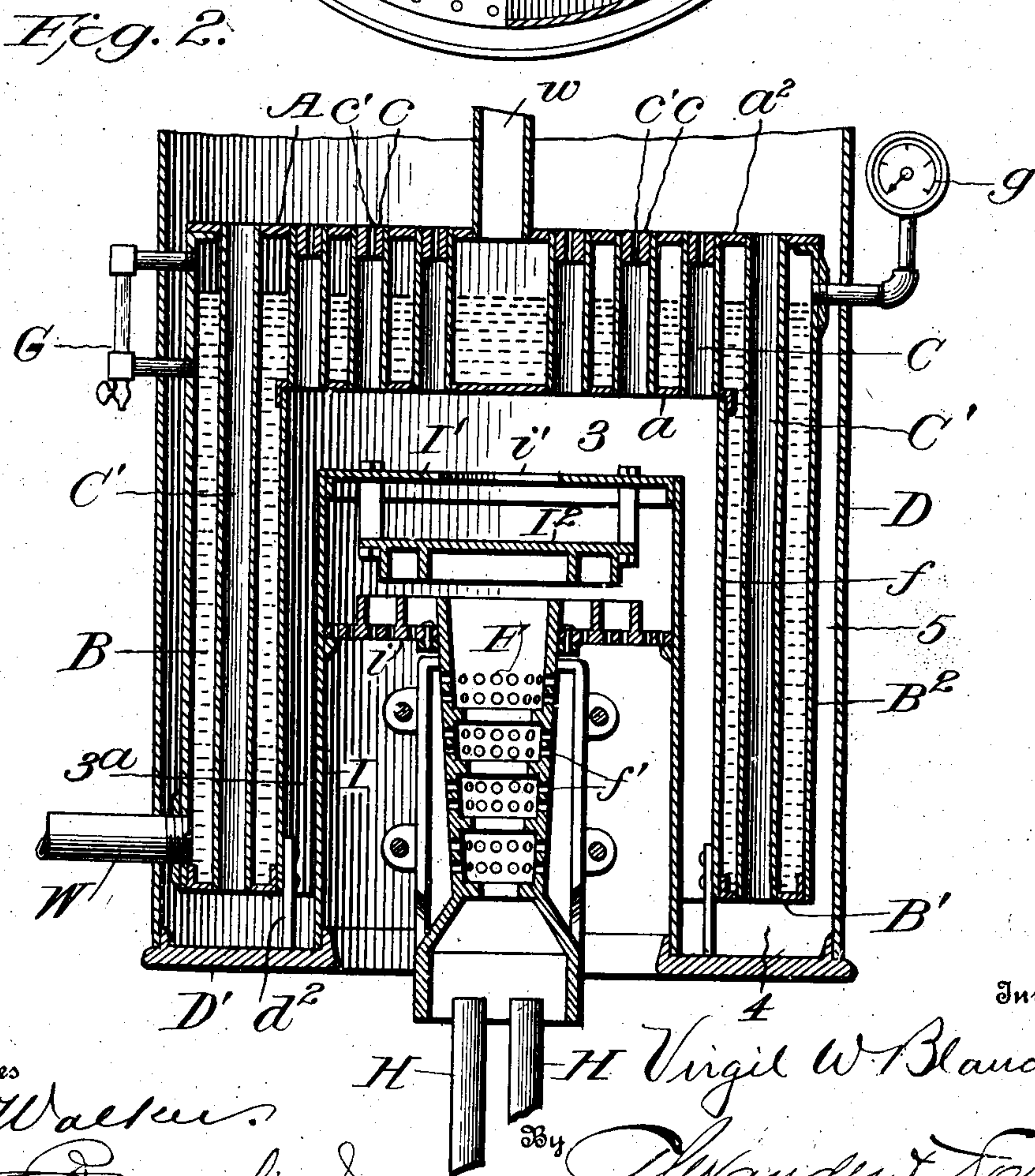
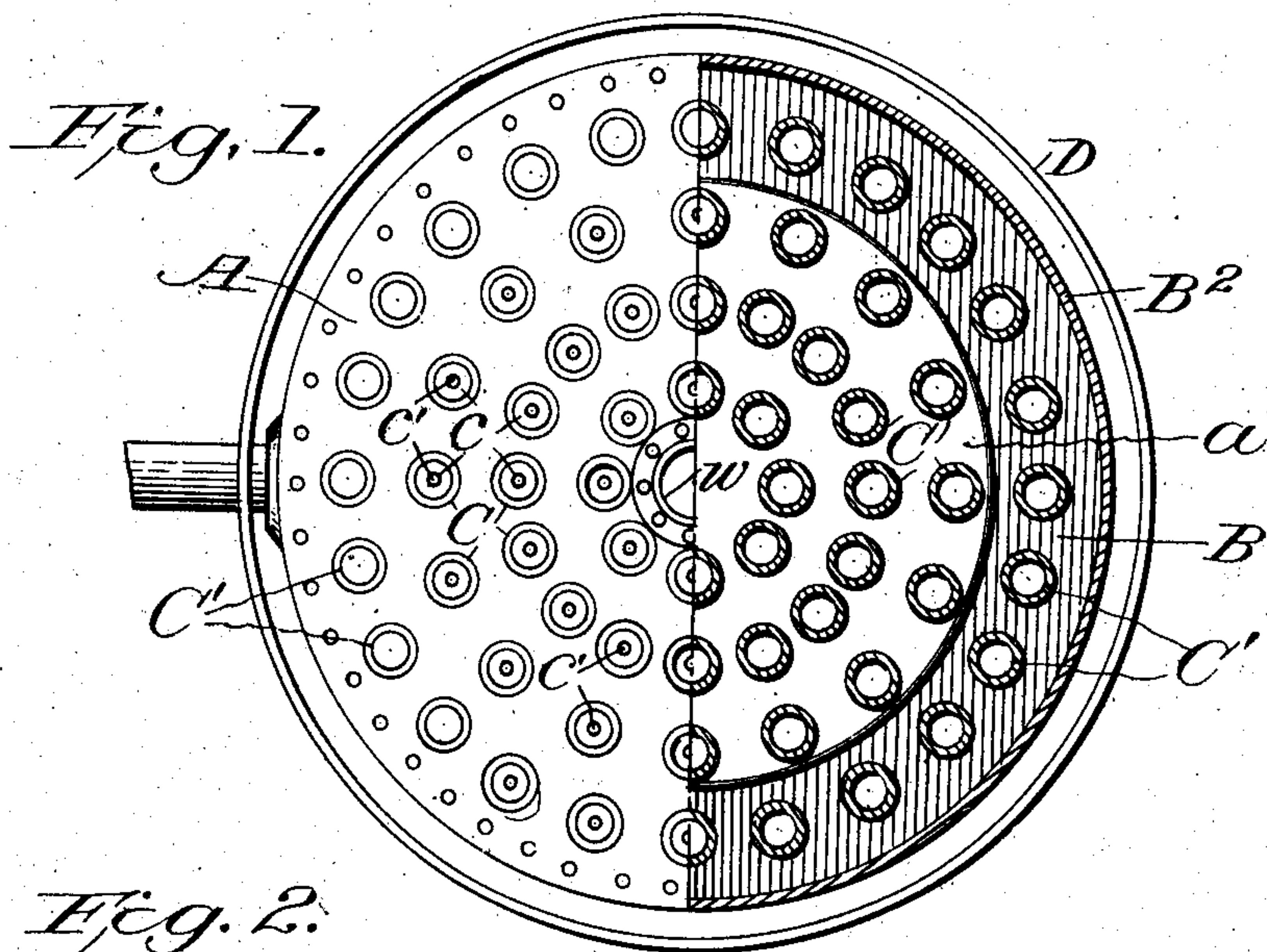


No. 834,221.

PATENTED OCT. 23, 1906.

V. W. BLANCHARD.
STEAM BOILER.

APPLICATION FILED JAN. 22, 1906.



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UNITED STATES PATENT OFFICE.

VIRGIL W. BLANCHARD, OF NEW YORK, N. Y.

STEAM-BOILER.

No. 834,221.

Specification of Letters Patent.

Patented Oct. 23, 1906.

Application filed January 22, 1906. Serial No. 297,248.

To all whom it may concern:

Be it known that I, VIRGIL W. BLANCHARD, of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Steam-Boilers; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in steam-boilers especially adapted for use in connection with gaseous-fuel-burning apparatus, and in particular with gas stoves and furnaces, as shown in my applications Serial Nos. 297,240 and 297,247.

The invention consists in the novel construction of the boiler, as hereinafter described and claimed, and illustrated in the accompanying drawings.

The boiler is adapted to be heated by a gas-burning apparatus such as described in my application Serial No. 297,240.

In the accompanying drawings, Figure 1 is a partial plan and partial transverse section of the boiler. Fig. 2 is a longitudinal vertical section through the boiler.

The boiler shown is approximately cup-shaped in transverse section. It has a top portion A, which is preferably circular in contour, and a depending annular portion or leg B, of exterior diameter conformable to that of the portion A, but hollow. This annular portion incloses an inverted combustion-chamber 3, which is closed at its upper end by the lower crown-sheet a of the upper portion of the boiler and has its sides formed by the inner wall f of the annular portion of the boiler. The bottom of the leg B is formed by an annular plate B' , and the outer wall of this leg B is formed by a metal plate B^2 , which extends to the top of the boiler and forms also the outer wall of the chamber A and is rigidly attached to the top plate a^2 of said chamber. The crown-sheet a and top plate a^2 are connected by vertically-disposed fire-tubes C, which open at their lower ends into chamber 3, but preferably have their upper ends stopped by plugs c , which have small bores c' , that will admit a slow reduced flow of gases upwardly through said tubes. The top plate a^2 and annular plate B' are similarly connected by fire-tubes C' , which extend entirely through the bottom and form ties between said plates, as well as flues for the passage of heating-gases.

The boiler as thus constructed is preferably inclosed in a casing D and may be supported on the bottom D' of the casing by legs d^2 , attached to the lower part of the boiler, as shown, so as to leave a passage for the products of combustion from chamber 3 under the leg B^2 of the boiler, and the space 5 between the casing D of the outer wall of the boiler, forming an ascending-flue for products of combustion. Water is supplied to the lower end of the boiler from a pipe W, and the steam can escape from the upper end thereof through a pipe w . The boiler may be provided with the usual water-gage G and pressure-gage g of any suitable construction.

Within the chamber 3 is the gas-burning apparatus. This, as shown, comprises a burner F, into which gaseous mixtures are discharged from tubes H, connected with any suitable supply, and in passing through this burner the gases are intermixed with large quantities of air supplied through perforations f' in the walls of the burner, which is preferably constructed as shown in my application Serial No. 297,240. This burner is suspended from a perforated plate i within a cylinder I, located in chamber 3, the space between the walls of the cylinder I and the inner wall of the leg B of the boiler forming a descending-flue 3^a for the products of combustion. The upper end of the cylinder I may be provided with a plate I' , having an aperture i' for the escape of the burning gases, and below the plate I' may be suspended a deflecting and heating plate I^2 , against which the hot gases of combustion impinge as they emerge from the burner F. I do not herein claim this particular construction of the gas-burning portion of the apparatus, and therefore a more detailed description thereof is unnecessary. The heated products of combustion issue through opening i' into chamber 2 and against the under side of the crown-sheet a of the boiler. The lightest and hottest gases naturally flow into the fire-tubes C, but are retarded therein by reason of the plugs c . The openings c' in said plugs permit the gases to slowly escape from these fire-tubes, but with sufficient rapidity to maintain a constant circulation of gases therein. The great volume of the heated gases, however, is compelled to pass down the flue 3^a in contact with the inner wall b of the boiler and descend to the flues 4. Here part of the gases rise through the tubes C' in the boiler, while

other portions rise through flue 5. In this manner the annular body of water in the legs B of the boiler is subjected to a large area of heating-surface, being exposed to heat internally by contact with the tubes C' and externally by contact with the walls heated by the flues 3 and 5. Thus by this device the water is very rapidly converted into steam. The water is maintained at the proper level in the boiler above the crown-sheet a, which level can readily be determined by the gage G. This construction provides a very compact boiler presenting a large amount of heating-surface and in which all the walls of the boiler are heating-surfaces and so are the fire-tubes C C' thereof. The fire-tubes C are naturally the hottest and are located in the upper part of the boiler, where they will act most efficiently in generating steam and in superheating steam above the water-level.

The boiler is particularly adapted for use in connection with a gas heating apparatus; but I do not restrict myself to its employment in connection with gas-heaters alone.

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

1. The combination of a boiler having a circular top plate, an annular base-plate, a cylindrical outer wall connecting the top and base plates, a short internal cylinder connected with the inner edge of the base-plate, and a crown-sheet connected to the upper edge of the inner cylinder; with a casing inclosing said boiler, the space between the casing and boiler forming an ascending flue for the products of combustion, means for supporting the boiler above the bottom of said casing to admit the passage of gases thereunder, and a heating apparatus within the annular chamber of the boiler substantially as described.

2. A boiler having a circular top plate, an annular base-plate, a cylindrical outer wall connecting the top and base plates, a short internal cylinder connected with the inner edge of the base-plate, a crown-sheet connected to the upper edge of the inner cylinder, short fire-tubes connecting the crown-sheet to the top plate, and long fire-tubes connecting the base-plate and top plate, in combination with a casing inclosing said boiler, the space

between the casing and boiler forming an ascending-flue for the products of combustion, means for supporting the boiler above the bottom of said casing, to admit the passage of gases thereunder, and a gas-burning apparatus within the annular chamber of the boiler substantially as described.

3. In a boiler, the combination of a gas-burning apparatus, an inverted-cup-shaped boiler placed over the gas-burning apparatus, a combustion-chamber between the upper end of said burner and the crown-sheet of said boiler, descending-flues between the said burner and the surrounding annular leg of the boiler, a casing, and flues between the outer walls of the boiler and the casing.

4. In combination a gas-burning apparatus, an inverted-cup-shaped boiler placed over the gas-burning apparatus, a combustion-chamber between the upper end of said burner and the crown-sheet of said boiler, descending-flues between the said gas-burner and the surrounding annular leg of the boiler, a casing inclosing the boiler, flues between the outer walls of the boiler and the casing, fire-tubes between the crown-sheet and fire-wall above the burner, and fire-tubes extending longitudinally through the annular leg of the boiler.

5. In combination, a boiler having an annular lower portion and a cylindrical upper portion, inclosing a heating-chamber, fire-tubes passing through the upper cylindrical portion, and opening into the upper end of the heating-chamber, fire-tubes passing through the annular portion and through the upper portion exterior to the shorter tubes, and plugs having small openings for the escape of gases in the upper end of the shorter tubes; with a gas-burner in said chamber, descending-flues in said chamber, and ascending-flues exterior to the boiler, substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

VIRGIL W. BLANCHARD.

In presence of—

JAMES R. MANSFIELD,
L. E. WITHAM.