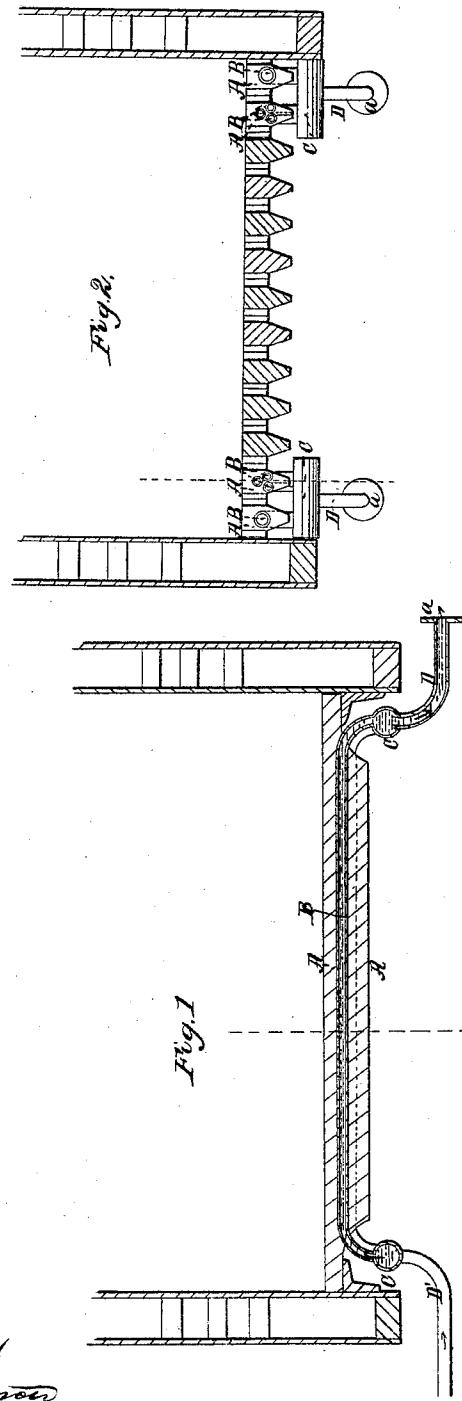


J. Codding, Jr. & J. Mc Cunniff,  
Furnace Grate.

No 27,271.

Patented Feb. 28, 1860.



Witnesses:

H. Combs  
R. S. Glancey

Inventor:  
J. Codding Jr.  
J. McCunniff  
for many Co  
Attorneys

# UNITED STATES PATENT OFFICE.

JOS. CODLING, JR., AND JNO. McCUNNIFF, OF FAIRBANKS, IOWA.

## FEED-WATER HEATER FOR STEAM-BOILERS.

Specification of Letters Patent No. 27,271, dated February 28, 1860.

*To all whom it may concern:*

Be it known that we, JOSEPH CODLING, Junr., and JOHN McCUNNIFF, of Fairbanks, in the county of Buchanan and State of 5 Iowa, have invented a new and useful Improvement in Feed-Water Heaters for Locomotive-Boilers; and we do hereby declare that the following is a full, clear, and exact 10 description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1, is a longitudinal vertical section of a locomotive grate with our improvement applied. Fig. 2, is a transverse vertical section of the same.

Similar letters of reference indicate corresponding parts in both figures.

Our invention consists in the employment in combination with hollow grate bars, of 20 copper tubes passing longitudinally through the said bars and connecting with transversely arranged cylinders or boxes which are arranged below them at each end, and provided with connections to the feed pump 25 and tank, as hereinafter described.

To enable others skilled in the art to make and use our invention we will proceed to describe its construction and operation.

In applying our invention we do not propose generally to apply it to all the grate 30 bars of a furnace, but only to two or three bars at each side, as shown in the drawing.

A, A, are the hollow bars and B, B, the tubes passing, longitudinally through them, 35 one or more tubes in each bar as shown in Fig. 2, of the drawing. The said tubes descend in a curved form, from the ends of the bars to connect with the tops of the transversely arranged cylinders C, C, of which 40 there is one at each end of each series of tubes.

To the bottoms of each of the cylinders C, which are arranged at the end of the grate, nearest the head of the locomotive there is 45 attached a pipe D which descends and is curved in such a manner as just to clear the bottom of the fire-box and is provided with

a flange a; to make the connection with one of the feed pumps. To the bottom of each of the other cylinders C', C', there is attached a pipe D', curved like D, said pipe being intended to have a detachable hose connection, with the tank of the tender. The pipes D and D', are intended to project a short distance upward into the cylinders 55 C, C', to allow sand or other solid sedimentary matter contained in the water to collect around them, and hence the said cylinders, constitute sediment collectors as well as serving to supply the water to the tubes B, B, 60 and receive it therefrom for conveyance to the feed pumps. The sediment may be removed from the cylinders C, C', from time to time by taking off one end of each.

The water is drawn from the tank through 65 the pipes D', cylinders C', tubes B, B, cylinder C, and pipe D, as indicated by the arrows, by the action of the pump and in passing through the tubes B, B, has its temperature very considerably raised so that it is 70 delivered into the boiler hot. The advantages of the employment of this system of tubes and boxes over the passing of the water directly through the bars themselves, is, that the copper tubes are less liable to scale, and 75 will not be cracked by admission of cold water in case of their having become hot and dry by the disconnection of the tender while the fire is up, and that better provision is afforded for the collection of any sedimentary matter.

What we claim as our invention and desire to secure by Letters Patent is—

The employment in combination with hollow grate bars, of a system of tubes B, B, 85 and cylinders or boxes C, C, and connecting pipes D, D', the whole arranged substantially as herein specified.

JOSEPH CODLING, JUNR.  
JOHN McCUNNIFF.

Witnesses:

RUFUS CONABB, Jr.,  
MARTIN L. LAY.