

No. 668,326.

Patented Feb. 19, 1901.

M. J. BURKE.  
WATER TUBE BOILER.

(Application filed Apr. 5, 1898. Renewed Aug. 30, 1900.)

(No Model.)

Fig. 1.

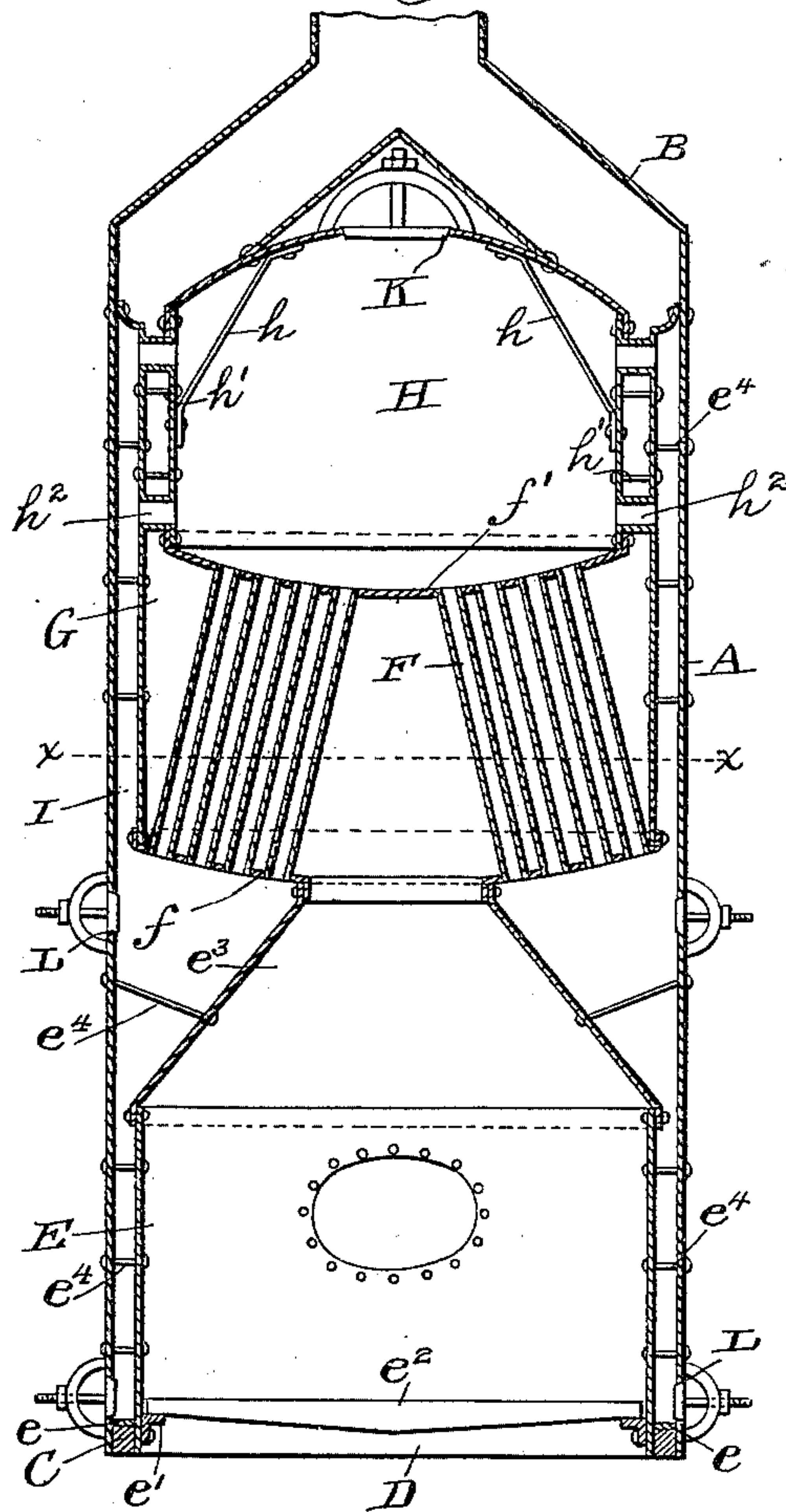
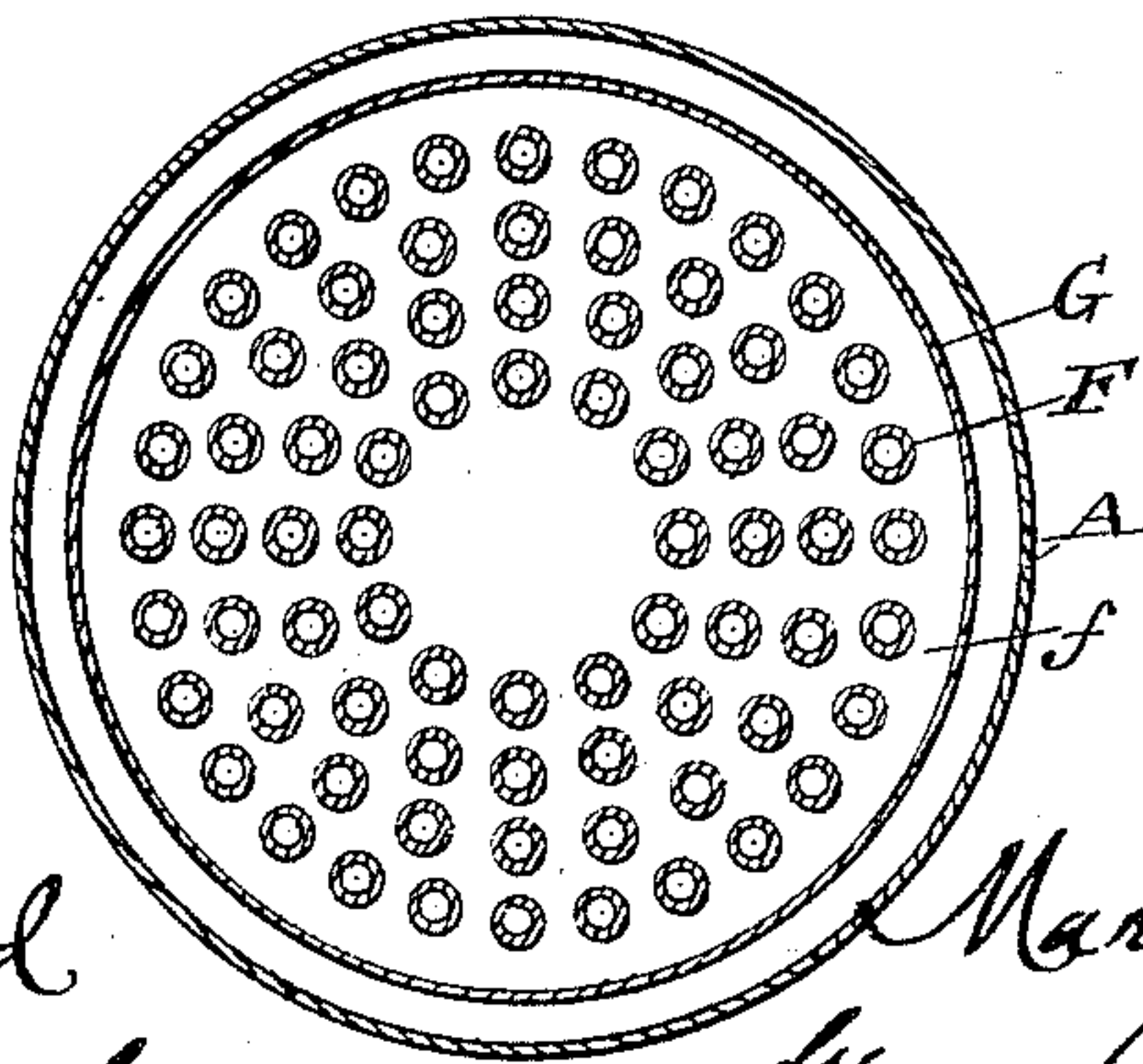


Fig. 2.



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# UNITED STATES PATENT OFFICE.

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## WATER-TUBE BOILER.

SPECIFICATION forming part of Letters Patent No. 668,326, dated February 19, 1901.

Application filed April 5, 1898. Renewed August 30, 1900. Serial No. 28,575. (No model.)

*To all whom it may concern:*

Be it known that I, MARTIN J. BURKE, a citizen of the United States, residing at Marion, in the county of Marion and State of Ohio, have invented certain new and useful Improvements in Boilers, of which the following is a specification.

My invention relates to upright submerged water-tube boilers, and has for one of its objects to do away with the necessity of building brick walls and arches to confine the heat to the boiler by providing a water-jacket surrounding the boiler and steam-drum.

Another object of my invention is to provide means while using straight water-tubes of bringing them immediately over the fire, so as to have them present the greatest possible heating-surface to the greatest available heat.

These objects I accomplish in the manner and by the means hereinafter fully described in detail and particularly pointed out in the claims, reference being had to the accompanying drawings, in which like reference-letters indicate like parts in both figures.

Figure 1 is a vertical central section of my invention. Fig. 2 is a sectional view on the line  $x x$ , Fig. 1.

A indicates the outer shell of an upright cylindrical boiler, the upper part of which is connected with a dome-shaped section B and the lower part of which rests on mud-ring C, which surrounds and contains the ash-pit D.

My invention consists of a cylindrical fire-chamber E of smaller diameter than the outer shell A of the boiler. Said fire-chamber E rests on the mud-ring C and is connected with the bottom of the outer shell A of the boiler by an annular flange  $e$ . Inside said fire-chamber E, near the bottom, an annular flange  $e'$  is secured projecting inwardly, and on this flange  $e'$  rest the grate-bars  $e^2$ . The fire-chamber E is bolted to a section  $e^3$  like a frustum of a cone. Stay-bolts  $e^4$  connect said fire-chamber E and said section  $e^3$  to the shell A. The fire-chamber E has the usual fire-door. The water-tubes F are arranged in a series of circles above the section  $e^3$  and inclined inwardly toward the top, leaving a circular opening in the center tapering upward. The inner edge of the lower flue-plate  $f$  is bolted to the top of the section  $e^3$ , and the outer edge of said flue-plate is bolted to the

bottom of a cylindrical chamber G, the top of which is flared out until it meets the shell A near the top, to which it is bolted. Stay-bolts  $e^4$  connect said cylindrical chamber G and said shell A at intervals. The upper flue-plate  $f'$ , which is also the bottom of the steam-drum H, is bolted at its outer edge to the bottom of the sides of the drum H. The steam-drum H is cylindrical and is strengthened by having the top bolted to the sides by the braces  $h$  between the top and sides and by the stay-bolts  $h'$  between the sides of the steam-drum H and the cylindrical chamber G. The space between the shell A and the fire-chamber E, the section  $e^3$ , and the cylindrical chamber G forms a water-jacket I, into which the water-tubes F open at the bottom and in which the water rises a little above the bottom of the steam-drum H. Circulating steam-pipes  $h^2$  connect the interior of the steam-drum and the water-jacket I near the bottom of the steam-drum H just above the water-line and near the top of the steam-drum H just where the cylindrical chamber G joins the shell A.

The usual water connections, steam-pipes, valves, and gages are connected with the boiler.

The manhole K at the top of the steam-drum H and the hand-holes L allow access for cleaning, &c.

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

1. In an upright cylindrical water-tube boiler, having an annular water-jacket on its internal face and fire-pot in its lower part, a cylindrical chamber secured at the bottom to the plate supporting the tubes, and at the top secured to the outer shell of the boiler, and a steam-drum provided with holes in its bottom adapted to receive the upper ends of said water-tubes, substantially as shown and described.

2. In an upright cylindrical water-tube boiler, having an annular water-jacket on its internal face and fire-pot in its lower part, a plate at an angle to said tube in which the lower ends of said tubes are secured, said plate having an opening in its center where it is secured to the top of said fire-pot, a series of converging water-tubes arranged



around the opening in the top of the fire-pot, said tubes having an open space in the center tapering toward the top, a cylindrical chamber secured at the bottom to the outer edge of said plate and at the top secured to the outer shell of the boiler, and a steam-drum provided with holes in its bottom adapted to receive the upper ends of said water-tubes, substantially as shown and described.

10 3. In an upright cylindrical water-tube boiler, having an annular water-jacket on its internal face, a cylindrical fire-chamber with cone-shaped top concentric with the outer shell of the boiler, but of smaller diameter;

15 a series of converging water-tubes arranged with an opening in the center tapering toward the top, the inner edge of the lower plate supporting said water-tubes at an angle and being bolted to the top of said fire-chamber,

20 and its outer edge bolted to the bottom of a cylindrical chamber; a cylindrical chamber secured to the outer shell; a steam-drum having the water-tubes entering its bottom and its sides braced by stay-bolts to the inside of said cylindrical chamber and to the top of said steam-drum; a steam-pipe connecting the interior of said steam-drum with the water-jacket near the bottom just above the water-line and near the top of said steam-

25 drum just where the top of the cylindrical chamber joins the outer shell, and stay-bolts bracing said fire-chamber and said cylindrical chamber to said outer shell, substantially as shown and described.

4. An upright cylindrical water-tube boiler 35 consisting of an outer shell having an annular water-jacket on its internal face, a dome member extended over the top, a fire-pot in the lower part of the space formed by the water-jacket, said pot having a top shaped 40 like a frustum of a cone and a grate in its bottom; a series of converging water-tubes arranged around the opening in the top of said pot, said tube having an open space in the center tapering toward the top; a cylindrical chamber in the upper part of the space 45 formed by said jacket, the bottom of said chamber at an angle to said tubes and forming the bottom tube-plate, and the top of said chamber secured to outer shell, a steam-drum 50 provided with openings in its bottom, adapted to receive the upper ends of the water-tubes, said steam-drum extending into the dome, and the sides of said drum being braced to the top of the drum and to the inside of 55 the cylinder by stay-bolts, steam-pipes connecting the interior of the drum and the water-jacket just above the water-line, and just below where the top of the cylinder joins the outer shell, and stay-bolts bracing the fire-pot and cylinder against the outer shell, substantially as shown and described. 60

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

MARTIN J. BURKE.

Witnesses:

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