

C. W. PIERCE.
 ROTARY STEAM BOILER.

No. 175,624.

Patented April 4, 1876.

Fig. 1.

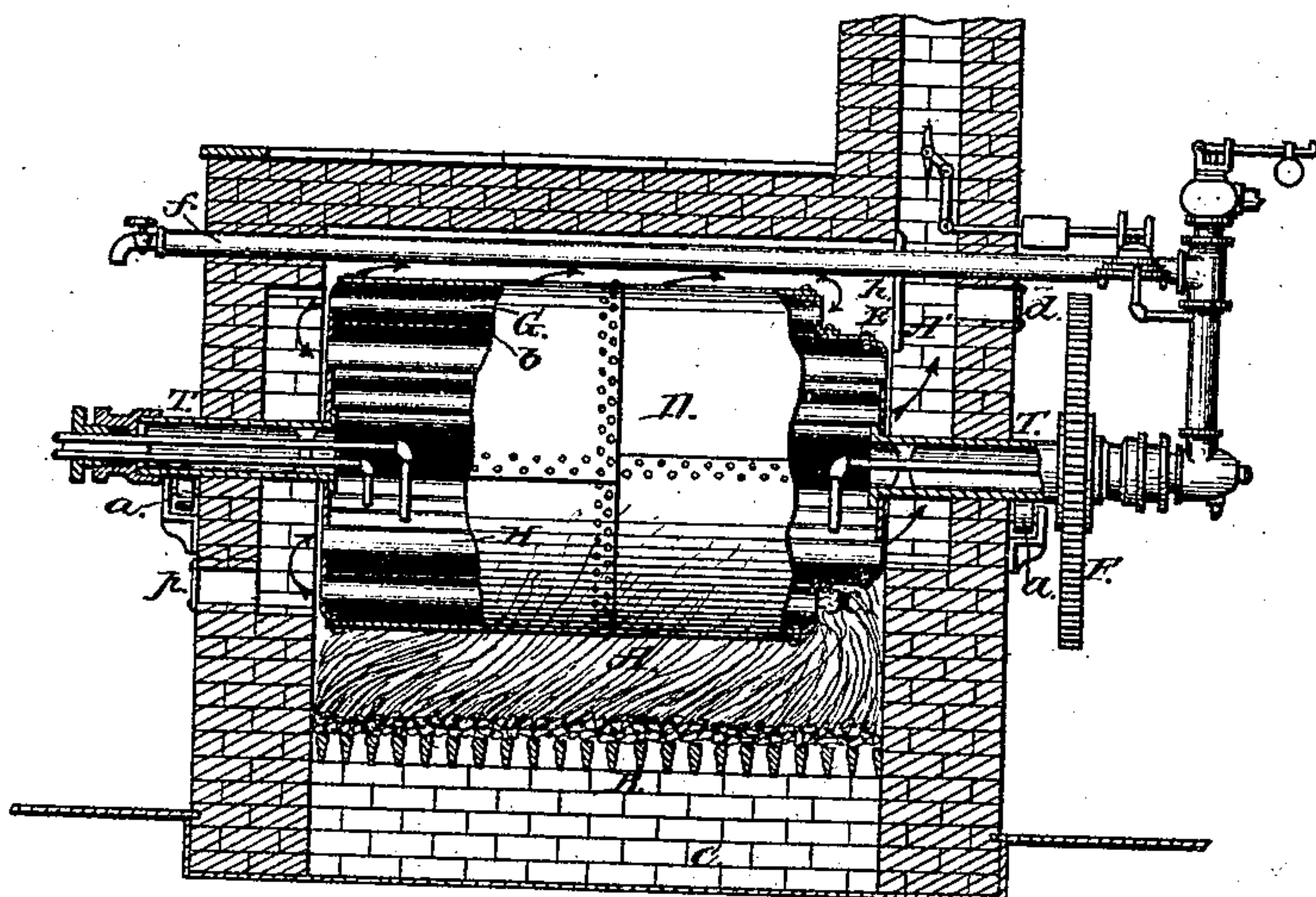
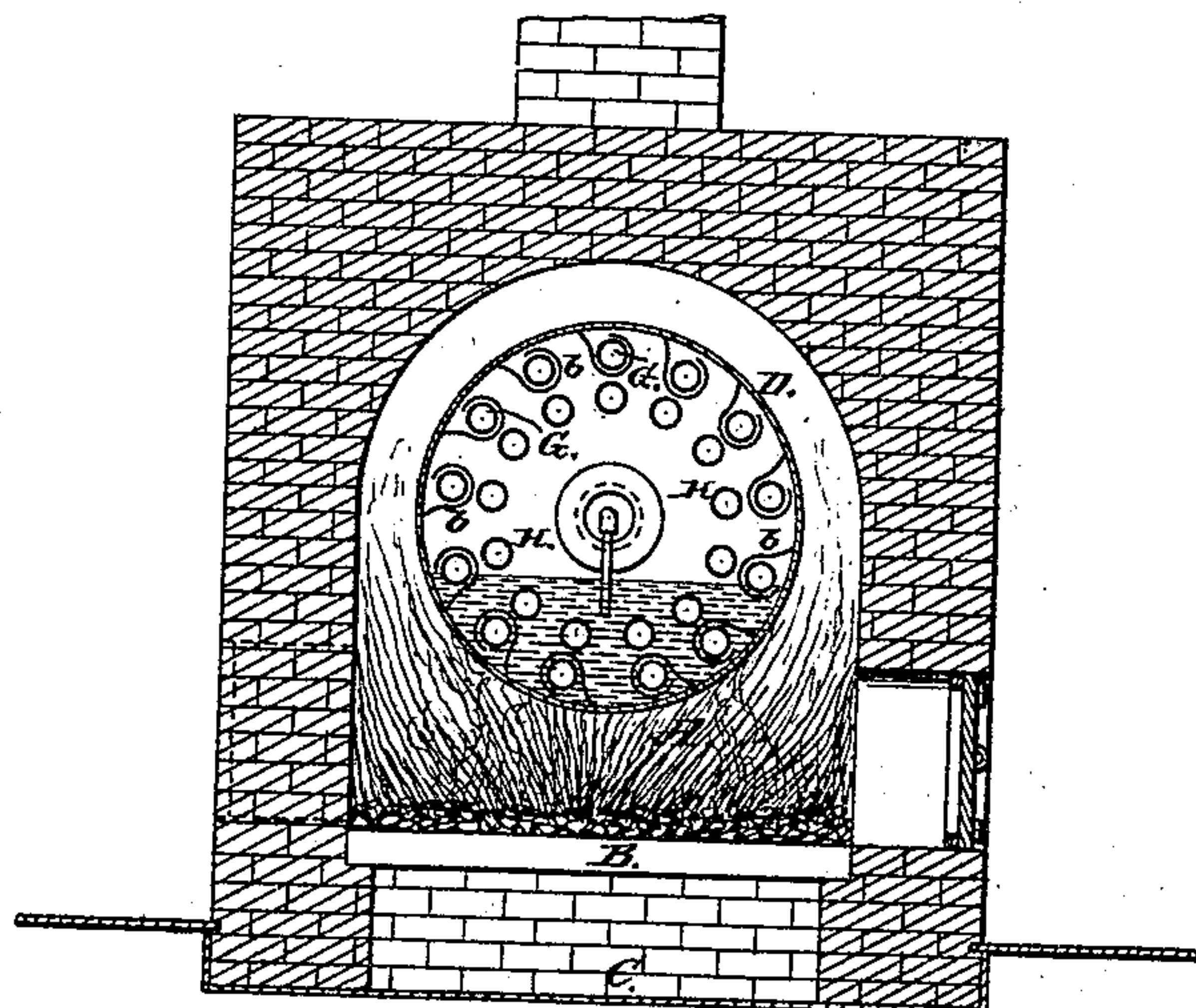


Fig. 2.



Witnesses:
 W. J. Butler.
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UNITED STATES PATENT OFFICE.

CHARLES W. PIERCE, OF NEW YORK, N. Y.

IMPROVEMENT IN ROTARY STEAM-BOILERS.

Specification forming part of Letters Patent No. 175,624, dated April 4, 1876; application filed January 26, 1876.

To all whom it may concern:

Be it known that I, CHARLES W. PIERCE, of New York, in the county of New York and State of New York, have invented new and valuable Improvements in Steam-Boilers; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a longitudinal vertical section of my boiler, and Fig. 2 is a transverse vertical sectional view thereof.

This invention has relation to rotary tubular steam-boilers; and the nature of my invention and improvement on this class of boilers consists in the protrusion or extension on or of the head of the boiler, in the unequal length of the tubes or flues, in trunnions T, damper *e*, doors *d* and *p*, and tube *f*, relatively arranged as hereinafter described.

In the annexed drawings, A designates the furnace-chamber; B, the grate-bars; C, the ash-pit; D, the boiler-shell; X, boiler extension; T, the trunnions; G and H, tubes or flues; *b*, the buckets; *e*, the damper; *d* and *p*, doors in the end of the furnace-chamber; *f*, tube in the arch of the furnace-chamber; *a*, anti-friction rollers; and F the spur-wheel, and *h*, annular chamber.

To the external surface, at the center of each head of the boiler D, which is cylindrical, and of any suitable length and diameter, is attached a hollow trunnion, T, which extends outside of the furnace-chambers A and is supported by anti-friction rollers *a*. To one of the trunnions T is keyed a spur-wheel, F, which receives rotation from any convenient prime mover.

G G designate a number of flue-tubes, which are arranged equidistant apart within and concentrically around the axis of the boiler-shell. These flues are near the boiler-shell, are open at the outward surface of the boiler-heads and throughout their whole length, and admit the flame and products of combustion to pass freely through them while the boiler is rotating. Each one of the flues G is nearly encircled by a bucket, *b*, as shown in Fig. 2.

These buckets *b* are equal in length with the flues G, and are attached to the inner surface of the shell D of the boiler, or they may be held in position by any convenient method.

When the boiler is rotated the buckets *b* will successively take up the water, and during that part of the revolution which is performed above the water-line in the boiler supply water to the flues and to the boiler-shell, thereby preventing unequal expansion and contraction, and greatly facilitating the generating of steam.

Inside of the circle of the flues G are other flues, H, which, like the flues G, are open through both the heads of the boiler and throughout their whole length, but are longer than the flues G. This increased length of the flues H becomes necessary in consequence of lengthening the central portion of the boiler by a protrusion, X, of or on one or both the heads of the boiler, in this case one, which extension X may be of any desired diameter less than the whole diameter of the boiler B. By this construction the boiler *per se* deflects the flame and products of combustion through the shorter flues G into the annular chamber *h* in the interior surface of the furnace-chamber A, equal in diameter to the boiler D, thence they return through the longer flues H through the annular opening into the chimney A'. This office performed by the boiler or extension X increases its steaming capacity.

Between the arch of the furnace-chamber A and the chimney A' is a damper, *e*, which, when open, allows the products of combustion to escape into the chimney A' without passing through the flues G and H. In the opposite end of the furnace-chamber A is a door, *d*, which, open, admits the external air to pass through the furnace-chamber A and the flues G and H into the chimney A'. By this device the boiler may be used or stopped at short intervals with safety and economy. The door *d* gives access to that end of the boiler if required. Similar provision is made for the opposite end of the boiler by the door *p*, which opens into the furnace-chamber A, and communicates directly with the chimney A'.

In the arch of the furnace-chamber A, and passing through it parallel with the boiler D, is a tube, *f*, through which the steam passes,

and is rendered more perfect and effective. The quality of steam may be modified at pleasure, by placing other tubes parallel, and connected with the tube *f*.

The deflection herein described might be effected by a flange attached to the head of the boiler between the flues. Water is admitted into the boiler through one of the trunnions *T*, and steam conducted off through the other.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. A rotary boiler, having an extension, *X*, less in diameter than the outer shell, by means

of which is formed an annular fire-chamber, *h*, and the extension and the outer tube shell are provided with tubes of unequal length, substantially as described.

2. In combination, the boiler-shell *D*, trunnions *T*, flues *G* and *H*, bucket *b*, damper *e*, doors *d* and *p*, annular chamber *h*, and tube *f*, constructed and operating substantially as and for the purpose set forth.

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Witnesses:

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