

(No Model.)

2 Sheets—Sheet 1.

G. E. DIXON.
HEATER.

No. 498,536.

Patented May 30, 1893.

FIG. 1

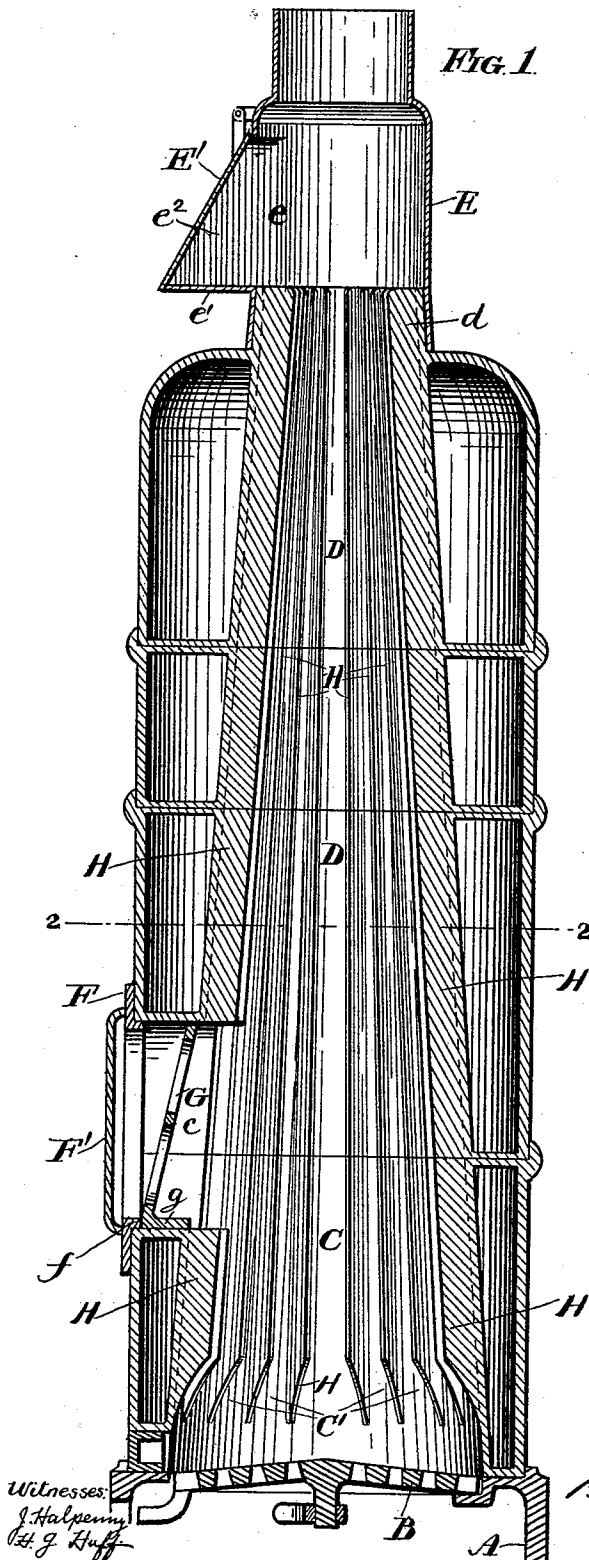
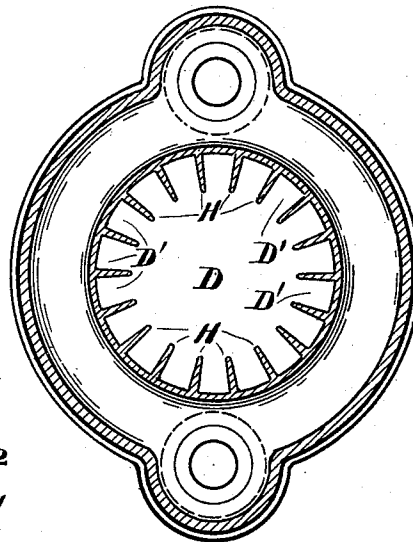


FIG. 2



Inventor

George E. Dixon

By Quincy Hopkins
attor

Witnesses:
J. Halpenny
Ch. J. Ruff

(No Model.)

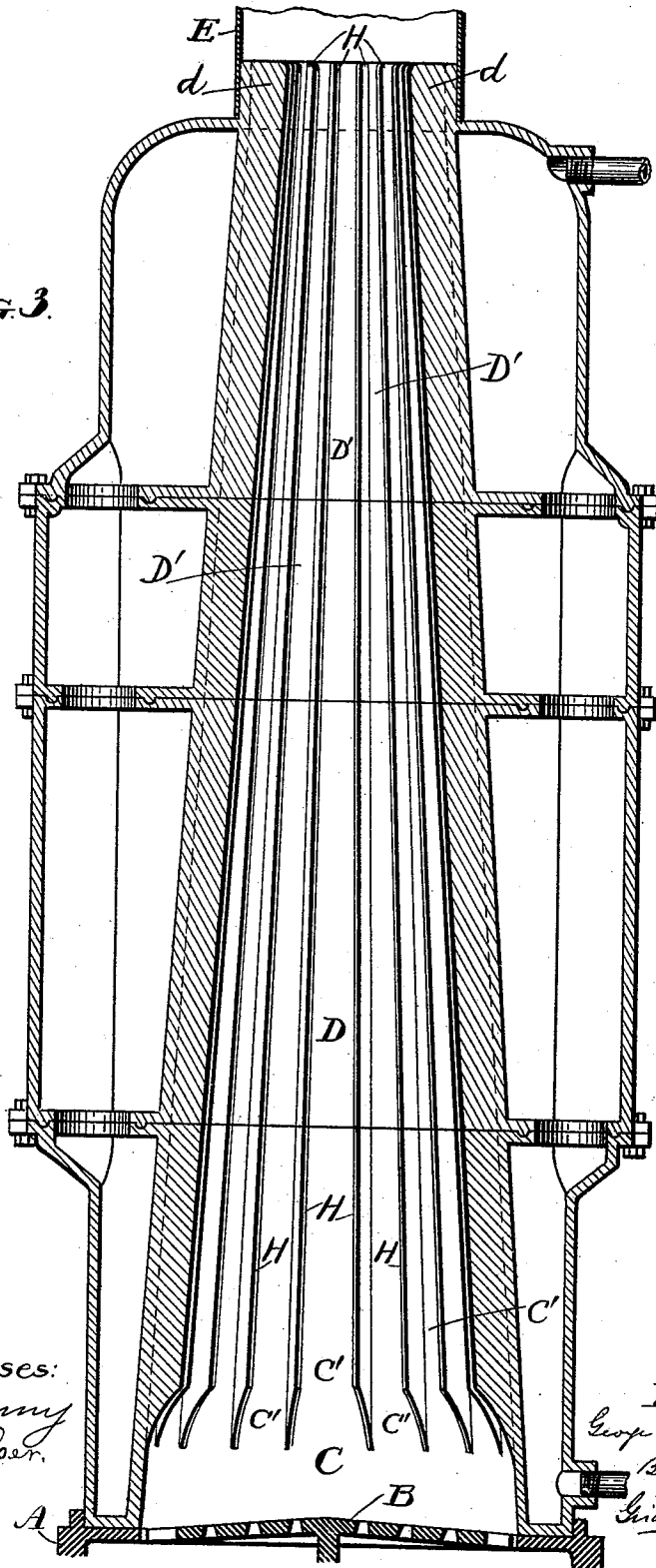
2 Sheets—Sheet 2.

G. E. DIXON.
HEATER.

No. 498,536.

Patented May 30, 1893.

FIG. 3.



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UNITED STATES PATENT OFFICE.

GEORGE E. DIXON, OF CHICAGO, ILLINOIS, ASSIGNOR OF ONE-HALF TO
ROBERT WEBSTER CALDWELL, OF SAME PLACE.

HEATER.

SPECIFICATION forming part of Letters Patent No. 498,536, dated May 30, 1893.

Application filed August 6, 1892. Serial No. 442,345. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. DIXON, a citizen of Great Britain, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Heaters, of which the following is a specification.

The present invention relates to steam and hot water heaters; or, in other words, to a heater having double walls or jackets, between which is left a space adapted to contain water, which, in case of a steam heater, is converted into steam, and which, in case of a hot water heater, is simply heated and caused to circulate through the pipes of the system. It is a well known fact that in heaters of this description the central portion of the body of fuel in the combustion chamber burns, while the outer portion of said body of fuel, for a depth of three inches or more, does not burn. This is due primarily to the fact that the fuel is in direct contact with the inner shell of the heater, and hence is separated from the body of water simply by the metal of which the inner shell is formed, this metal being usually of about one-quarter of an inch in thickness. The result of this is that the heat is absorbed from the fuel so rapidly that it is not possible to maintain it at the high temperature necessary to insure combustion.

The object of the present invention is to provide a heater of such construction that these conditions will not exist, and of such construction that the outer portion of the body of fuel will burn more rapidly than the central portion. In order to accomplish this result it is necessary first to hold the fuel out of contact with the water jacket, and then bring a sufficient quantity of oxygen into contact with the sides of the body of fuel.

To this end the invention consists in arranging within the combustion chamber a suitable grating that will hold the fuel out of contact with the inner shell, and that will at the same time leave an air space between said body of fuel and inner shell, said grating being of such construction that air passing through said air space may come in contact with the sides of the entire body of fuel from top to bottom.

In the accompanying drawings, which are made a part of this specification: Figures 1 and 2 are respectively a vertical and a horizontal section of a heater embodying the invention. Fig. 3 is a vertical section of a heater embodying the invention, the cutting plane being at right angles to the cutting plane of Fig. 1.

A represents a portion of the base of the heater, and B the grate, so mounted that it may be tilted in the customary manner. Above the grate is a fire-box C, and above the fire-box is a fuel magazine D. The fire-box and magazine are continuations of each other, and, preferably, they flare downward, so that it is not possible for the fuel to become choked in either of them. Since combustion takes place from top to bottom of the fire box and magazine, these parts taken together constitute the combustion chamber. On the upper end *d* of the magazine is slipped a part E, which has in one of its sides an opening *e*, and from the bottom and side margins of which project flanges *e'* and *e''*, respectively, the edges of the flanges *e''* being sloped as shown, and to this part E, near the upper margin of the opening, is hinged a door E' for closing said opening. Through this opening fuel may be fed into the magazine.

At about where the feed door is usually located in a heater that has no fuel magazine; viz., at the upper part of the fire-box, I provide my improved heater with an opening *c*, surrounding which is a frame F, having on its bottom side a flange *f*, which projects into the opening and rests upon the lower margin thereof for sustaining the frame, and to this frame is hinged a door F'. Within the opening, and extending from side to side, and from top to bottom thereof, is a grate G, which occupies an inclined position and has a foot *g* by which it is supported. The foot is wide enough to pass the vertical plane of the center of gravity of the grate, and in this way the grate is prevented from falling inward, and since it bears at bottom against the flange *f* of the door frame, and at top against the top of the frame, it cannot be forced outward by the fuel pressing against it. This grate is used when the heater is used as a magazine

heater, and its objects are first to prevent the fuel from forcing the door open, and, second, to enable the draft to be regulated.

There are a number of flanges projecting from the inner surface of the inner shell. These flanges are, preferably, cast with the inner shell, and are so located and arranged that they constitute in effect a grate for supporting the fuel and holding it out of contact with said shell. As shown in the drawings, the opposite faces of each of these flanges are substantially parallel, and the flanges themselves are radial, but, of course, accuracy in these respects is not necessary. The object to be attained is to hold the fuel out of contact with the shell, and to afford a number of intervening channels or air spaces C' and D', the inner edges of the flanges being sufficiently far apart to enable the air within the channels to have ample contact with the surface of the fuel, and to enable combustion to be carried on over the entire side-surface of the body of fuel in the heater. It will be observed that the flanges terminate a short distance above the grate. If they were continued quite to the grate each of the channels C'-D' would constitute a direct open passageway from the ash pit to the smoke flue, and the entire draft would pass through these passageways without passing through any part of the body of the fuel. With the construction shown in the drawings a small amount of fuel will rest against the inner shell of the heater below the flanges, and thus close the lower ends of the channels C', and cause the air entering the combustion chamber from the ash pit to pass through the fuel resting upon the grate. After passing through the lower portion of the body of fuel, the air finds its way into the air flues and passes up through them in contact with the sides of the body of fuel, as already described. This terminating of the flanges above the grate also enables the use of a grate of sufficient diameter to practically fill the lower part of the fire-box, and at the same time enables the grate to be tilted without coming in contact with the flanges.

The Joy heater, which is well known to the trade, does not accomplish the object of my present invention. In the Joy heater the fuel in the combustion chamber or fire-box is in direct contact with the inner shell of the water jacket, and this is open to the objection above pointed out. Above the fire-box the Joy heater has a fuel magazine, which is formed by a number of hollow projections extending inward from the inner shell of the heater. The proportions of these projections are such that they unite, or practically unite, at their inner edges and form a continuous, or practically continuous, vertical chamber, which serves the purpose of a fuel magazine. The spaces between these projections form flues, through which the products of combustion pass upon leaving the fire-box, but it is not the intention of this construction that

the air passing through these flues shall have contact with the sides of the body of fuel in the magazine. As with the fire-box, so with the magazine, the fuel is separated from the body of water only by a thin sheet of metal, so that the sides of the body of fuel cannot be brought to a sufficiently high temperature to support combustion.

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a heater the combination with an inner and an outer shell, leaving a water space between them, of a grating arranged within the combustion chamber so as to hold the fuel out of contact with the inner shell, and so as to leave an air space between the sides of the body of the fuel and inner shell, substantially as set forth.

2. In a heater the combination with an inner and an outer shell, leaving a water space between them, of a number of flanges projecting from the inner shell into the fire-box, said flanges being of such number and so located as to form a grating adapted to hold the fuel out of contact with the inner shell, and said flanges resulting in intervening air spaces in open communication with the space occupied by the fuel, so that the air passing through said air spaces may have contact with the body of fuel in the fire-box so as to support combustion at the sides of said body of fuel, substantially as set forth.

3. In a heater the combination with an inner and an outer shell, leaving a water space between them, and a grate extending over, practically, the whole area of the bottom of the fire-box, of a number of flanges projecting from the inner shell into the fire-box and terminating within a short distance of said grate, said flanges being of such number and proportions and so located as to hold the fuel out of contact with the inner shell, and leave air spaces between said fuel and inner shell, substantially as set forth.

4. In a heater the combination with an inner and an outer shell, leaving a water space between them, said inner shell forming a fire-box C and a fuel magazine D, of a number of flanges projecting from the inner shell into the fire-box and fuel magazine, and a smoke pipe connecting with the top of the magazine, said flanges being of such number and proportions and so located as to hold the fuel out of contact with the inner shell and form air spaces between said fuel and inner shell, said air spaces being in open communication with the space occupied by the fuel in order that the air passing through said air spaces may have contact with the sides of the body of fuel from top to bottom, for supporting combustion, substantially as set forth.

5. In a heater the combination with an inner and an outer shell, forming a fire-box C and a fuel magazine D, of a number of flanges projecting from the inner shell into the fire-

box and fuel magazine, a smoke pipe connecting with the top of the magazine, and an opening above the magazine for the admission of fuel, said flanges being of such number and proportions and so located as to hold the fuel out of contact with the inner shell and form air spaces between said fuel and inner shell, said air spaces being in open communication with the space occupied by the fuel in order that the air passing through said air spaces may have contact with the sides of

the body of fuel from top to bottom, for supporting combustion, substantially as set forth.

6. The combination with a heater having an opening *c*, of a grate *G* placed in inclined position in said opening and having the foot *g*, substantially as set forth. 15

GEORGE E. DIXON.

Witnesses:

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