delivery tube whereby the latter is pro-
tected from wear and corrosion and means
to secure said lining in position in the tube.

In testimony whereof I have hereunto set
my hand in presence of two subscribing wit-
nesses.

DAVID WILLIAMSON PATTON.

Witnesses:

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A. H. BORGMAYER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
