(No Model.)

T. E. BUTTON.

STEAM BOILER.

No. 387,393. Patented Aug. 7, 1888.

FIG. 1.

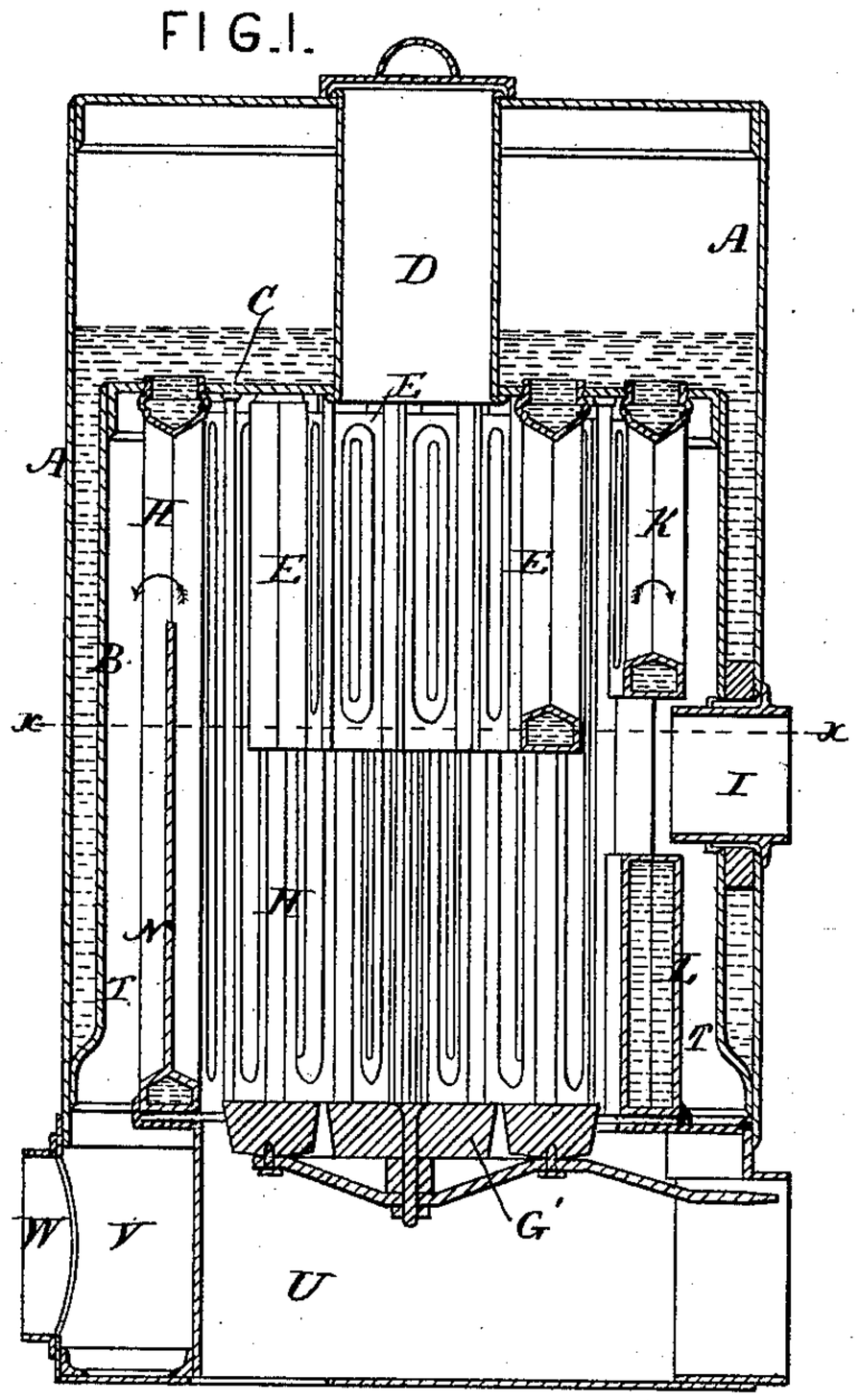


FIG. 2.

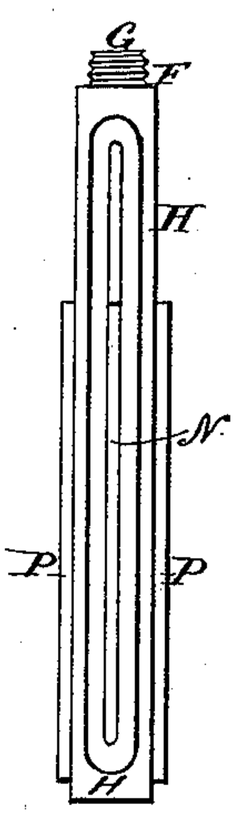


FIG. 2a.

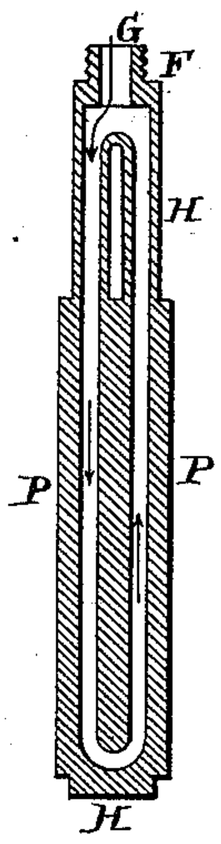


FIG. 3.

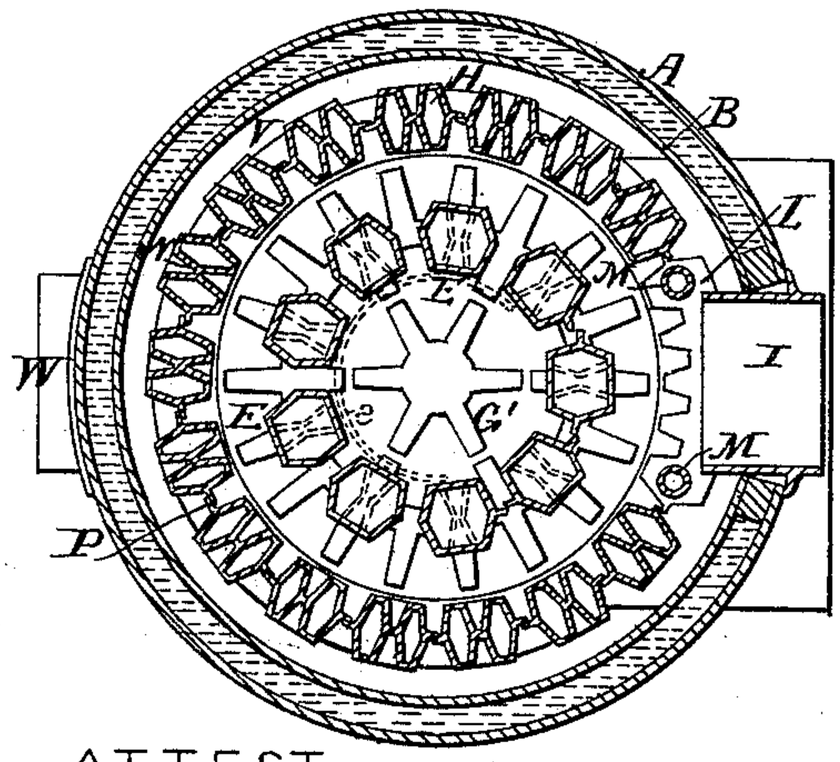
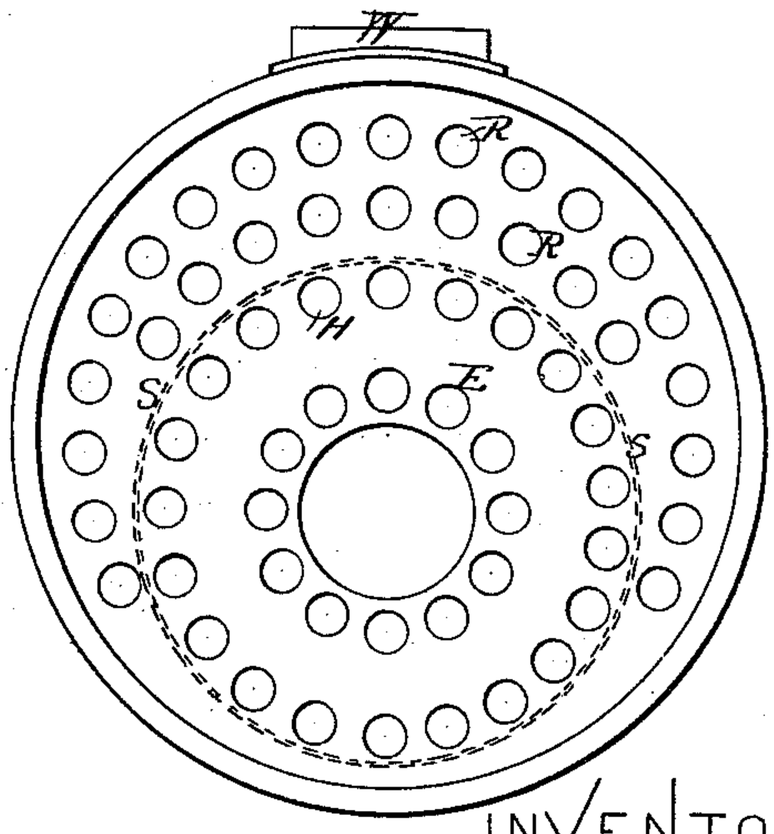


FIG. 4.



ATTEST-

Harry L. Amer.

I. J. Masson

INVENTOR-

Theodore E. Button.

by E. E. Masson.
atty.

UNITED STATES PATENT OFFICE.

THEODORE E. BUTTON, OF WATERFORD, NEW YORK, ASSIGNOR OF ONE-HALF TO CHARLES R. BUTTON, OF SAME PLACE.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 387,393, dated August 7, 1888.

Application filed March 9, 1888. Serial No. 266,746. (No model.)

To all whom it may concern:

Be it known that I, THEODORE E. BUTTON, a citizen of the United States of America, residing at Waterford, in the county of Saratoga and State of New York, have invented certain new and useful Improvements in Steam-Boilers, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention has for its objects to provide a boiler for heating or other purposes, having a magazine and fire-box formed therein of loops substantially in contact with each other and pendent from the crown-sheet, a series of such loops extending from the crown-sheet into a heating-chamber, so as to secure an extensive and most effective heating-surface and utilize the fuel to the greatest possible extent. I attain these objects by the construction illustrated in the accompanying drawings, in which—

Figure 1 represents a vertical sectional view of a boiler constructed according to my invention. Fig. 2 is a detached view of one of the water-circulating loops forming a part of my improved boiler. Fig. 2ª is a vertical section of the same loop. Fig. 3 is a horizontal sectional view taken on line *x x* of Fig. 1; and Fig. 4 is a plan view of a modification of my invention, showing the same as applied to large boilers.

The letter A indicates the outer shell of the boiler, and B the inner shell, which is concentric therewith, and is enlarged and riveted to the outer shell at its lower end, as shown in Fig. 1.

The letter C indicates the crown-sheet of the boiler, which is riveted to the upper end of the inner shell. The top of the outer shell and the crown-sheet of the inner shell are provided with corresponding openings, which are connected by a short supply-tube, D, secured at said openings, the said tube constituting the upper section of the magazine of the boiler. The lower section of the magazine is composed of a circular row of depending loops, E, preferably of that class known as the "Bundy Radiator Loop." The upper ends of these loops are contracted, so as to permit their bodies to be close together and yet have the perforations in the crown-sheet at sufficient distances apart and form a shoulder, F, upon said end, the contracted portion G being threaded, so as to be screwed into threaded apertures formed in the crown-sheet for their reception. The inner row of said loops extends about half-way down into the inner shell of the boiler, terminating in the fire-box thereof. Inside of the circle of these loops, forming the lower section of the magazine, is placed a sheet-iron cylinder, *e*, which completes said magazine and prevents the heated gases from passing therein and inflaming the fuel used; or said loops E may be provided with webs, as hereinafter described.

The fire-box of the boiler is composed of loops H, similar to those before mentioned, and surrounds the said loops in a circle connected therewith, as shown. The tubes or loops H are longer, however, than the tubes or loops E, and extend down to the plane of the lower edge of the shells, at which point is located the fire-grate G′, which may be of any suitable construction. A door, I, is located, as usual, at one side of the furnace on a plane about even with the lower end of the magazine, and the flue forming the frame of said opening passes through and is secured to the shells of the boiler. In order to make this side opening into the fire-box, two or three of the long loops are dispensed with and three short loops, K, are used, having their lower ends terminating on a level with the upper part of the door. The lower part of said portion of the fire-box is formed of a hollow section, L, of corrugated cast-iron, connected with the upper loops, K, by means of vertical pipes M. The loops H, which partially constitute the fire-box, are provided with webs N, which fill the lower two-thirds of the space between the branches of said loops, and the outer sides of said branches are provided with longitudinal lapping-flanges P. The object of said webs and flanges is to close the lower part of the fire-box, so as to compel the heated gases and products of combustion to take the direction of the arrows, in an upper course, before descending toward the escape-flue to secure the full effect of the heat. To insert the upper end of the flanged loops into the crown-sheet, each alternate one is screwed therein until it

is within one-quarter turn of its seat. The intermediate loops are then inserted and screwed fully to their seats, after which the first-mentioned loops are given their last quarter-turn and screwed fully up to their seats.

In the furnace above described the magazine, the fire-box, and the boiler-shell are all concentric with each other; but for larger furnaces I prefer the modified construction shown in Fig. 4, in which the said magazine and fire-box are eccentric to the boiler-shell, in order to bring the mouth of the magazine near the front in convenient position to be loaded, and to provide an additional heating-chamber, into which are placed the additional dependent loops R, similar to those before mentioned. The loops constituting the fire-box may be surrounded with a sheet-iron cylinder, as shown at S in Fig. 4, covering the lower two-thirds thereof, or thereabout, in which case the webs and flanges above described will not be necessary.

The base of the furnace is formed with an ash-pit, U, below the fire-box, and with a horizontal flue, V, which communicates with the lower end of the circular chamber T of the boiler and with the escape-flue W, through which the products of combustion pass to the chimney.

The boiler can be inclosed in a jacket of sheet metal, or walled with bricks, as usual.

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

1. The combination of a steam-boiler shell with a fuel-magazine formed in part by a series of loops depending from the crown-sheet within the fire-box and having longitudinal flanges, substantially as set forth.

2. The combination of a double-wall steam-boiler shell with a fire-box formed by a series of vertical loops depending from the crown-sheet and extending to the grate, and having longitudinal flanges, substantially as specified.

3. The combination, in a steam-boiler, of the magazine, formed in part of a series of loops dependent from the crown-sheet, and the fire-box formed by a series of loops surrounding the magazine and also depending from the crown-sheet, substantially as set forth.

4. The combination of the fire-box, formed by a series of loops, with the short loops K, depending from the crown-sheet, and the section L, connected therewith by means of pipes M, to form an opening opposite the door of the boiler, substantially as and for the purpose set forth.

5. The combination of the shell and crown-sheet of a steam-boiler, with the series of dependent loops forming the magazine and the pendent loops constituting the fire-box thereof, the said loops having longitudinal lapping-flanges, substantially as specified.

6. The combination of the shell and crown-sheet, with loops depending therefrom and forming a magazine, and the pendent loops constituting the fire-box, the loops having webs partly closing the spaces in said loops, and longitudinal lapping-flanges on the sides thereof, whereby the products of combustion are carried up and deflected in their passage from the fire-box, substantially as set forth.

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

THEODORE E. BUTTON.

Witnesses:
A. E. BUTTON,
CHAS. R. BUTTON.