

(Model.)

W. T. EWING.

INJECTOR.

No. 376,188.

Patented Jan. 10, 1888.

Fig. 1.

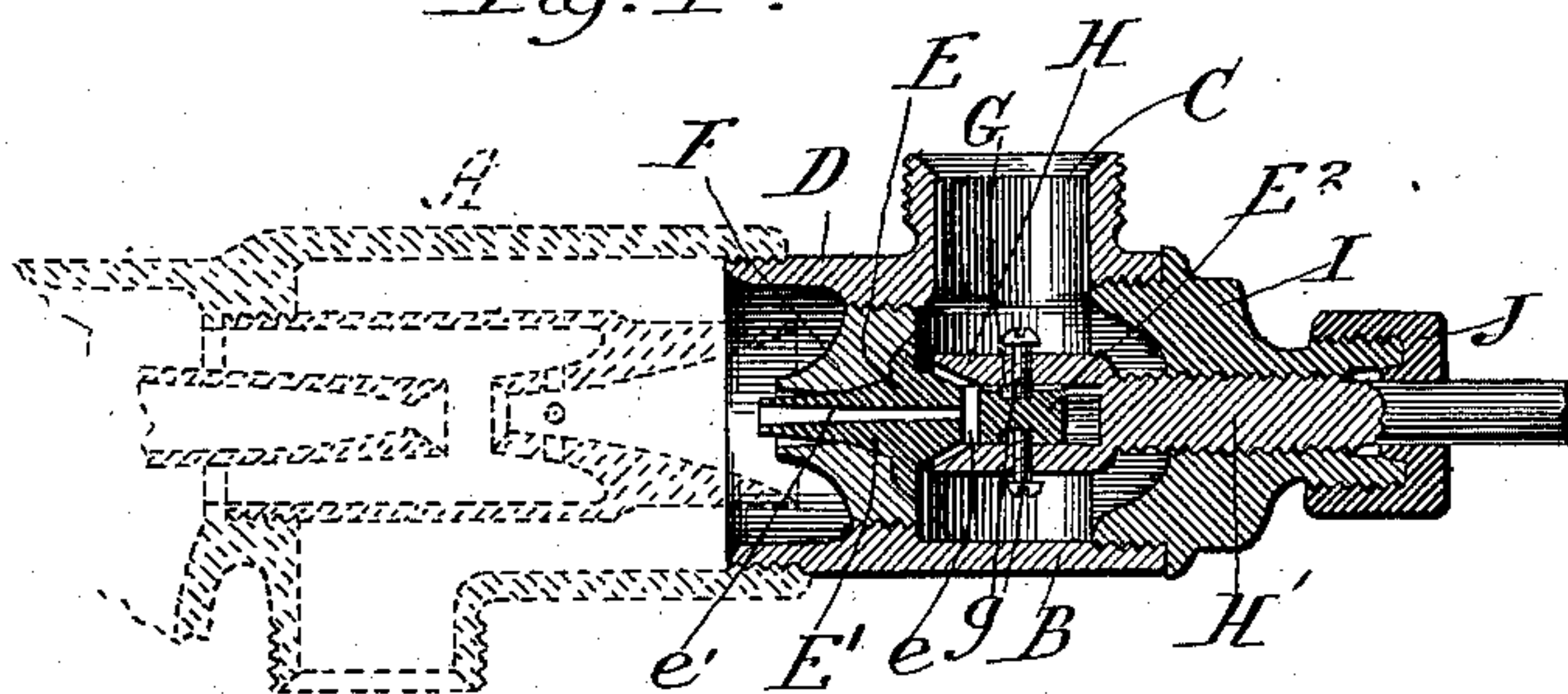
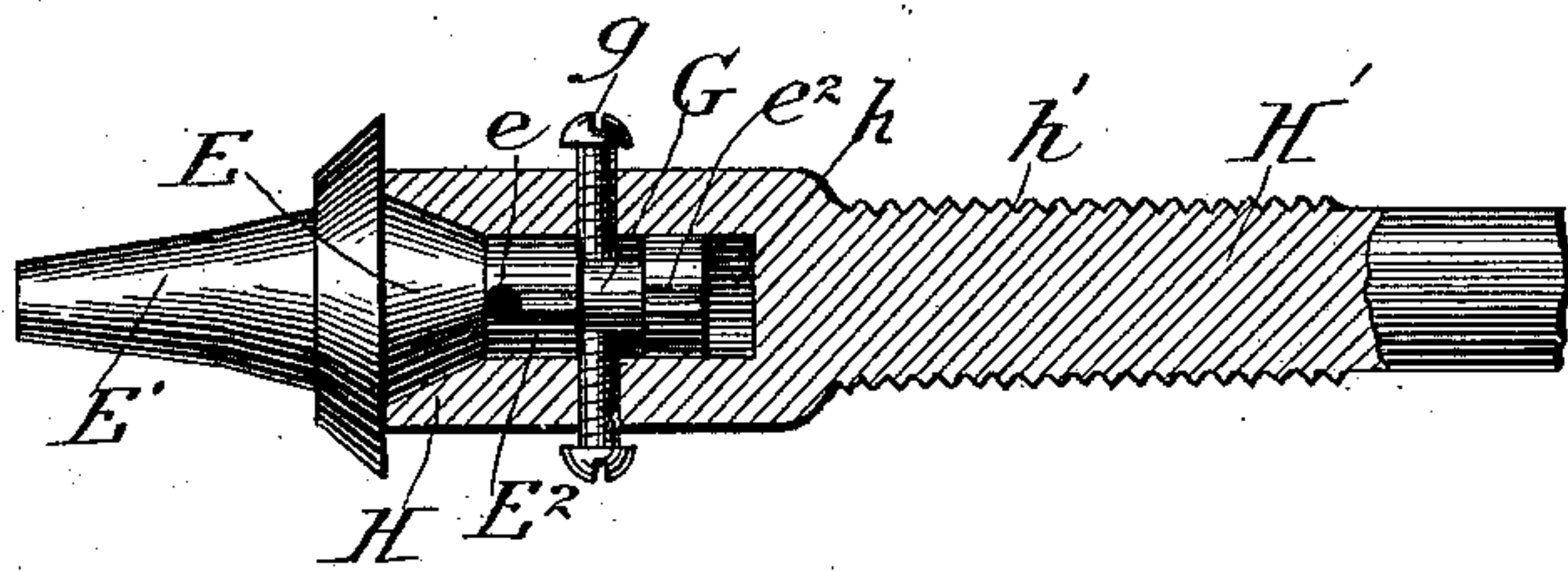


Fig. 2.



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INJECTOR.

SPECIFICATION forming part of Letters Patent No. 376,188, dated January 10, 1888.

Application filed August 6, 1887. Serial No. 246,346. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM T. EWING, of Chicago, Illinois, have invented certain new and useful Improvements in Injectors, of which the following is a specification.

My improvements relate particularly to the steam-valves of lifting-injectors, and my object is to secure in such injectors simplicity of construction and efficiency in operation.

In the accompanying drawings I have illustrated my improvements in connection with an injector, the principal elements shown being the injector proper, (shown in broken lines,) the case or shell for containing the steam-valves, and having a steam inlet and outlet and a screw-cap or end piece; a main valve having a central-discharge steam-plug through which steam passes to prime the injector, and also adapted to be opened to admit steam directly to the injector to force water to the boiler; a seat for said valve formed in or screwed in the case or shell; an auxiliary valve seated on the main valve and sliding on the stem thereof and adapted to open and close the aperture of the main valve; a screw or screws which pass through the substance of the auxiliary valve and engage the main valve and a valve-stem and operating-handle, whereby the auxiliary valve is first operated to open the aperture of the main valve and a further movement of the handle opens the main valve, and the usual packing device for the valve-stem.

Figure 1 is an elevation in longitudinal section, and Fig. 2 is a plan view of the main valve and its connections and a sectional view of the auxiliary valve and part of its stem.

A is the injector; B, the case or shell in which the steam-valves are located. C is the steam-inlet; D, the steam-outlet or branch with which the main steam-valve and the combining-nozzle of the injector communicate.

E is the main valve, and F its seat, the latter, as shown, being screwed into the case B. Valve E has a conical extension, E', forming a steam-plug. This steam-plug has a longitudinal aperture, e', which communicates with an aperture, e, in the main valve and on the steam side. The back of the main valve is so constructed as to form a seat for the auxiliary valve, and its diameter is greater than that of

said valve, whereby an extended surface on the back of said valve is presented to the steam, so that the valve is held to its seat while the injector is priming.

E² is a short stem on the main valve, which enters a hollow in the auxiliary valve. As shown, the aperture e is in this stem. This stem has a groove or channel, e², extending longitudinally of its surface, whereby steam is admitted to the chamber in the hollow of the auxiliary valve and behind the stem of the main valve when the aperture in the latter is uncovered, to assist in separating the valves and hold the main valve on its seat. This stem has also an annular groove, G, which receives the end of a screw or screws, g, which passes through the substance of the auxiliary valve, its end protruding into the groove and being adapted to engage the walls thereof to operate the main valve. One screw will be sufficient and should be fitted steam-tight.

H is the auxiliary valve, and h its hollow, which is longer than the stem of the main valve, whereby a steam-chamber is provided at the end of said stem. Valve H has a stem, H', with a threaded portion, h', to engage corresponding threads in the cap I. When so constructed, the valves are operated by screwing the stem out and in; but said stem may be made plain and to slide out and in. It has the usual stuffing-box, J.

In operation the auxiliary valve is drawn back, uncovering the aperture e, when the steam will flow through this aperture and out through the orifice of the steam-plug to prime the injector. When the water appears at the overflow, the auxiliary valve is drawn farther out until the screw g engages the rear wall of the groove G in the valve-stem E², and the main valve is drawn from its seat, when the steam is admitted directly to the injector to force water to the boiler.

The valves here described can be withdrawn from the case B by unscrewing the cap I, and then separated by turning the screw g out of the groove G. The main valve is held effectually to its seat while the injector is priming by the steam-pressure which acts upon its entire area, and the steam admitted through the groove to the chamber behind stem E² will assist to prevent said valve sticking should

obstructions find their way into the working parts. The main valve is not twisted in its seat, and if a plain stem be used on the auxiliary valve the latter is also withdrawn without turning. The screw *g* should not impinge on the bottom of groove *G*, but simply project far enough into said groove to engage the walls thereof.

I claim—

1. The combination, with a main valve having a central-discharge orifice communicating by a suitable aperture with the steam-space, of an auxiliary valve seated on the main valve and adapted to slide thereon to open or close the aperture therein, and a screw, as *g*, projecting through the substance of the auxiliary valve and into a groove in the stem of the main valve, whereby to operate the latter, substantially as set forth.
2. The combination of the main valve having a central-discharge orifice, *e'*, and an aper-

ture, *e*, a stem, *E*², having a groove, *e*², and an annular groove, *G*, with an auxiliary valve, *H*, seated on the main valve and adapted to slide on its stem to open or close the aperture, and a screw, as *g*, projected through the body of the auxiliary valve into the annular groove *G*, whereby to operate the main valve, substantially as set forth.

3. The combination of the central-discharge steam-valve *E*, having a stem, *E*², provided with a longitudinal groove, *e*², and entering the hollow of an auxiliary valve, an auxiliary valve having a hollow, *h*, of greater length than the stem *E*², whereby to form a steam-chamber behind said stem, and a screw, as *g*, and groove, as *G*, forming a sliding connection between said valves, substantially as set forth.

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Witnesses:

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