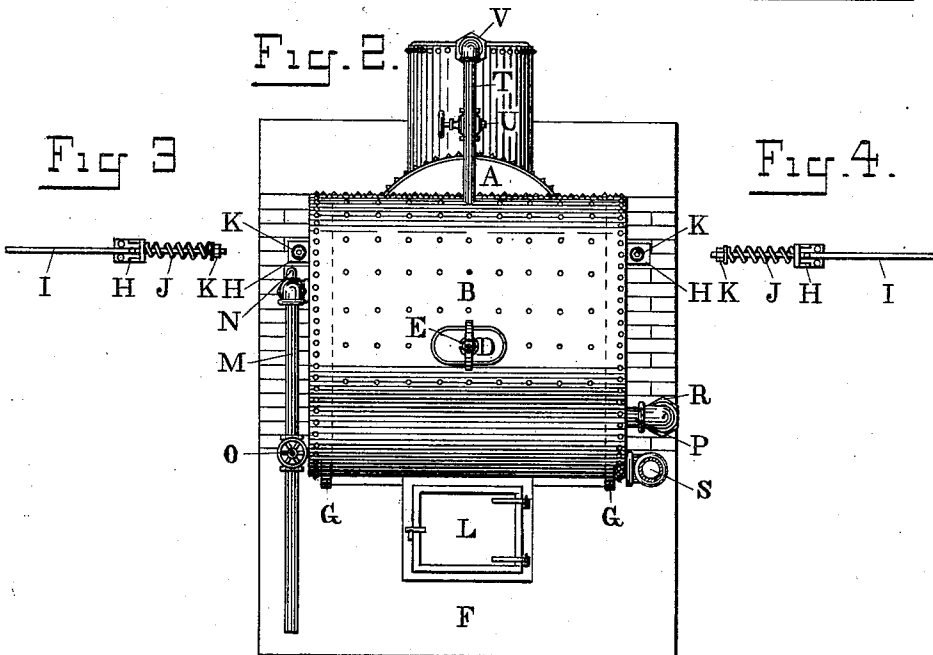
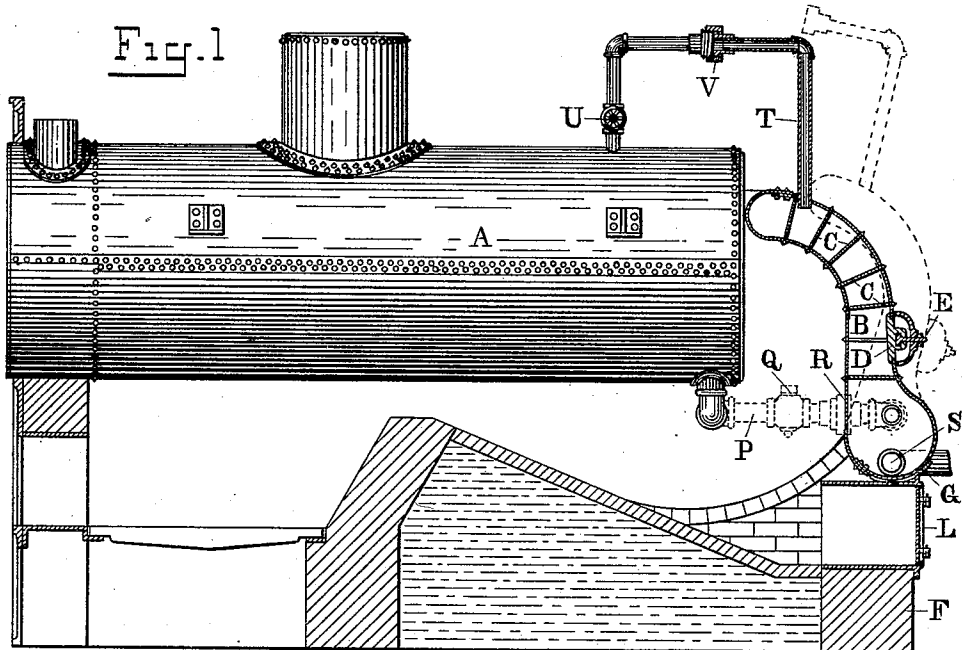


(No Model.)

E. A. THUSTON.
FEED WATER HEATER.

No. 512,634.

Patented Jan. 9, 1894.



Witnesses

R. A. McDougall
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Inventor

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By his Attorney

UNITED STATES PATENT OFFICE.

ELI ALEXANDER THUSTON, OF AVONDALE, ALABAMA, ASSIGNOR OF ONE-HALF TO JOHN MORDICA BRADLEY.

FEED-WATER HEATER.

SPECIFICATION forming part of Letters Patent No. 512,634, dated January 9, 1894.

Application filed September 25, 1893. Serial No. 486,397. (No model.)

To all whom it may concern:

Be it known that I, ELI ALEXANDER THUSTON, a citizen of the United States, residing at Avondale, in the county of Jefferson and State of Alabama, have invented certain new and useful Improvements in Water-Backs and Heaters for Boilers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in that class of devices called water heaters which heats the water in its passage from the pump to a boiler; and the objects of my improvement are, first, to provide a water back and heater for a boiler furnace, which will be simple and cheap to construct, and will be so placed in connection with the furnace, that it will present a large heating surface to the direct action of the flame as it passes through the furnace, thereby utilizing a large part of the heat for heating the feed water, that is now wasted against the back wall of the furnace; second, to provide a heater for a boiler which will also form a water back to the furnace, taking the place of the brick work and covering plates now used for that purpose, my water back occupying the whole back of the furnace setting, and it is attached by bolts in such a manner, that it can be disconnected and turned out at the top from the boiler without difficulty, or tearing down the brickwork, to get at the back end of the boiler, if necessary at any time to make repairs. I attain these objects by the device and attachments illustrated in the accompanying drawings, in which—

Figure 1, is a side view of a boiler, with my water back and heater shown attached, the water back and furnace setting shown in section through the center. Fig. 2, is a vertical back view of the boiler and setting, showing my water back and heater in position, on the back furnace wall. Fig. 3, is a side view of one of the anchor bolts, with angle bracket and spring, to hold the water back to the boiler. Fig. 4, is a side view of the anchor bolt, on the opposite side of the water back. Similar letters refer to similar parts throughout the several views.

The boiler A can be of any of the usual

forms of boiler, and can be set in any of the usual forms of setting, as a battery of boilers, or singly, no special form of boiler, or special design of setting being required to attach my water back and heater.

The water back and heater B is made of the usual boiler plate, or other metallic material, the heads are flanged, and the sheets and heads attached to each other by rivets, in the same manner as for boilers. Stay bolts C, C are provided as may be necessary, inserted and riveted in the usual manner. A man hole and man hole plate D are provided in any suitable position in the back of the heater. The man hole plate is held to place in the heater by the usual crow foot and bolt E.

The water back and heater is set on the back wall F of the boiler furnace, the ends of the heater lapping on the side walls as shown by dotted lines. Concave anchor plates G, G are set on the wall at both ends, to hold the bottom of the heater to place on the wall, the concave anchor plates forming a bearing for the heater to rest on. The heater can be freely moved at the top from the boiler, when disconnected if necessary without moving the bottom, as shown by dotted lines to get at the end of the boiler.

The ends of the heater are provided with metallic angle brackets H, H secured to the heads of the heater, anchor bolts I, I passing through the brackets. The inside ends of the bolts are built and secured in the side walls, to hold the heater to the boiler. On the ends of the bolts outside the brackets are placed coiled springs J, J. The bolts are provided on the ends outside the springs with nuts and washers K, K, the springs allowing for the expansion of the boiler without straining the anchor bolts, or tearing down the brick wall; if an explosion of gas takes place in the back of the furnace, the spring will allow the heater to fall off from the boiler, allowing the gas to escape without wrecking the walls.

A clean out door L is provided in the back furnace wall F, to clean out under the boiler, or to enter under the boiler when necessary for repairs; a feed water pipe M is placed on the outside of the brick work, and attached to the heater head in the usual manner. The pipe is provided with the usual check valve N and a stop valve O as shown.

A connecting pipe P is connected at one end to the boiler. The pipe crossing the furnace to the side wall is brought round and connected to the head of the heater. It is provided
5 with a stop valve Q and a union R. The pipe P makes the feed water pipe from the heater to the boiler, and the blow off pipe from the boiler to the heater. Its location being above
10 the bottom of the heater, forms a mud drum in the bottom of the heater, to catch the mud and prevent it entering the boiler; a blow off pipe S is placed in the heater head close to
15 the bottom shell, for the purpose of blowing off the boiler when necessary; an additional connecting pipe T has one end connected to
the top of the boiler and the other end connected to the top of the heater. The pipe T
20 equalizes the pressure in the heater and boiler, and is provided with a stop valve U and a union V as shown.

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

1. In a water-back and heater for boilers,
25 the combination of a metallic water back and heater of the form shown resting in concave anchor plates on the back furnace wall of a boiler, the heater forming the back of the furnace the top end turning toward and resting
30 against the boiler forming the covering arch at the back end of the boiler, metallic angle plates secured on the ends of the heater having anchor bolts from the brackets extending
35 in the side walls of the furnace, coiled springs on the anchor bolts between the nuts and the

brackets to allow for expansion and contraction, pipes connecting the heater and boiler at the top and bottom as shown, substantially as described.

2. In a water back and heater for boilers, 40 the combination of a metallic heater resting on the back furnace wall of a boiler, the top of the heater resting against the boiler, a pipe having a union and stop valve connecting the bottom of the boiler with the heater, a pipe 45 having a union and stop valve connecting the top of the boiler with the heater, a feed water pipe connected to the heater, and a blow off pipe connected to the heater, substantially as and for the purpose described. 50

3. A water back and heater for boilers, having a metallic heater resting on concave anchor plates on the back furnace wall of a boiler, the top end of the heater resting against
55 the boiler, a pipe connecting the bottom of the boiler with the heater, a pipe connecting the top of the boiler with the heater, metallic angle brackets secured to the ends of
60 the heater, anchor bolts passing through the brackets, coiled springs on the ends of the bolts outside the brackets, nuts and washers on the ends of the bolts outside the springs, to hold the heater to place against the end of
the boiler, substantially as described.

In testimony whereof I affix my signature in 65 presence of two witnesses.

ELI ALEXANDER THUSTON.

Witnesses:

B. L. DOZIER,

B. E. GRACE, Jr.