

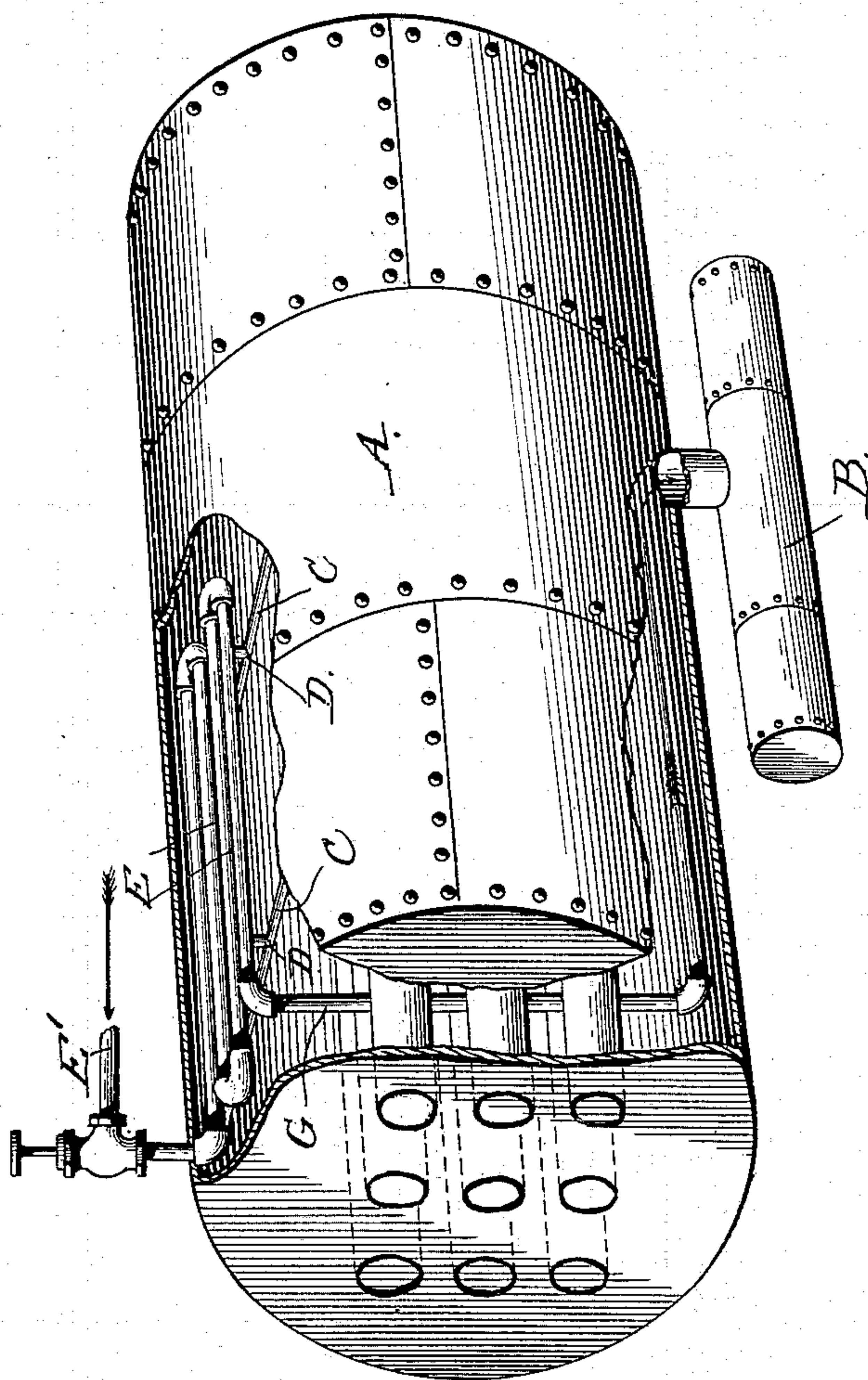
No. 615,517.

Patented Dec. 6, 1898.

C. APPLGATE.  
FEED WATER HEATER.

(Application filed May 24, 1898.)

(No Model.)



Witnesses  
*St. J. Koerth.*  
*Frank McDonald*

Inventor  
*Clarence Applegate*  
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his Attorney



# UNITED STATES PATENT OFFICE.

CLARENCE APPLGATE, OF EVANSVILLE, INDIANA, ASSIGNOR OF SEVEN-EIGHTHS TO PETER EMRICH, ABRAHAM EICHEL, AND McDONALD BROTHERS, OF SAME PLACE.

## FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 615,517, dated December 6, 1898.

Application filed May 24, 1898. Serial No. 681,547. (No model.)

*To all whom it may concern:*

Be it known that I, CLARENCE APPLGATE, a citizen of the United States, residing at Evansville, in the county of Vanderburg and State of Indiana, have invented new and useful Improvements in Feed-Water Heaters, of which the following is a specification.

My invention relates to that class of devices which is designed for heating the water which is fed to a boiler and wherein the heat of the steam within the boiler is utilized as the means for heating the feed-water, in the present instance the feed-water being discharged upon the bottom or fire-wall of the boiler and in a plane parallel therewith, whereby the jet or jets of heated water are caused to sweep across the boiler in the direction of its length and to dislodge and carry away to the usual outlet to the attached mud-drum any sedimentary matter which has settled upon the fire-wall, thereby keeping the boiler and its tubes clean and reducing to a minimum the formation of incrustation and smudge and the consumption of fuel for heating the boiler.

My invention consists in combining with a boiler and its mud-drum the feed-water heater whose construction and arrangement I will hereinafter describe, and specifically point out in the claim.

In the drawing hereto annexed the figure represents a perspective view of a horizontal boiler with its shell partly broken away to disclose the feed-water heater.

In carrying out my invention I may use the construction with any well-known type of locomotive or other boiler having horizontal tubes and superposed steam-space.

In the drawing the boiler A is shown detached from any furnace; but it will be understood that it will be so mounted and related to a furnace and its accessories that the water in the boiler will be heated by the products of combustion in the usual and well-known manner. Beneath the boiler is a mud-drum B of the usual character connecting with the boiler at its lowest point and being designed to receive the settlings of the feed-water, which are removed from the boiler by the inflow of the feed-water. Secured trans-

versely across the steam-space above the flues 50 of the boiler are horizontal bars or supports C, which extend from side to side of the boiler and are provided with short vertical bars D, upon which the feed-water coil E is supported. This coil has a terminal or pipe E', 55 which connects with the locomotive-tank or with any other suitable source of supply, and it may be used in connection with any of the valve-operating devices, injectors, and other accessories of a modern boiler. These are 60 not shown, as they form no part of this invention. The pipe E' enters the shell of the coiler from the top and is formed or connected with the coil E, which runs back and forth in the boiler and extends for a considerable distance 65 along the steam-space.

As many bends or coils may be used as found desirable, and these are disposed transversely in a common plane and are designed to be seated upon or fitted to the vertical 70 members D of the support-bars C. By means of these short bars the individual members of the coil are spaced and prevented from warping, and each member is supported at the uppermost limits of the steam-space, where the heat is always the most intense, and the coil is clear above the water-line and the boiler-flues. The other terminal end of the coil is formed or connected with a vertical member 75 or pipe G, which passes downwardly through the water and between the flues until it reaches a point proximate to the fire-wall of the boiler, when the lower end of the pipe is connected with a pipe H, which projects horizontally and extends along the fire-wall for a 80 considerable distance, its discharge end pointing toward the outlet to the mud-drum and lying substantially in line with the smudge or sedimentary matter which deposits upon the fire-wall, whereby the jet of feed-water 85 discharging from this horizontal portion of the pipe exerts its full power to dislodge and sweep away to the outlet to the mud-drum any accumulation of sedimentary matter, this action being continuous with the supply 90 of feed-water to the boiler.

The construction herein shown and described is exceedingly simple and effective,



and extensive experiments show that by making the coil extend through a large portion of the steam-space and locating said coil close to the top of the boiler the water entering the feed-pipe is highly heated during its flow through the tortuous passage, and it is discharged into the boiler in line with the sedimentary deposit, with the result that the boiler is kept clean and the interior of the boiler and the flues kept free from incrustation, and by preventing the formation of these coatings I am enabled to raise steam to a given pressure with a minimum consumption of fuel.

15 Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

20 An improved feed-water heater consisting of the combination with a boiler and its connected mud-drum, of a coiled pipe horizontally disposed in the upper limits of the steam-space of the boiler, and having a feed-water-supply connection at one end, said pipe

having its opposite end connected with a pipe which extends downwardly between the boiler-tubes to a point proximate to the lower wall of the boiler, a horizontal pipe connected with the lower end of the vertical pipe and extending for some distance along, close to and parallel with the lower wall of the boiler so as to discharge in the path of sedimentary deposit and remove the same simultaneously with the admission of feed-water, and means for supporting the individual members of the coil consisting of bars passing transversely across the steam-space and below each end of the coil, and having vertically-projecting spacing-bars adapted to engage and support the separate coils in the steam-space.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

CLARENCE APPEGATE.

Witnesses:

AZRO DYER,  
WM. REISTER.