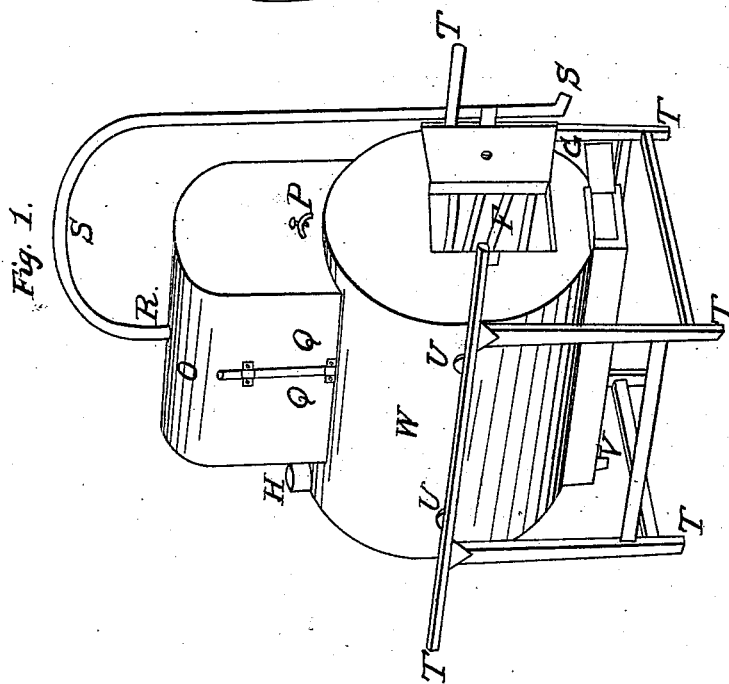
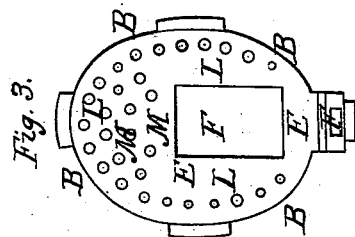
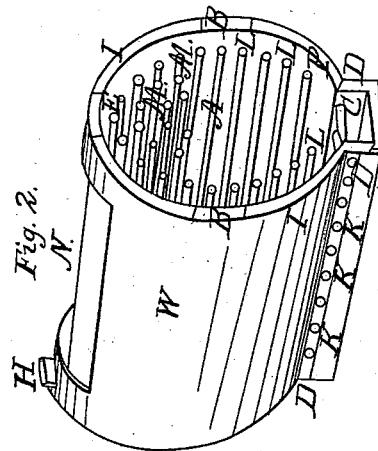


Sharp & Horton,
Steam-Boiler Water-Tube.
No 2,871. Patented Dec. 5, 1842.



UNITED STATES PATENT OFFICE.

AUSTIN W. SHARP AND WILLIAM F. HORTON, OF HONEOYE FALLS, NEW YORK.

IMPROVEMENT IN STEAM BOILERS OR GENERATORS.

Specification forming part of Letters Patent No. 2,871, dated December 5, 1842.

To all whom it may concern:

Be it known that we, AUSTIN W. SHARP and WILLIAM F. HORTON, of Honeoye Falls, in the town of Mendon, in the county of Monroe and State of New York, have invented a new and Improved Mode of Constructing Steam-Boilers; and we do hereby declare that the following is a full and exact description.

The nature of our invention consists in so constructing the boiler that the entire fire-chamber and ash-pit are surrounded with water (excepting an opening for the door and for the smoke-pipe and another small one in the end of the ash-pit) and in placing tubes within the fire-chamber of the former and in the manner hereinafter described.

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

We construct the boiler of tin-plate, sheet-copper, boiler-iron, or any other metal best adapted to the use to which the boiler is to be applied. We prefer tin-plate or copper for domestic manufacturing and all other purposes where there will be but little pressure on the boiler, and boiler-iron of proper thickness where it is to be used for propelling cars, boats, or overcoming other resistances. The fire-chamber is of an oval form, the vertical diameter being a little greater than the horizontal. The length of the fire-chamber should be greater than its vertical diameter and placed horizontally. The fire-chamber, with the tubes within it, is represented at A, Fig. 2, both the front heads being off.

The inner plate of the boiler (see B B B, Figures 2 and 3) is of a cylindrical or oval shape, and constitutes the extreme limits of the fire-chamber on the top, sides, and bottom, excepting that at the bottom this plate drops down a few inches, so as to form an ash-pit of sufficient depth and width, (letter G, Fig. 2,) which extends back the whole length of the fire-chamber. The fire-chamber is of the same length as the plate B B, on which at each end of the fire-chamber is fastened (by soldering, if of tin or copper) a head-plate, through which are holes corresponding in shape and number to the ends of the tubes hereinafter described.

E E, Fig. 2, represent the inner front head.

The inner back head exactly corresponds to it, excepting the openings. F F in said figure are in the inner front head only.

Fig. F* is an opening for supplying the fire with fuel, and F is an opening into the ash-pit of sufficient size for cleaning out the ashes and supplying a draft of air for the furnace or fire-chamber above it to the aperture is slid, as seen at G, Fig. 1, for regulating the draft.

The above-described inner plates and heads are surrounded or incased by an outer plate or cylinder, with heads parallel to the first, and made so much larger as to have between them the requisite water-space extending entirely around the sides and both ends of the fire-chamber and ash-pit, with the exception of the openings F* F, Fig. 3, corresponding to the openings F* F, Fig. 3, and also of an opening for the smoke-pipe, as seen at H H, Figs. 1 and 2. The end of the space between the two plates is seen at I, Fig. 2. Across the top of the ash-pit are placed short tubes, communicating at each end with the water-space between the cylinders, and constitute the fire-grate. The ends of these tubes may be seen at K, Fig. 2, which shows the ash-pit with the outer plate removed from it.

Around the interior of the fire-chamber is arranged a series of tubes at any convenient distance from and parallel to the inner plate, so as to leave a sufficient space between the tubes and plate for the fire to circulate on. This space and the spaces between the several tubes must be varied according to the size and use of the boiler and the kind of fuel to be employed.

In a boiler of tin-plate with a fire-chamber sixteen inches long and twelve wide and fourteen high, with tubes one inch in diameter, and dry wood fuel, the tubes should be one inch from the plate and about the same distance from each other. Each end of these tubes communicates with the water-spaces in both ends. In the upper part of the fire-chamber and under the above-mentioned tubes and parallel to them is arranged an additional number of tubes at about the same distances from each other and communicating in like manner at each end with the water-spaces in the ends. The first row of tubes

is shown at L L, Fig. 2, and the additional tubes at M M M, Fig. 2. At letters L M, Fig. 2, one end of these several tubes is seen as they enter through the inner of the front water-space, the outer head being off. These tubes may be of any convenient size or shape. Where great strength is required the form of the cylinder is preferable; but where strength is not important one row of oval or Gothic tubes, the greater diameter of which is from three to four inches and the smaller diameter or thickness from one-half an inch to an inch, may be advantageously substituted for all the cylinders in the upper half of the fire-chamber. The form and arrangement are represented at L M, Fig. 2.

Through the upper part of the outer cylindrical plate or case is an opening, as shown at N, Fig. 2, through which the water-space in the boiler is connected with the water in the water and steam chamber, which is represented at O, Fig. 1, in its place on this outer cylinder. Near the bottom of chamber O, Fig. 1, is placed a common brace-cock, as seen at P, Fig. 1, to ascertain when the water is getting too low, which is always the case when nothing but steam will pass through it. Near the bottom of chamber O is inserted a tube, which, turning at a right angle, extends up along the side about two-thirds of the distance to the top.

Q, Fig. 1, represents the tube through which the boiler and reservoir are filled with water as high as the top of the tube, the space above being left for steam. The top of this tube must be properly stopped when the boiler is used. A wooden cork or plug is sufficient for common purposes.

In the top of the chamber O is inserted a short tube, as shown at R, Fig. 1, on which or in which is a screw, by means of which the tube S S, same figure, is fastened to it. This pipe is used to convey the steam to whatever is to be heated. The various parts composing this boiler, as above described, should be riveted together when consisting of boiler-iron; but when consisting of tin-plate or copper all the pieces may be soldered together, being prevented from melting by the water which comes in contact with every part which is exposed to the fire.

The above boiler and its appendages may be greatly varied in the size, form, and pro-

portion of the various parts and of the whole, while its essential principles, as above described, remain unchanged. When made from one to two feet long, and of tin or copper plate, one of our boilers is rendered portable by being placed on a frame, as seen at T, Fig. 1.

U, Fig. 1, represents projections soldered onto the boiler. Over these projections a strip of tin is nailed or screwed, by which means the boiler is secured in its place on the frame.

In the bottom of the ash-pit is inserted a stop-cock, by means of which the water in the boiler may be drawn off. It is represented at V, Fig. 1.

In our boiler wood or coal may be used for fuel with equal advantage.

According to the best information, knowledge, and belief of your petitioners, their boiler possesses the following advantages over any other invented or in use: First, it exposes a greater amount of surface to the direct and most advantageous action of the fire; second, it combines great strength and durability with simplicity and cheapness of construction; third, boilers constructed on the above principles may be so varied in size, form, materials, and mode of being put together as to be advantageously used in almost every case in the arts in which it is desired to heat water or liquids of any kind, or to generate steam for the purpose of propelling engines. It also allows of a perfect circulation of the water owing to the water-space under the ash-pit.

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

The combination and arrangement, as herein set forth, of the several parts, constructed substantially in the manner and upon the principles above described—that is to say, of the boiler constructed of double plates and double heads parallel to each other, so that the fire-chamber and ash-pit are surrounded with water, in combination with the hollow grate bars and tubes, arranged as set forth.

AUSTIN W. SHARP.
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Witnesses:

EDWARD S. PALMER,
CHARLES PAULK.