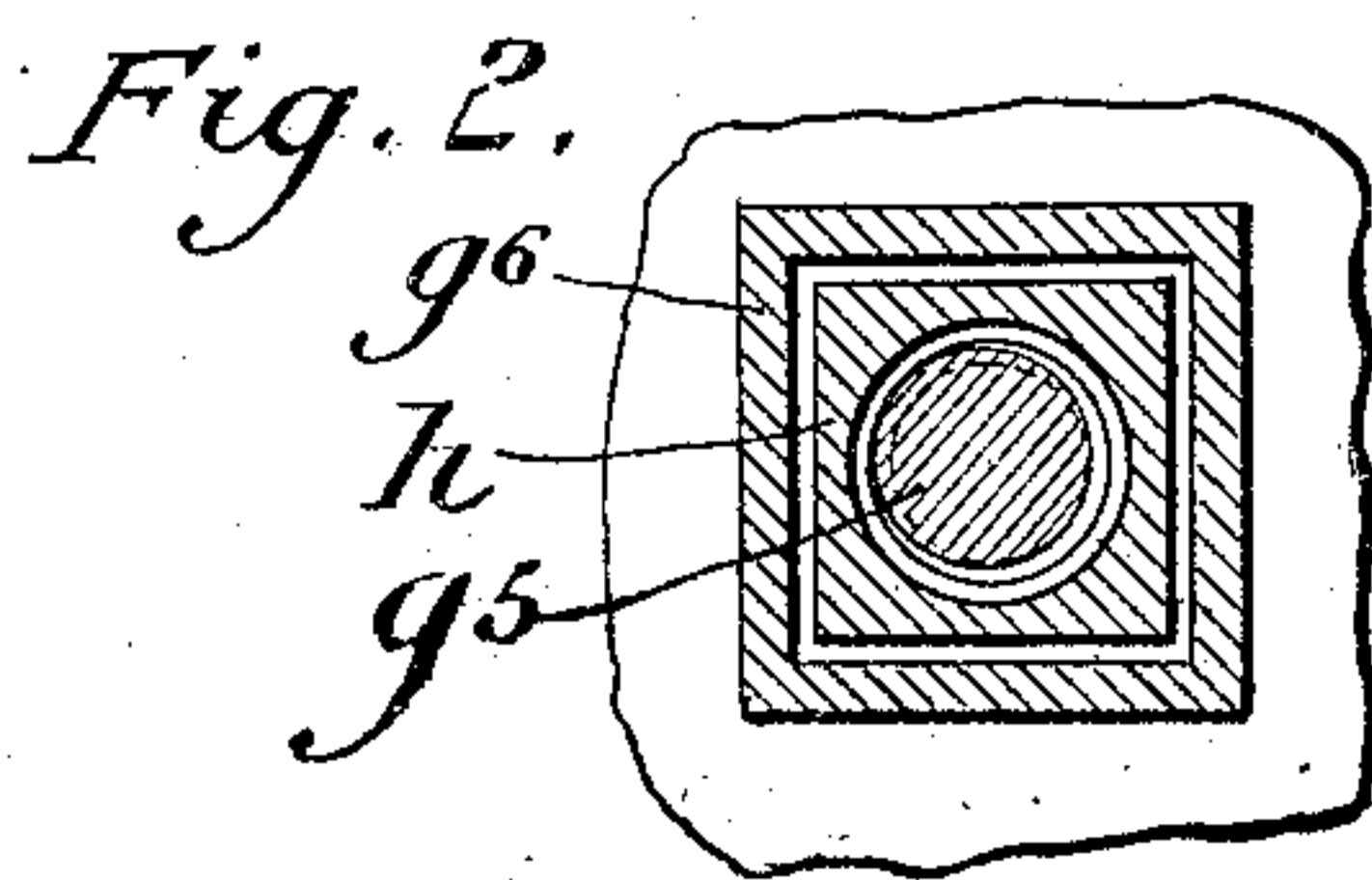
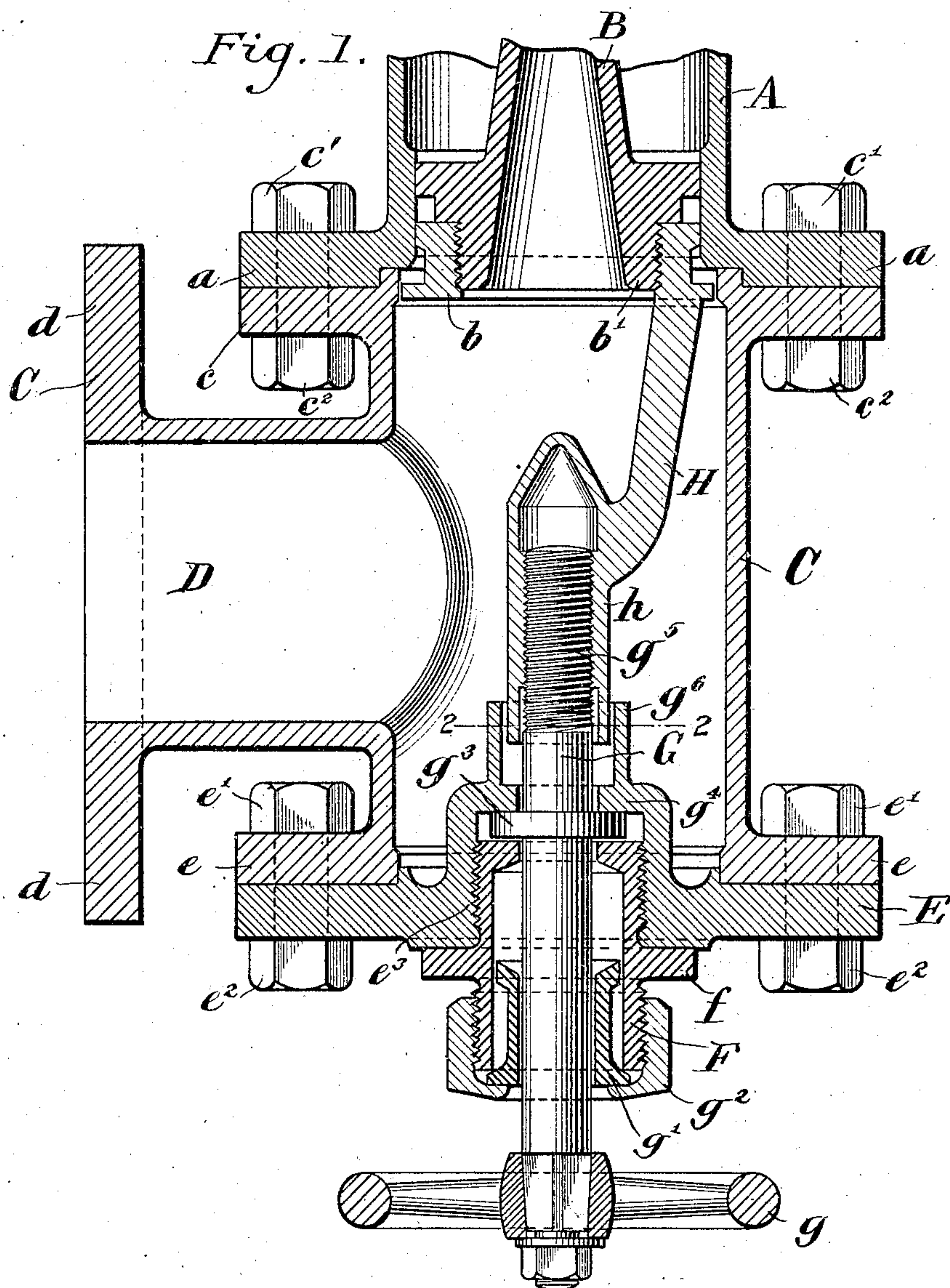


No. 785,409.

PATENTED MAR. 21, 1905.

W. B. CULVER.  
STEAM INJECTOR.  
APPLICATION FILED JAN. 20, 1904.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

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## STEAM-INJECTOR.

SPECIFICATION forming part of Letters Patent No. 785,409, dated March 21, 1905.

Application filed January 20, 1904. Serial No. 189,869.

*To all whom it may concern:*

Be it known that I, WILLARD B. CULVER, a citizen of the United States, residing at Carbondale, in the county of Lackawanna and State of Pennsylvania, have invented a certain new and useful Improvement in Steam-Injectors, of which the following is a specification.

In steam-injectors heretofore commonly employed difficulty has been experienced with respect to the fouling of the internal mechanism through the passage of water containing impurities, such as lime, &c. During the passage of the water impregnated with or carrying such impurities through the mechanism, and particularly through the combining-tube, such impurities accumulate upon the surface over which the water flows, thereby forming a scale upon such surface, which becoming hard tends to obstruct the further passage of water whether pure or impure.

The primary object of the present invention is to provide an injector from which the combining-tube may readily be withdrawn for the purpose of cleansing the operative surface thereof from such impurities.

A further object is to simplify injector construction and increase the efficiency thereof.

In carrying out the invention I employ a main casing, in which the combining-tube is adjustably mounted. To this casing is detachably secured an elbow or T connection, having an orifice whereby water passing through the injector may be forced to the boiler. Said connection is also provided with an orifice lying directly below the combining-tube and of such size as to permit such tube to be removed therethrough. Coacting with this orifice is the combining-tube-adjusting mechanism, in the present instance taking the form of an adjusting-screw operated by a hand-wheel and connected with a sliding collar within the main casing, to which the combining-tube is secured.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a central vertical section of the lower portion of a steam-injector embodying

my invention, and Fig. 2 is a detail view hereinafter to be referred to.

The main casing A, within which the combining-tube B is slidably mounted, is here shown as provided with an annular flange *a*. Within the neck of the main casing A operates the collar *b*, having a threaded orifice with which the lower threaded end *b'* of the combining-tube coacts.

C designates the elbow connection, the upper portion whereof is here shown as provided with the flange *c*, coacting with the flange *a*, both flanges being detachably secured together by any suitable means—as, for instance, the bolts *c'* and nuts *c''*.

D designates the outlet-orifice to the boiler. If desired, this may be provided with the annular flange *d*, whereby the same may be connected either with the boiler, an appurtenance thereof, or a pipe leading thereto. The lower portion of the connection C is here shown as provided with the annular flange *e*, and with this coacts a disk E, closing the orifice at the lower end of said connection C, said disk E being secured to the flange *e* by any suitable means—as, for instance, by bolts and nuts *e'* *e''*. At about its center the disk E is provided with a screw-threaded orifice *e'''*, and with this coacts a plug F, having flange *f* and exteriorly threaded both above and below said flange. Within the plug F operates the adjusting-screw G, provided with hand-wheel *g* and centered within said plug F by means of bushing *g'*, a nut *g''* coacting with the lower end of said plug F and said bushing for the purpose of adjustment.

*g'''* designates a flange carried by the screw G and operating in a recess between the upper end of the plug F and the inwardly-extending portion *g''''* of the disk E. The upper end of the screw G is threaded, as at *g'''''*, and this threaded end coacts with a similarly-threaded socket *h*, (preferably square in cross-section,) carried by an arm or arms H, depending from and, if desired, formed integral with the collar *b*, the lower end of said socket operating in the square extension *g''''''* of the disk E. This coaction of the lower end of the threaded



socket *h* and the extension *g*<sup>6</sup> of said disk E is illustrated in the detail view Fig. 2, from which unnecessary parts have been omitted, the sole purpose of said view being to illustrate the preferred arrangement for preventing said socket from turning relatively to said extension.

As will be seen, the collar *b* and the combining-tube B secured thereto may readily be adjusted within the main casing A by the turning of the adjusting-screw G. It will also be seen that by reason of the construction of the elbow connection C and the arrangement therein of the orifice at its lower end, of a size not less than the diameter of the collar *b* or that of the combining-tube B, said combining-tube may readily be withdrawn from the injector for cleansing purposes. To do this, it is not necessary to interfere with the connection between the main casing A and the elbow connection C or with the latter and the boiler or the pipe communicating with the orifice D and such boiler. The disk E only need be removed, and this can readily be accomplished by taking out the securing devices, such as the bolts and nuts *e*<sup>1</sup> *e*<sup>2</sup>, whereupon said collar *b* and the combining-tube B may be drawn downwardly out of the main casing A and out of the elbow connection C and after being cleansed restored in the same manner.

Having now described my invention, what I claim as new therein, and desire to secure by Letters Patent, is as follows:

1. In an injector, the combination with a main casing, of a combining-tube movably mounted therein, a supplemental casing secured to said main casing and having an orifice communicating with the boiler, said supplemental casing having an additional orifice directly underlying said combining-tube and of a size at least coextensive with the diameter of said tube, a closure for said last-named orifice independent of the combining-tube and

when in operative position occupying a fixed relation to said supplemental casing, and a connection, including adjusting mechanism, between said closure and said combining-tube, substantially as set forth.

2. In an injector, the combination with a main casing, of a combining-tube movably mounted therein, a supplemental casing secured to said main casing and having an orifice communicating with the boiler, said supplemental casing having an additional orifice directly underlying said combining-tube and of a size at least coextensive with the diameter of said tube, a closure for said last-named orifice independent of the combining-tube and when in operative position occupying a fixed relation to said supplemental casing, an adjusting-screw carried by said closure, and a connection, including adjusting mechanism, between the same and said combining-tube, substantially as set forth.

3. In an injector, the combination with a main casing, of a sliding collar operable therein, a combining-tube connected with said collar, a supplemental casing and means for securing the same to said main casing, an orifice in said supplemental casing communicating with the boiler, another orifice in said supplemental casing directly underlying said collar and combining-tube and of a size at least coextensive with that of said collar and combining-tube, a closure for said last-named orifice, means for securing said closure in position over said orifice, and an adjusting device carried by said closure and coacting with an appurtenance of said collar, substantially as set forth.

This specification signed and witnessed this 16th day of January, 1904.

WILLARD B. CULVER.

Witnesses:

S. O. EDMONDS,  
I. MCINTOSH.