(Model.)

W. B. MACK.

INJECTOR.

No. 457,514. Patented Aug. 11, 1891.

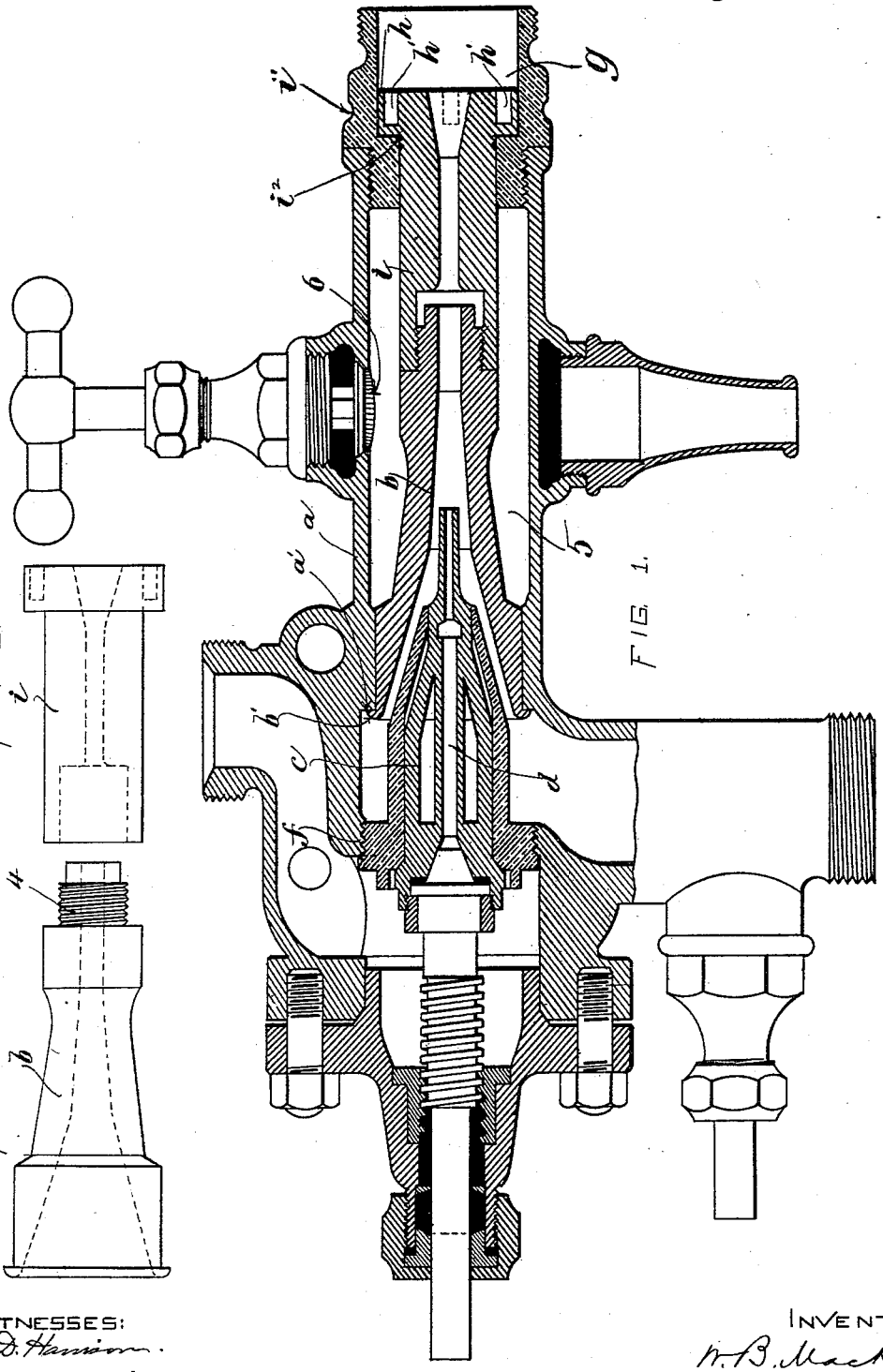

FIG. 1.

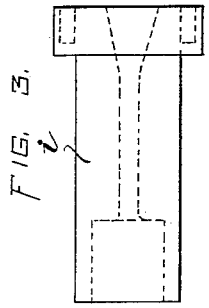

FIG. 3.

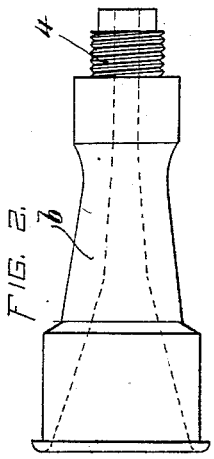

FIG. 2.

WITNESSES:
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UNITED STATES PATENT OFFICE.

WILLIAM B. MACK, OF BOSTON, MASSACHUSETTS.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 457,514, dated August 11, 1891.

Application filed March 11, 1891. Serial No. 384,540. (Model.)

To all whom it may concern:

Be it known that I, WILLIAM B. MACK, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Injectors, of which the following is a specification.

This invention relates to boiler-feeding injectors in which the combining-tube of the injector which receives the current of mingled steam and water is surrounded by a water-space communicating with the interior of said tube and with an overflow-nozzle.

The invention has for its chief object to provide certain improvements in the construction of the injector, whereby access to said space for the purpose of removing deposits of lime or other foreign matter therefrom will be made more feasible; and it consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a longitudinal section of an injector embodying my improvements. Figs. 2 and 3 represent side views of the combining and delivery tubes of the injector, said tubes being separated.

The same letters and numerals of reference indicate the same parts in all the figures.

In the drawings, *a* represents the casing of the injector, and *b* represents the combining-tube located within said casing and having an enlarged inner end which receives the cone *c*, around which the water enters said combining-tube and through which the steam-nozzle *d* passes into the combining-tube.

i represents the delivery-tube, which constitutes a continuation of the combining-tube.

My present invention relates entirely to the construction of the combining and delivery tubes and to the mode of their application to the casing of the injector, the injector being in all other respects substantially the same as the well-known Mack injector, although I do not desire to be understood as limiting myself in my improvements, hereinafter described, to this particular style of injector, but may apply said improvements to any other injector to which they are applicable.

The combining-tube *b* is provided at its inner and larger end with a narrow outwardly-projecting flange or lip *b'*, which is of smaller diameter than the internally-screw-threaded opening *f*, into which the cone *c* is screwed, so that the portion of the combining-tube on which said flange is formed may be passed through said opening before the steam-cone is applied. The flange *b'* has a bearing on a shoulder *a'* formed within the casing, said shoulder supporting the flange and preventing the combining-tube, on which it is formed, from moving toward the delivering end of the injector-casing.

The combining and delivery tubes are detachably united by a screw-thread connection, one member of which is an external thread 4, formed on the combining-tube, while the other is an internal thread formed within the delivery-tube. The delivery-tube has at its outer end a head or enlargement *h*, which is adapted to rotate in a chamber *g*, formed in the delivery-tube nut or terminal *i'*, which is screwed into one end of the casing, said nut *i'* having an internal shoulder i^2, which constitutes a bearing for the inner side of the head *h*. Said head *h* is provided with orifices *h' h'* to enable it to be engaged by a spanner, whereby the delivery-tube may be rotated to engage it with or remove it from the combining-tube.

From the foregoing it will be seen that the combining and delivery tubes are inserted to place from opposite ends of the casing, the combining-tube being inserted from one end and the delivery-tube from the opposite end. The said tubes are united within the casing by screwing their threaded ends together, this being accomplished by rotating the delivery-tube by means of its head *h* until the flange *b'* of the combining-tube comes to a firm bearing on the shoulder *a'* of the casing. It will be observed that the delivery-tube has no screw-thread connection with the nut *i'* and is free to rotate independently in said nut. This fact enables the delivery-tube to be readily unscrewed from the combining-tube and withdrawn from the casing whenever it is desired to obtain access to the space 5, surrounding the combining-tube.

It often happens that when the water forced by the injector contains a considerable percentage of lime solid accumulations of this

material will form in the space 5 to such an extent as to fill the same and obstruct the overflow-outlet 6. This accumulation is of a very rigid nature, and therefore makes it difficult, if not impossible, to remove the combining-tube, the main portion of said tube being surrounded and embedded in said deposit. Heretofore the delivery-tube has been so constructed and applied to the casing that it can only be removed with the combining-tube. Hence access to the space 5 for the purpose of removing said deposits is oftentimes a matter of great difficulty.

It will be seen that my improvement, which comprehends the making of the delivery-tube independently removable, enables said delivery-tube, which presents but a small surface to the space 5 and is so located as to be beyond the area or portion of said space in which the principal accumulation of lime occurs, to be readily removed, so that free access can be had to the space 5 for the purpose of removing the deposits of lime therein, either by the introduction of a suitable acid or otherwise. My invention therefore obviates all difficulty concerning the removal of deposits from the space 5, thus making it easy to keep the injector in good working order and reducing the liability of permanent disability of the injector.

I claim—

In an injector, the combination of the casing having an internal shoulder a', the shouldered terminal or nut i', engaged with one end of the casing and provided with an internal shoulder i^2, the combining and delivery tubes detachably united at their meeting ends by a screw-thread connection, the inner end of said combining-tube having a flange b' formed to bear on the shoulder a' of the casing and the outer end of the delivery-tube, and a head h, formed to bear on the shoulder i^2 of the nut, the said delivery-tube being independently rotatable and adapted to be engaged by a tool, whereby the delivery-tube may be rotated to engage it with or remove it from the combining-tube, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 3d day of March, A. D. 1891.

WILLIAM B. MACK.

Witnesses:
WM. B. MACK, Jr.,
C. F. BROWN.