

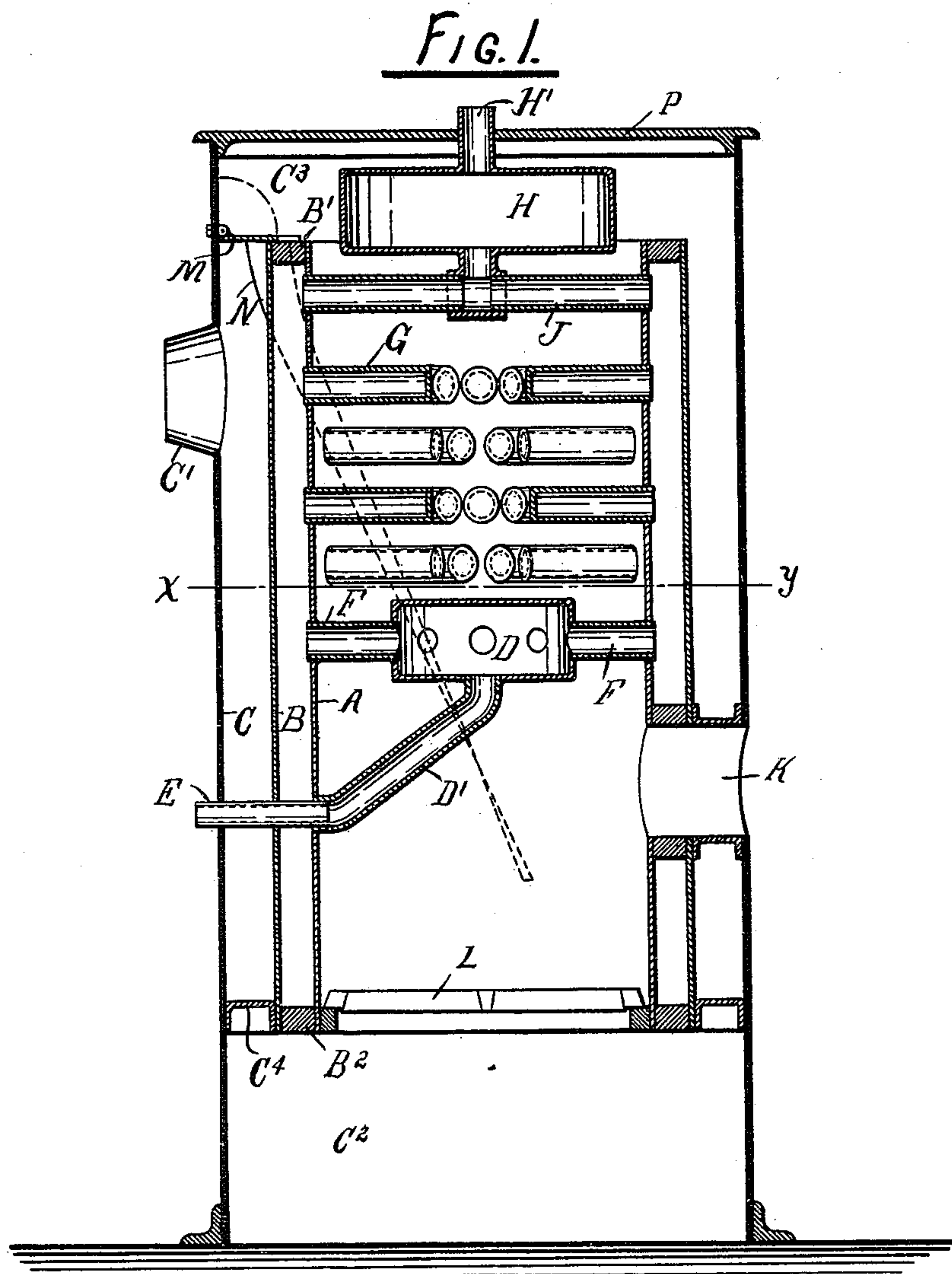
(No Model.)

2 Sheets—Sheet 1.

M. W. BAILY.
STEAM BOILER.

No. 405,864.

Patented June 25, 1889.



WITNESSES
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2 Sheets—Sheet 2.

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FIG. 2.

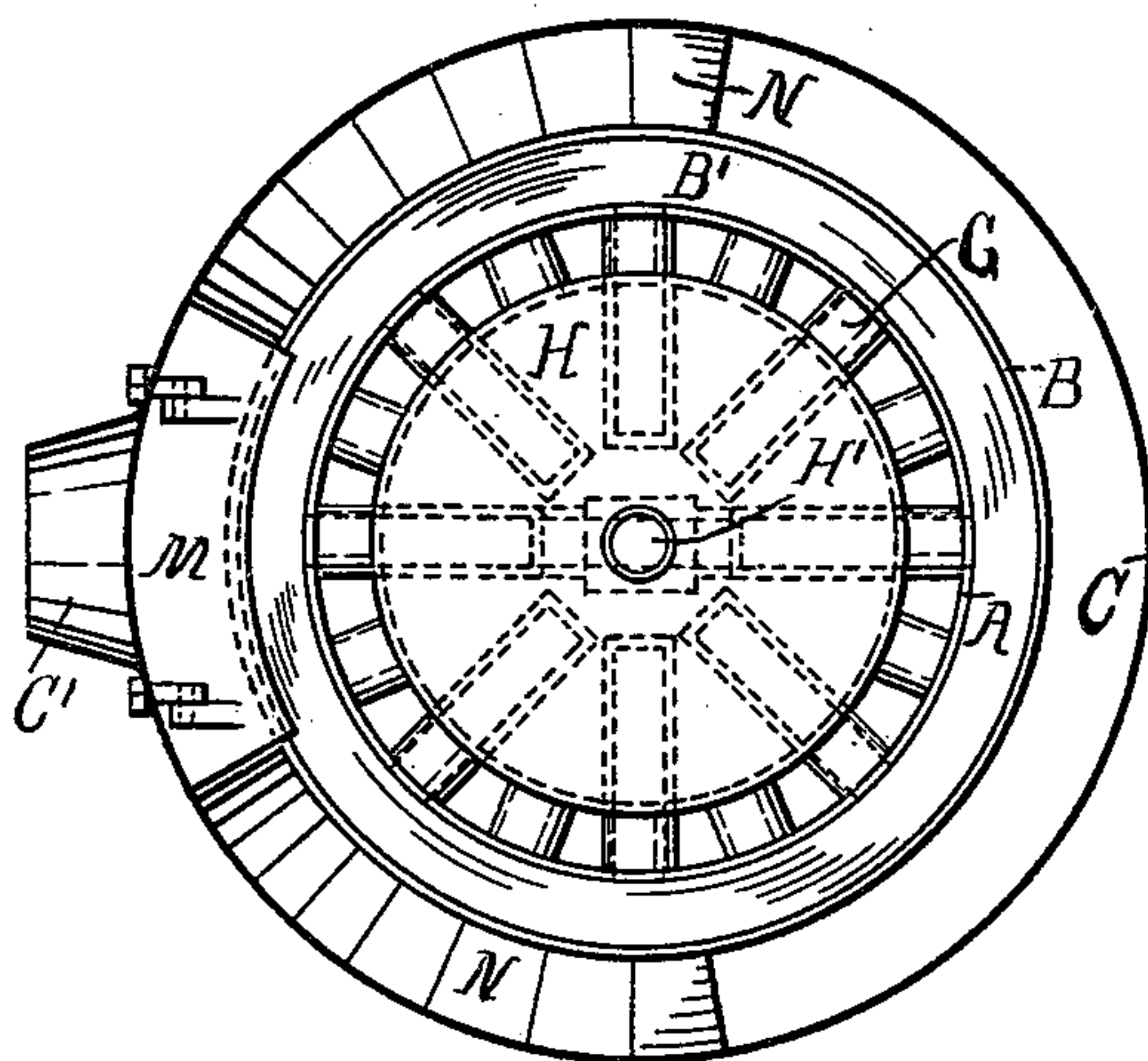
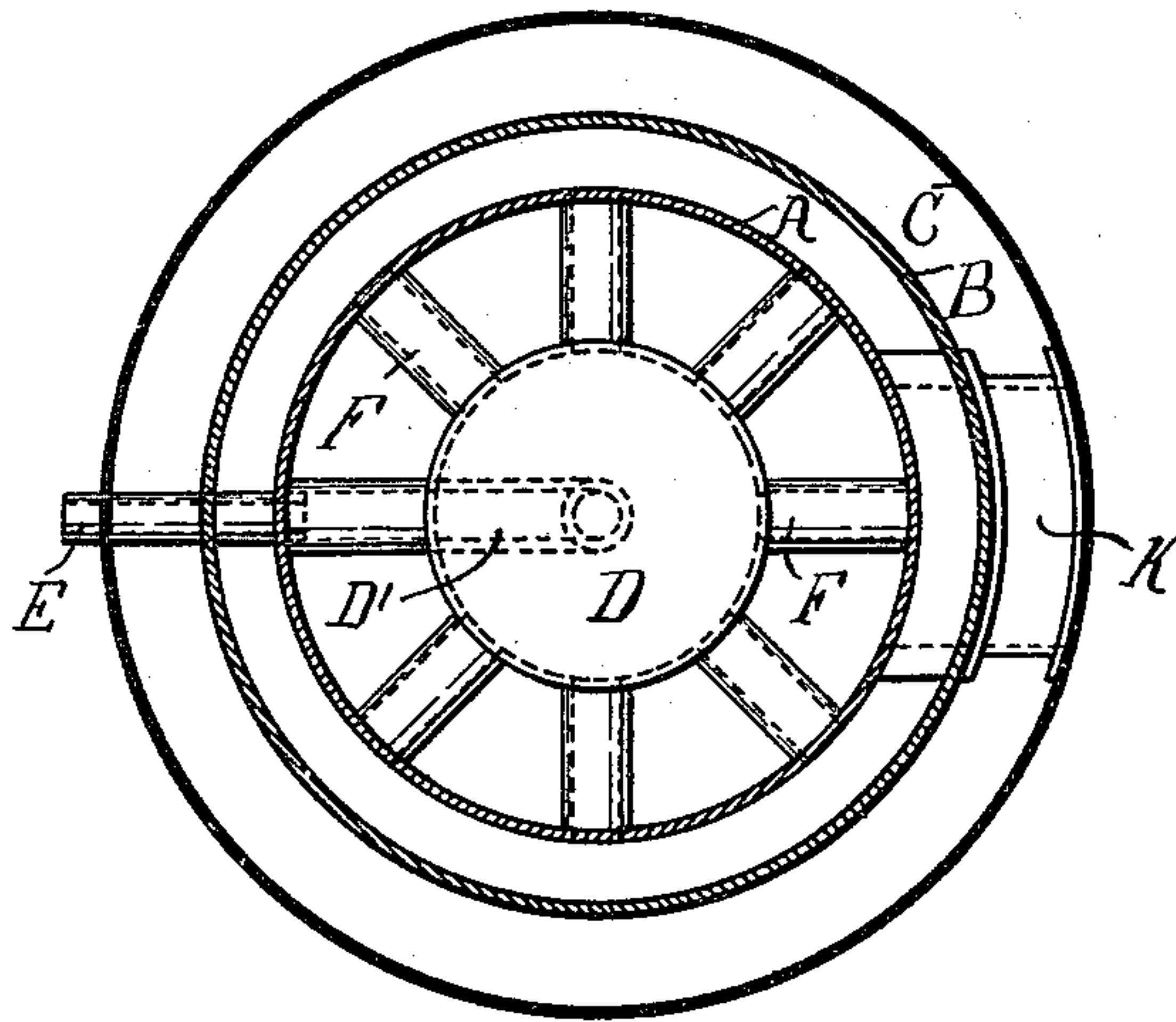


FIG. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

MIFFLIN W. BAILY, OF POTTSTOWN, PENNSYLVANIA.

STEAM-BOILER.

SPECIFICATION forming part of Letters Patent No. 405,864, dated June 25, 1889.

Application filed March 11, 1889. Serial No. 302,809. (No model.)

To all whom it may concern:

Be it known that I, MIFFLIN W. BAILY, a citizen of the United States, residing at Pottstown, in the county of Montgomery and State of Pennsylvania, have invented certain new and useful Improvements in Steam-Boilers; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

My invention relates more particularly to vertical cylindrical boilers adapted to maintain a circulation of steam through a system of piping, as for house-warming purposes.

The main objects of my invention are to provide a boiler of simple construction having large direct heating-surface, the products of combustion being brought in contact with the outer shell of the boiler before reaching the stack, and to admit the condensed steam or water to the boiler in such manner as to induce a rapid circulation through a system of piping, as above referred to. To effect these objects, I preferably construct my boiler, as shown in the drawings, of an inner and outer shell forming an annular water and steam space with an interior fire-box at one end. Centrally above the grate I place a water-distributing chamber, which I connect by water-tubes with the water-space of the boiler, and also with the water-supply. Above this chamber I provide water-tubes extending radially from the inner shell and with closed inner ends. Above these water-tubes I place a steam-drum, which is connected with the steam-space of the boiler and has a supply-outlet. Surrounding the outer shell and at a proper distance from it is a casing extending above the top of the boiler, and provided with a check-plate, partition-plates, and a smoke-outlet, all of which are so arranged as to compel the products of combustion, after being deflected by the steam-drum, to come in contact with the outer surface of the boiler before escaping. The water of condensation or supply is admitted to the boiler by means of a tube passing through the outer casing and the

outer shell of boiler and inserted into a larger tube leading upward into the distributing-chamber referred to.

Figure 1 is a sectional elevation of a boiler, showing the features of my invention. Fig. 2 is a top view of the same with the cover P removed. Fig. 3 is a section through X Y of Fig. 1.

An inner shell A and an outer shell B, when united by means of top and bottom rings B' and B², form the main body of the boiler, which thus consists of an open cylinder surrounded by an annular water and steam space between the shells. An interior grate L is located at one end.

A casing C surrounds the body of the boiler at some distance from it and extends below and above the same, forming an ash-pit C² and a smoke-chamber C³, which is closed on top by a cover P, and which communicates with the open space between the casing C and the outside shell B of the boiler. The casing is provided with a smoke-outlet C' below the top of the boiler, and partition-strips N extend diagonally from the top of the boiler toward the lower end in contact with both the outer shell B and the casing C. A ring C⁴ connects the casing with the lower end of the boiler and closes the space between them. The upper ends of the strips are on opposite sides of the smoke-outlet C', and a check-plate M, which may be hinged, as shown, is placed above the smoke-outlet C', so as to close the opening between the casing and the boiler and the ends of the partitions N, thus cutting off direct communication with the outlet C'.

Above the fire-door K and directly over the grate is placed a distributing-chamber D, which is connected by radial water-tubes F with the water-space of the boiler. A water-inlet tube D' also enters this chamber and extends downward at an angle from the center and connects with the inner shell A, its lower open end inclosing the inner end of a tube E, which passes through the casing C and the water-space of the boiler, said tube E being screwed or otherwise secured to the outer shell B.

Above the distributing-chamber water-tubes G are screwed radially into the inner shell, the ends, which reach toward the center

of the boiler, being closed. These tubes are arranged in staggered rows and reach to the water-line. Above them tubes J are screwed through the inner shell into the steam-space and connect with a superheating drum H, which is supported centrally above the grate and extends into the smoke-chamber C³. The steam is taken from this drum through a tube H', which passes through the cover P.

The operation of my boiler and of the several features of construction described will be readily understood. The water of condensation is taken from the system of piping into the distributing-chamber D through the tubes E and D'. The water is rapidly heated to a high temperature in this chamber and the tube D', and is distributed through the tubes F to the boiler, thus causing a suction upon the system of piping, which induces a rapid circulation through the latter.

The blind-end tubes G present a great amount of direct-heating surface, which causes a thorough circulation of water through them, and the steam as generated rises through the tubes J into the steam-drum H, where it is superheated before being withdrawn. The products of combustion are deflected by this drum and enter the smoke-chamber C³, from which, if the check-plate M is closed, as shown, they are compelled by the partition-plates N to traverse around the whole outer surface of the shell B before reaching the smoke-outlet C'.

The boiler, as above set forth, combines, with a compact and economical construction, a great amount of heating-surface, so arranged as to produce a rapid generation and circulation of steam through the system. I do not, however, limit my invention to the exact construction shown, as it may be considerably modified without departing from the spirit of my invention; but

What I claim is—

1. A steam-boiler having a distributing-chamber arranged above the fire-box, said chamber being connected by tubes with the water-space of the boiler and also with a wa-

ter-supply tube passing through said water-space, substantially as set forth.

2. A cylindrical steam-boiler having a distributing-chamber arranged above the fire-box, said chamber being connected by tubes with the water-space of the boiler and having a water-supply tube extending below said chamber and connecting with an inlet-tube passing through the annular water-space of the boiler, substantially as set forth.

3. A cylindrical steam-boiler having a distributing-chamber arranged above the fire-box, said chamber being connected by tubes with the water-space of the boiler and having a water-supply tube extending below the chamber and connected with said water-space, the lower end of said supply-tube inclosing the end of a tube secured to the outer shell of the boiler and passing through said water-space, substantially as set forth.

4. The combination, with a cylindrical steam-boiler having an interior fire-box, of a casing forming an annular smoke-circulating chamber surrounding the outer boiler-shell and communicating with the fire-box, said chamber being provided with a smoke-outlet, a check-plate above said outlet, and partitions extending from said check-plate toward the lower end of the chamber, all arranged substantially as and for the purpose set forth.

5. A cylindrical boiler having an interior fire-box, an annular water-space, an annular smoke-circulating chamber, a water-distributing chamber connected with said water-space and also with a supply-tube passing through said water-space and smoke-chamber, and water-tubes and steam-drum arranged above said distributing-chamber, all substantially as set forth.

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

MIFFLIN W. BAILY.

Witnesses:

L. H. DAVIS,
W. J. BINDER.