

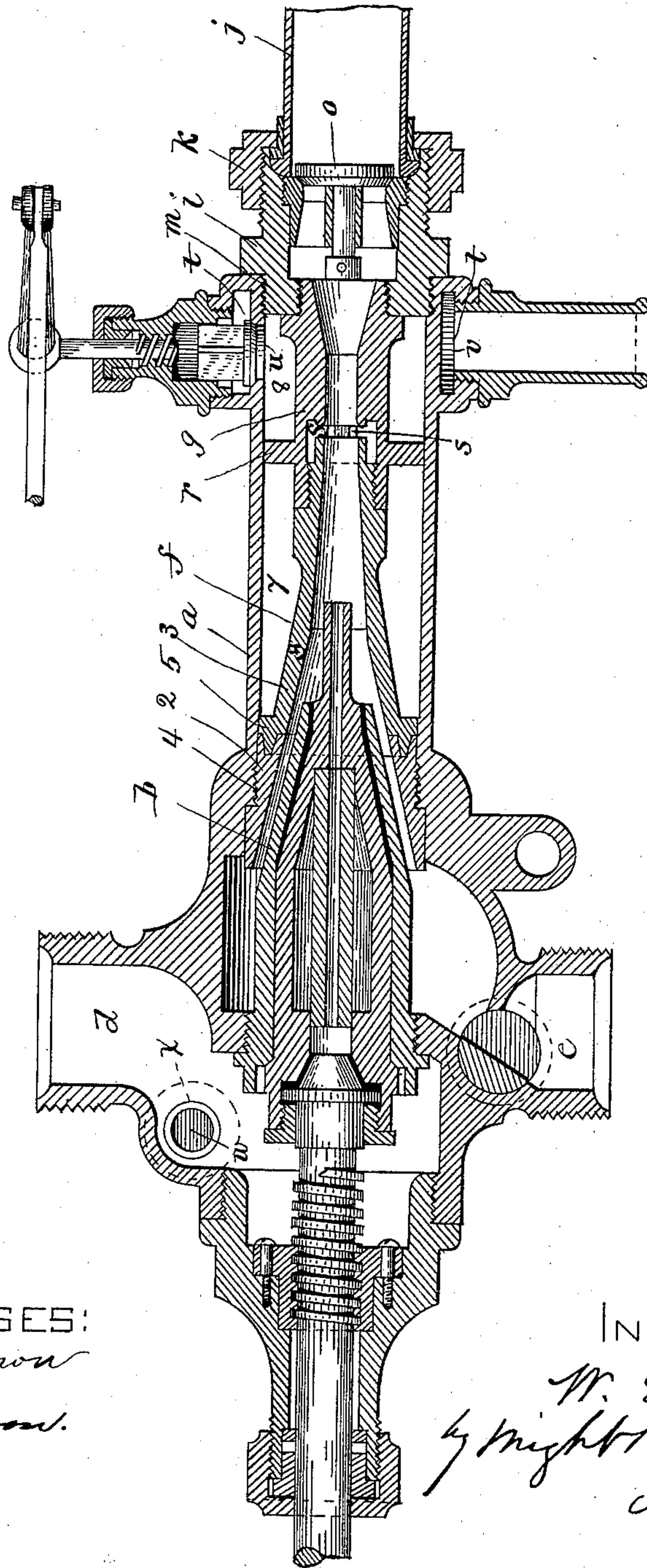
(Model.)

W. E. DODGE.

INJECTOR.

No. 383,109.

Patented May 22, 1888.



WITNESSES:  
*Horace Brown*  
*A. D. Hanson.*

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*Atty.*



# UNITED STATES PATENT OFFICE.

WALTER E. DODGE, OF EVERETT, ASSIGNOR TO THE NATIONAL TUBE WORKS COMPANY, OF BOSTON, MASSACHUSETTS.

## INJECTOR.

SPECIFICATION forming part of Letters Patent No. 383,109, dated May 22, 1888.

Application filed October 19, 1887. Serial No. 252,806. (Model.)

*To all whom it may concern:*

Be it known that I, WALTER E. DODGE, of Everett, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Injectors, of which the following is a specification.

This invention has for its object to provide certain improvements in boiler-feeding injectors, whereby the combining and delivery cones can be conveniently applied and removed at the delivery end of the injector, and also whereby the part of the combining-cone which is subjected to the greatest wear may be removed and replaced without necessitating the discarding of the unworn portions of said cone.

To these ends the invention consists in the several improvements, which I will now proceed to describe and claim.

The accompanying drawing represents a longitudinal section of an injector having my improvements.

In the drawing, *a* represents the main casing of the injector, having the steam-cone *b*, the steam-inlet *d*, and the water-inlet *e*, all of the usual or any suitable construction, and forming no part of my invention.

My present improvements are mainly embodied in the combining-cone *f* and the delivery-cone *g*, which are arranged in the casing in the usual relation to the steam-cone.

In carrying out my invention I make the combining-cone in two sections, 2 3. The section 2 constitutes the forward end, which receives the steam-cone, and is externally threaded at 4 to screw into an internal thread formed in the casing *a*. The section 3 constitutes the portion of the combining-cone against which the steam from the steam-cone impinges, this portion being worn away more rapidly than any other part of the combining-cone, and therefore requiring frequent renewal. The section 3 is externally threaded at its rear end and screwed into a threaded socket in the delivery-cone *g*, and its opposite end is provided with an annular rib, 5, which enters an annular groove in the corresponding end of the section 2. Said rib and groove have a tapering form in cross-section, so that the rib fits snugly in the groove and insures a sufficiently tight joint.

The delivery-cone *g* is externally threaded

at its rear end and screwed into a coupling or connecting end, *i*, which connects the injector-casing with the pipe *j*, through which the water passes from the injector to the boiler. The coupling has a flanged nut, *k*, engaged with the pipe *j*, and also has an external screw-thread, whereby it is screwed into the end of the casing *a* at *m*. Within the coupling *i* is the usual valve, *o*, to prevent the return of water to the injector from the pipe *j*. When the coupling *i* is unscrewed and removed from the casing *a*, the delivery-cone *g* and the section 3 of the combining-cone are removed with it, the opening at the end of the casing, into which the coupling *i* is screwed, being large enough to permit the passage of the section 3 through it.

It will be seen that as the section 3 of the combining-cone is not positively secured to the section 2 it can readily be removed from the latter by removing the coupling *i*, and when so removed can be unscrewed from the delivery-cone and replaced by a new section, so that the section 2, which is screwed into the casing *a* from the other end of the latter, is not necessarily removed or disturbed in renewing the section 3, and does not have to be discarded when the section 3 is replaced by a new one.

The delivery-cone has a circular flange, *r*, which constitutes a partition extending across the space within the portion of the casing *a* in which the combining and delivery cones are located, and dividing said space into two chambers, 7 8, one of which, 8, receives the overflow through the usual overflow-vents, *s*, of the delivery-cone, said overflow escaping through an annular passage, *t*, communicating at *u* with the chamber 8 and at *v* with an escape pipe or nozzle. By thus dividing the annular space within the casing I confine the accumulation of overflow-water within the casing to the minimum, so that when the injector is being started there will be the smallest possible quantity of water to re-enter the delivery-cone through the vents *s s* and retard the operation of the injector, it being a well-known fact that overflow or dead water in the casing of the injector, when free to re-enter the delivery-cone, confuses (so to speak) the water which is being impelled through the injector and retards the operation at the commencement thereof.



I provide an orifice, *w*, in the casing *a* near the outer end of the steam-cone, said orifice being screw-threaded and adapted to receive the threaded shank of an oiler to supply oil, which is carried through the injector and lubricates all the working-surfaces. The orifice *w* has a cap, *x*, whereby it may be closed when the oiler is not applied. There should be two orifices, *w*, one at each side of the injector, so that an oiler can be applied to either side according to the side of the engine that the injector is applied to.

I claim—

1. An injector having a combining cone formed to receive the steam-cone and made in separable sections not positively connected with each other, one of said sections being positively secured directly to the casing of the injector, and the other to a coupling or connecting end detachably secured to said casing, the last-mentioned section including the surface which is subjected to the greatest wear, as set forth.

2. In an injector, the combination, with the casing and the other operative parts, of a combining-cone formed to receive the steam-cone, and composed of a section, 2, screwed directly to the casing, the section 3, fitted to but having no positive connection with the section 2, and detachably connected to the delivery-cone, and the coupling or connecting end to which the delivery-cone is detachably secured, said

coupling being detachably secured to the casing of the injector, said section 3 including the surface which is subjected to the greatest wear, as set forth. 35

3. In an injector, the combination, with the casing having the overflow-passage and the steam combining and delivery cones, of the flange or partition *r* on the delivery-cone, whereby the space within the casing containing the combining and delivery cones is divided and the overflow-water is confined to the space 8 surrounding the delivery-cone and excluded from the space 7 surrounding the combining-cone, substantially as and for the purpose specified. 45

4. The combination, with the steam combining and delivery cones of an injector, of a casing having one or more capped orifices, *w*, communicating with the space containing the receiving end of the steam-cone, whereby oil may be introduced into said space to be carried by the steam along the surfaces of said cones, as set forth. 55

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 17th day of October, A. D. 1887.

WALTER E. DODGE.

Witnesses:

C. F. BROWN,  
A. D. HARRISON.