

No. 722,838.

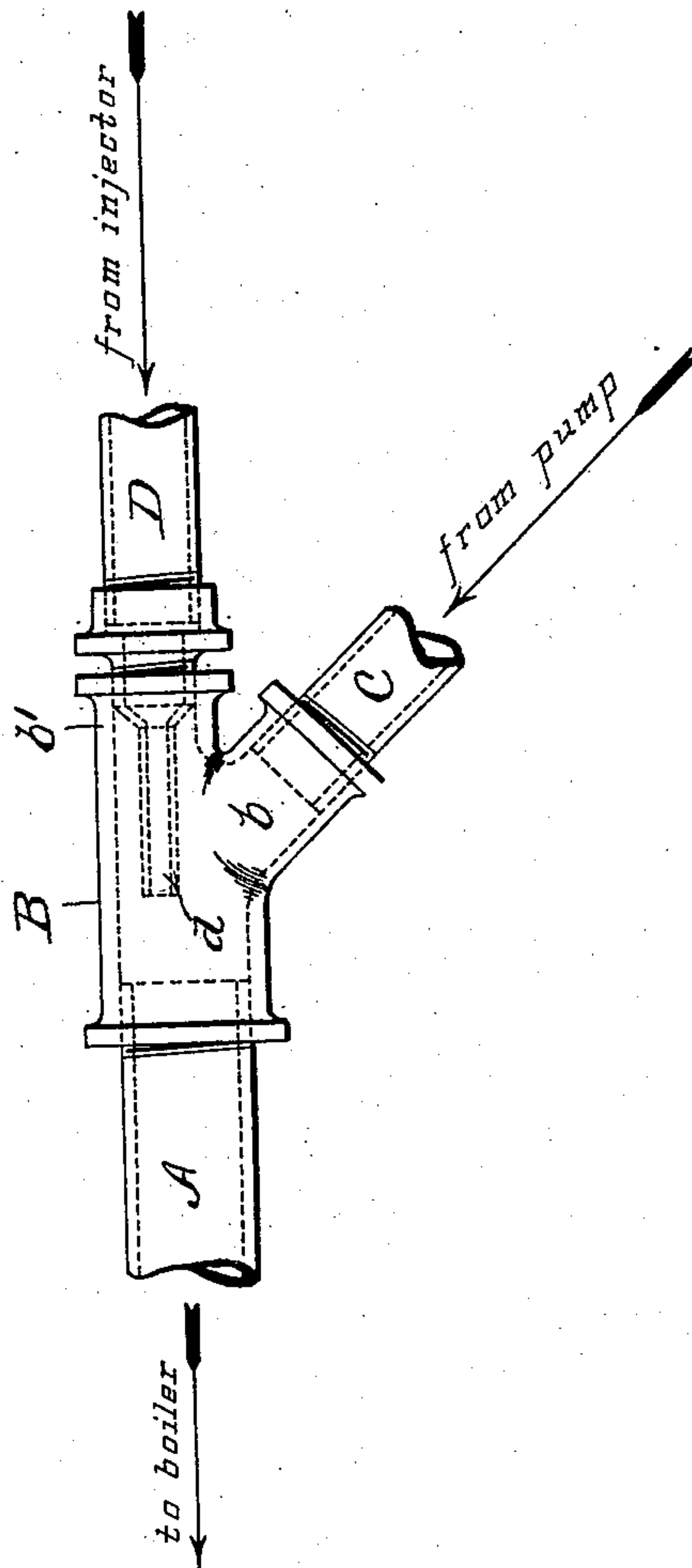
PATENTED MAR. 17, 1903.

S. M. GUSS.

METHOD OF FEEDING WATER TO STEAM BOILERS.

APPLICATION FILED OCT. 20, 1902.

NO MODEL.



Samuel M. Guss

Inventor

Witnesses.  
Calder Rieber  
D. M. Stewart

by *[Signature]*  
Attorneys

# UNITED STATES PATENT OFFICE.

SAMUEL M. GUSS, OF READING, PENNSYLVANIA.

## METHOD OF FEEDING WATER TO STEAM-BOILERS.

SPECIFICATION forming part of Letters Patent No. 722,838, dated March 17, 1903.

Application filed October 20, 1902. Serial No. 127,917. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL M. GUSS, a citizen of the United States of America, and a resident of Reading, in the county of Berks and State of Pennsylvania, have invented certain new and useful Improvements in Methods of Feeding Water to Steam-Boilers, of which the following is a specification.

My invention relates to an improved method of feeding steam-boilers, the purpose of which is to provide for furnishing water thereto at a high temperature with a minimum expenditure of fuel energy.

Both injectors and pumps are frequently provided for feeding the same boiler. It is well known, however, that the pump accomplishes the purpose with a less expenditure of steam than the injector, owing to the use of the steam expansively upon a piston, while the injector has the advantage of furnishing the water to the boiler at a higher temperature than is practicable with a steam-pump, even where the latter is employed in connection with a feed-water heater. This advantage is obviously an important one, both in the economical production of dry steam, due to the avoidance of violent ebullition, and in the maintenance of the boiler, due to the avoidance of an objectionably-reduced temperature therein adjacent to the feed-inlet.

The object of my invention is to combine the advantages of these separate means of feeding by employing both simultaneously in such a manner as to effectively utilize the economical forcing action of the pump in connection with the heating action of the injector method, as is hereinafter described, and specifically pointed out in the claim.

The accompanying diagrammatic drawing indicates merely a portion of the joint feed-pipe to the boiler with the connection thereto of the separate supply-pipes from the usual force-pump and injector, respectively, as preferably employed in carrying out my invention.

A represents the main feed-pipe, extending toward and connected to the boiler, as usual. B is a suitable reducing-T thereon, having an angular branch *b*, connected to a water-supply pipe C from an ordinary force-pump or the like, and another branch *b'* in line with the main feed-pipe A and suitably connected

to a pipe D from an injector. Forming a part of this latter connection, as shown, is a nozzle *d*, which extends into the fitting B to about the natural mixing-point of the currents delivering from said pump-pipe C and injector-pipe D, respectively.

In my improved method of feeding water to the boiler by combining the separate actions of the steam, first, upon the piston of a forcing-pump and, second, upon a condensing stream of water supplied to an injector I employ the actuating medium in the latter in a manner differing from the ordinary, as I have found to be practicable, as well as advantageous, because of the coöperating action of the forced jet supplied through the pipe C and which largely relieves the injected jet from the work ordinarily required of it—namely, the overcoming of the combined steam and water pressure in the boiler at the point of inlet to the latter. This difference in the use of the injector steam-supply consists in providing a greater inlet of steam to the injector relative to the supply of water thereto than is ordinarily required to operate the injector—in other words, a greater inlet than can be condensed by said supply of water, with which latter an uncondensed portion of steam is thus drawn onward into contact with the coöperating stream of cool water from the force-pump, by which it is condensed and its heat and velocity utilized. By this method of operating the injector in connection with the force-pump I am able in continuous practice to furnish feed-water to the boiler at a temperature of about 212° and with a considerable saving of fuel as compared with the ordinary use of the pump or injector, either separately or jointly, as heretofore occasionally used in emergencies.

The distinguishing feature of my invention is the using in the injector of a maximum amount of steam with a minimum amount of water, as permitted by the simultaneous use in connection therewith of a combining force jet of water the pressure of which relieves the injector in the opening of the check-valve to the boiler, while at the same time absorbing the velocity and excess temperature of the steam-laden injector-jet.

What I claim is—

The improved method of feeding water to



a steam-boiler by the combined actions of a force-pump and an injector which consists in operating said injector with a flow of steam in excess of the amount condensed by the water supplied thereto, and injecting the jet therefrom into an independently - forced stream of low-temperature feed-water moving in the same direction, the momentum of said low-temperature stream cooperating with that of the injected stream and the entrained

steam in the latter serving to raise the temperature of the combined streams to approximately boiling-point.

Signed at Reading, Pennsylvania, this 16th day of October, 1902.

SAMUEL M. GUSS.

Witnesses:

D. M. STEWART,

W. G. STEWART.