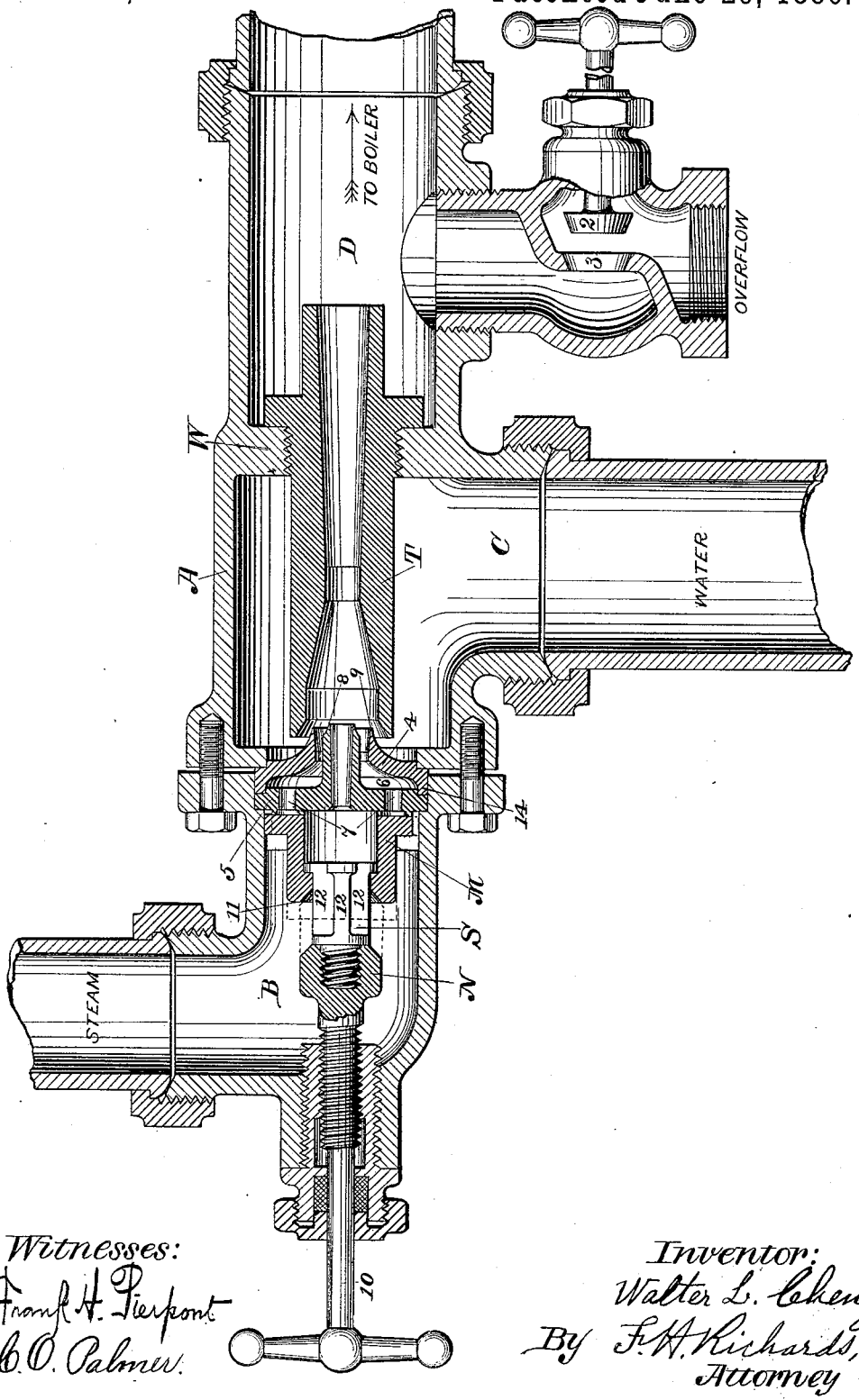
(Model.)

W. L. CHENEY.

INJECTOR.

No. 344,475. Patented June 29, 1886.



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UNITED STATES PATENT OFFICE.

WALTER L. CHENEY, OF HARTFORD, CONNECTICUT.

INJECTOR.

SPECIFICATION forming part of Letters Patent No. 344,475, dated June 29, 1886.

Application filed June 1, 1885. Serial No. 167,331. (Model.)

To all whom it may concern:

Be it known that I, WALTER L. CHENEY, a citizen of the United States, late of Boston, Massachusetts, now of the city and county of Hartford, State of Connecticut, have invented certain new and useful Improvements in Injectors, of which the following is a specification, reference being had to the accompanying drawing, which shows a longitudinal vertical section of an injector embodying my said improvements.

This invention relates to that class of injectors used for the purpose of first lifting and then forcing water by the direct application of steam under pressure.

The object of the invention is to furnish an apparatus which shall be at once effective, convenient to use and to manufacture, and in which the valves shall be of simple construction, and so arranged as to require a minimum of repairing.

In the illustration the apparatus is arranged horizontally, but this position is not essential.

A designates the injector casing or body; B, the steam-chamber, to which steam under suitable pressure is supplied by a pipe in the usual manner.

The injector-casing is divided into two parts by a partition-wall, W. The right-hand part or discharge-chamber D has a connection with the boiler or other place to be supplied by the injector and an overflow-valve of the ordinary description. This will be fully understood from the drawing, in which the overflow-valve disk is designated by 2 and the corresponding valve-seat by 3. The left-hand or receiving chamber C is provided with the usual water-supply pipe, and is formed to have bolted or otherwise secured thereto the aforesaid steam-chamber B. These two chambers are divided from each other by plates 4 and 5, between which plates there is formed the chamber 6, having any suitable passage, as 7, communicating with chamber B. Plate 5 is provided with a nozzle, 8, for a jet to lift the water into chamber C, and plate 4 with a nozzle, 9, for another jet to force it from said chamber into the combining-tube T, which is supported in wall W and delivers into chamber D. In practice the relative sizes and proportions of this tube and of the nozzles should be calculated for and adapted to the conditions under which the injector is to be used. The proportions shown in the drawings are believed to closely approximate such as are suitable for ordinary use; but I do not limit myself to them, as mechanics skilled in the art can vary the details to meet their various requirements.

Plate 5, on the side opposite to nozzle 8, serves as an annular valve-seat inclosing passage 7. An annular valve, M, sliding in chamber B, is fitted onto said seat so as to close the communication between chamber 6 and chamber B.

Steam is admitted to or excluded from the interior of valve M by means of a valve, N, which is shown in its open position, but which may be closed, as indicated by dotted lines, by means of the ordinary threaded valve-stem 10, shown at the extreme left hand of the drawing. It will of course be understood that it is not essential what means are employed for operating said valve N. This valve is fitted to seat 11, and is provided with an externally-flanged or hooked stud, S, which engages with an internal flange of valve M. By this means, after valve N has been raised from its seat, as shown, the further raising of it lifts the said valve M from its annular seat on plate 5, admitting steam from within valve M, through passage 7 and chamber 6, into nozzle 9, to form the forcing-jet. The hooked stud S is not round, but in section is cross-shaped, the space between its wings 12 (usually three or four in number) forming passages into the interior of valve M. I prefer to also notch the outside of the larger part of valve M so as to more freely admit steam, when this valve is lifted, to passage 7.

The operation of my improved injector is substantially the same as the operation of other two-jet injectors.

When the apparatus is not in use, valve M is closed onto its seat on plate 5, and valve N onto its seat 11 on valve M.

To put the apparatus into operation, suitable steam and water connections having been made and the overflow being open, valve N is opened, admitting steam through valve M into nozzle 8 to form the lifting-jet. Then valve N is further lifted, and this lifts valve M from its seat, admitting steam through passage 7 and chamber 6 into nozzle 9 to form the

forcing-jet. This jet being established, the overflow-valve is closed and the water driven into the boiler. The annular valve M is preferably a freely-revolving one, because then it will in practice turn within chamber B every time it is opened, naturally keeping the valve-faces and valve-seats true and steam-tight. This will be recognized as an important advantage by practical engineers.

By making plates 4 and 5 of circular form they are more readily manufactured. They are readily held in proper relation to each other by letting one within a rim, 14, formed on the other. By a similar method of construction they are also held in proper relation to the other parts of the injector, as clearly shown in the drawing.

Having thus described my invention, I claim—

1. In an injector, the combination, with a pair of fixed concentric nozzles, of the annular valve M, having an interior space communicating with one of said nozzles, a passage closed by said valve and leading to the other of said nozzles, and a valve arranged to close the interior of and to lift the said annular valve, substantially as set forth.

2. In an injector, the combination of plate 4, having nozzle 9, plate 5, having nozzle 8, passage 7, and a seat for valve M, valve M, having valve-seat 11, valve N, means, substantially as described, for operating valve N, and means, substantially as described, for operating valve M from valve N, substantially as set forth.

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