2 Sheets—Sheet 1.

J. C. STEAD.

FEED-WATER HEATERS FOR STEAM BOILERS.

No. 175,193. Patented March 21, 1876.

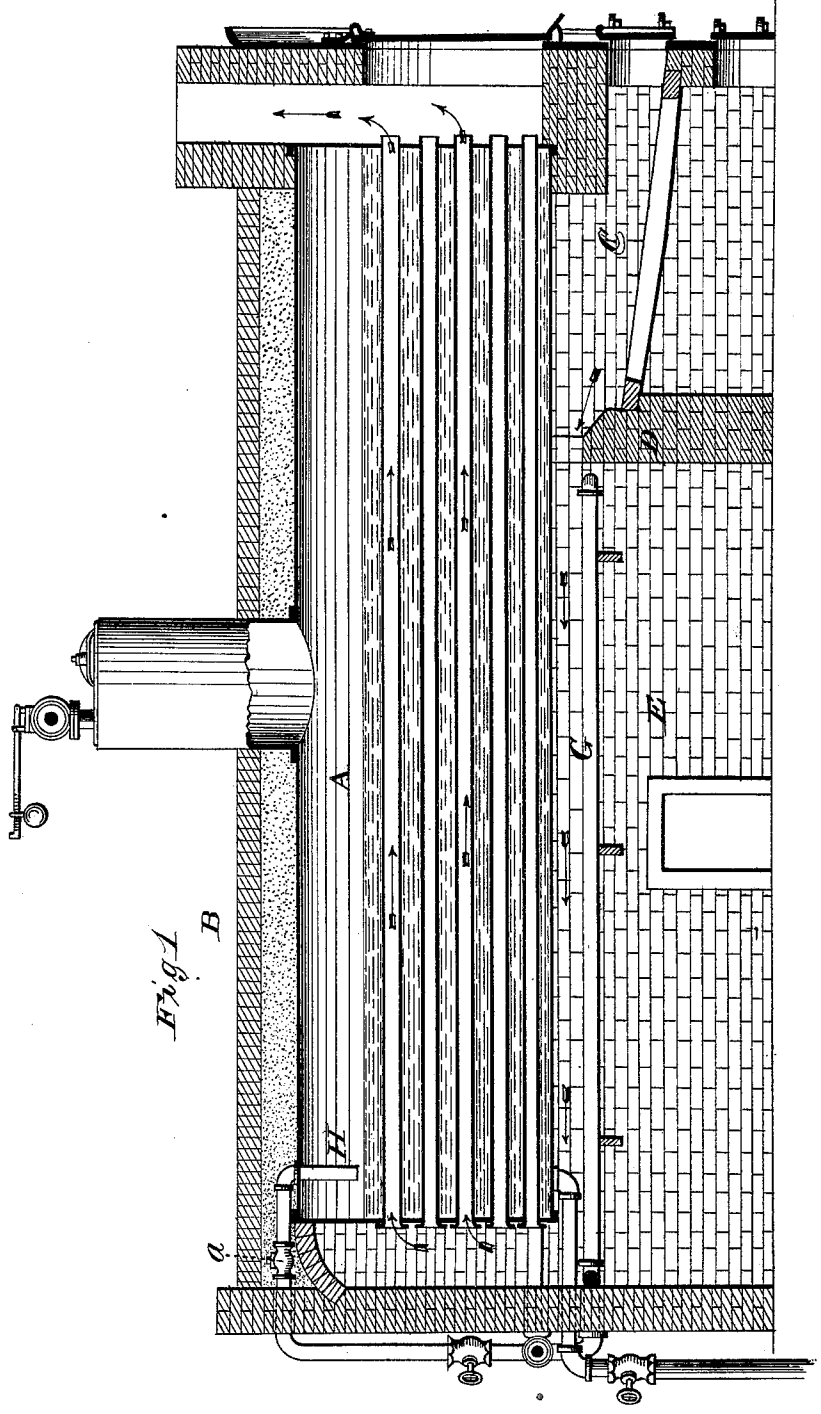

Fig. 1

WITNESSES

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2 Sheets—Sheet 2.

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Fig 2.

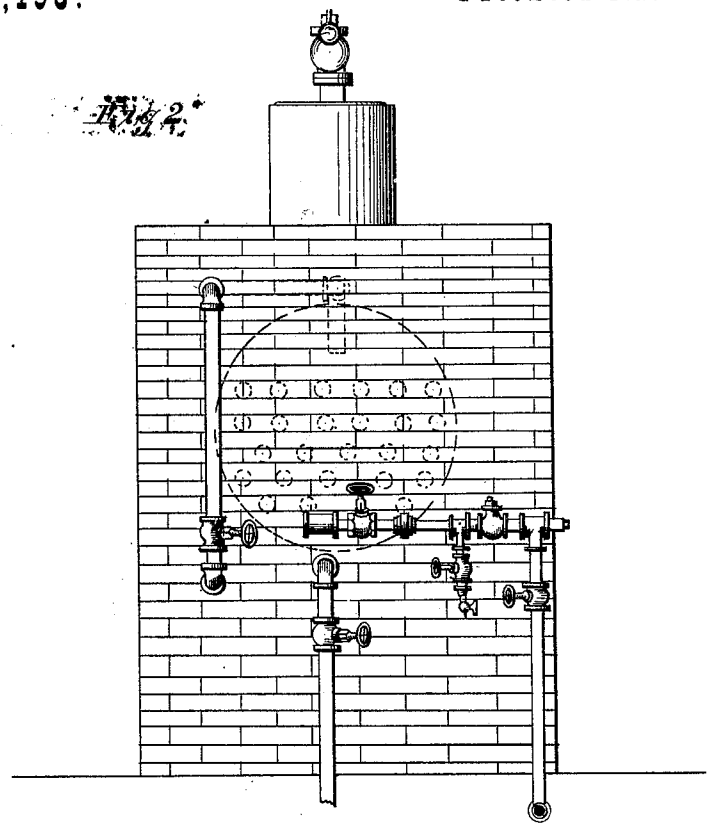
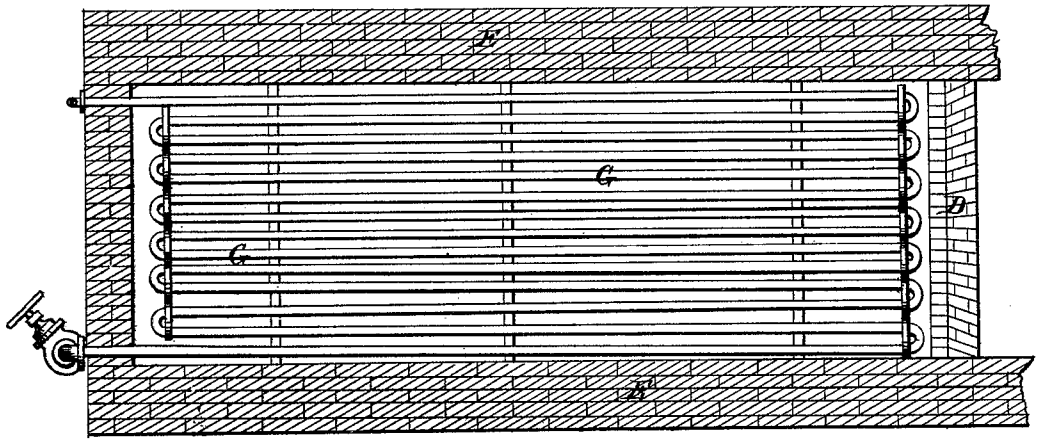


Fig 3



WITNESSES
Franck L. Durand
Philip Mc'n Nickle

By

INVENTOR
James C. Stead.
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Attorney.

UNITED STATES PATENT OFFICE.

JAMES CURTIS STEAD, OF GREEN POINT, NEW YORK.

IMPROVEMENT IN FEED-WATER HEATERS FOR STEAM-BOILERS.

Specification forming part of Letters Patent No. **175,193**, dated March 21, 1876; application filed December 17, 1875.

To all whom it may concern:

Be it known that I, JAMES C. STEAD, of Green Point, in the county of Kings and State of New York, have invented certain new and useful Improvements in Steam-Boiler Furnaces, of which the following is a specification:

The nature of my invention consists in the construction and arrangement of an attachment for steam-boilers for the purpose of supplying the same with hot water, and increasing the heating-surface, as will be hereinafter more fully set forth.

In order to enable others skilled in the art to which my invention appertains to make and use the same, I will now proceed to describe its construction and operation, referring to the annexed drawings, which form a part of this specification, and in which—

Figure 1 is a longitudinal vertical section of a steam boiler and furnace embodying my invention. Fig. 2 is a rear-end elevation of the same; and Fig. 3 is a horizontal section taken immediately below the boiler.

A represents an ordinary tubular boiler incased within and heated by a furnace, B, of which C is the fire-chamber, D the bridge-wall, and E the pit below the boiler. G G represent one or more coils of return-pipe placed horizontally under the boiler A on or near the level with the top of the bridge-wall D, and extending from said bridge-wall to the back wall of the furnace. The feed-water passes through this coil or coils G and through a pipe, H, into the boiler. The spaces between the pipes of the coil allow all cinders and ashes to fall freely into the pit E below. The pipe H, which leads the water into the boiler, enters the boiler at the top and discharges the heated water above the water-line therein. This, in connection with the valves *a a*, forms suitable means whereby the water at the top is made to circulate freely through the pipe in case the feeding of water ceases, preventing thereby the burning out of the pipes and making the coil an increased heating-surface for producing steam, and also tends greatly to prevent the explosion of boilers, as it is impossible to introduce cold water into them if there be any fire in the furnace.

Furthermore, in practice, the pipe G is like a coil of rope, so that if it expands in any part the balance of the coil will allow for the expansion and contraction. As this coil is not liable to unequal contraction or expansion because the water circulates through the entire coil, hence there is an equal expansion throughout.

I am fully aware that pipes for various purposes have been placed under steam-boilers; but they have been located wholly or in part in front of the bridge-wall or in the sides of the furnace, or so as to depend into the flame-chamber, or so as to rest on the close bed of the flame-chamber. My coil is placed entirely in the rear of the bridge-wall, and on a line with the top thereof.

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

1. In a stationary steam-boiler, the combination of return bend pipes G with the bridge-wall and rear wall of the furnace, the said pipes being supported on a skeleton frame, and in line with the top of the bridge-wall, to form an unobstructed and continuous passage from the fire-box to the smoke box, substantially as and for the purpose specified.

2. In a stationary steam-boiler, the combination, with the return bend pipes G, supported on a skeleton frame and arranged in line with the top of the bridge-wall, of a pipe, H, leading from the exit of the system of pipes G to the steam-space of the boiler, substantially as and for the purpose specified.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

JAMES CURTIS STEAD.

Witnesses:

JOHN F. HAYES,

JOHN R. WILLIAMS.