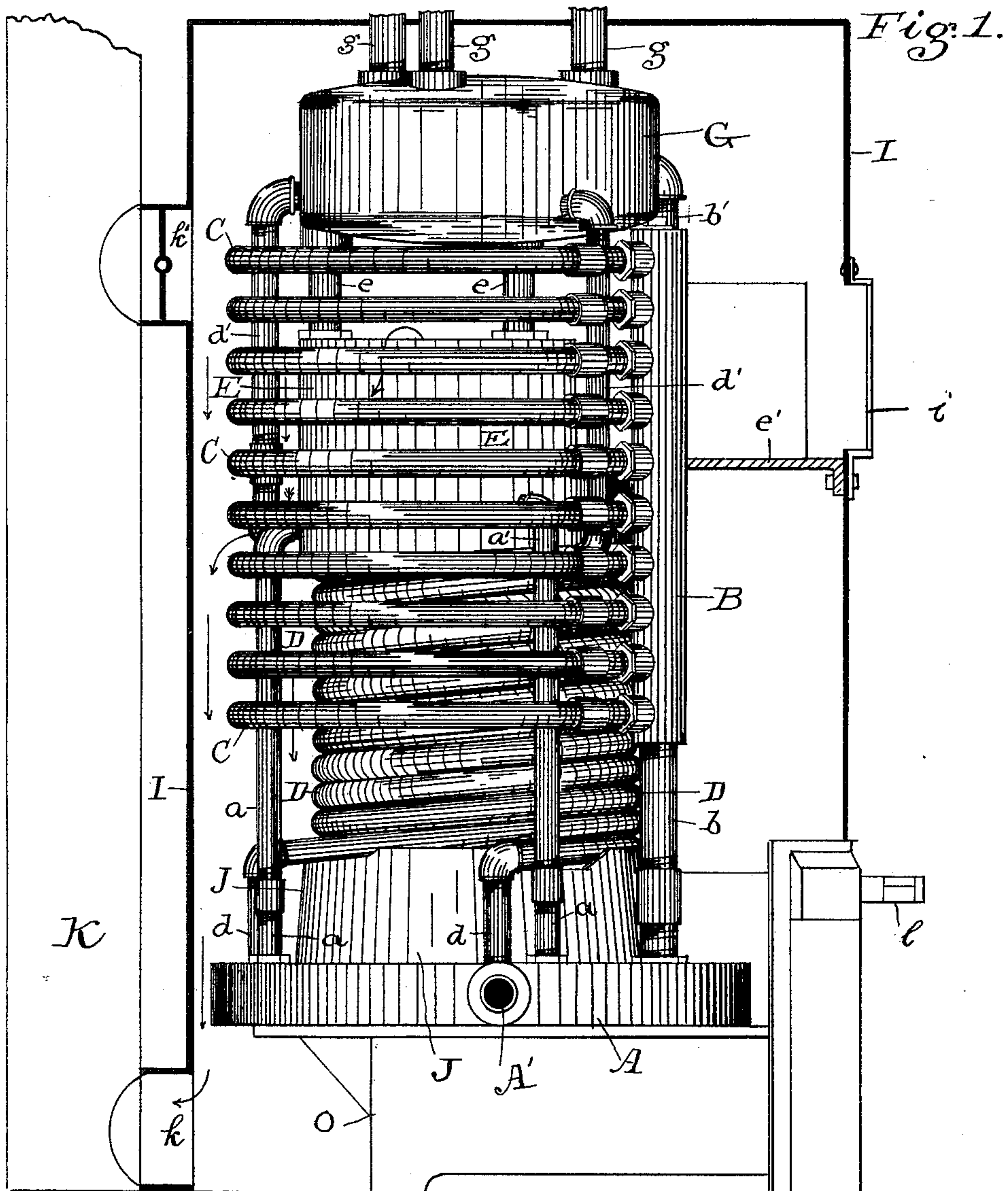


C. R. NELSON.
HEATER.

No. 407,107.

Patented July 16, 1889.



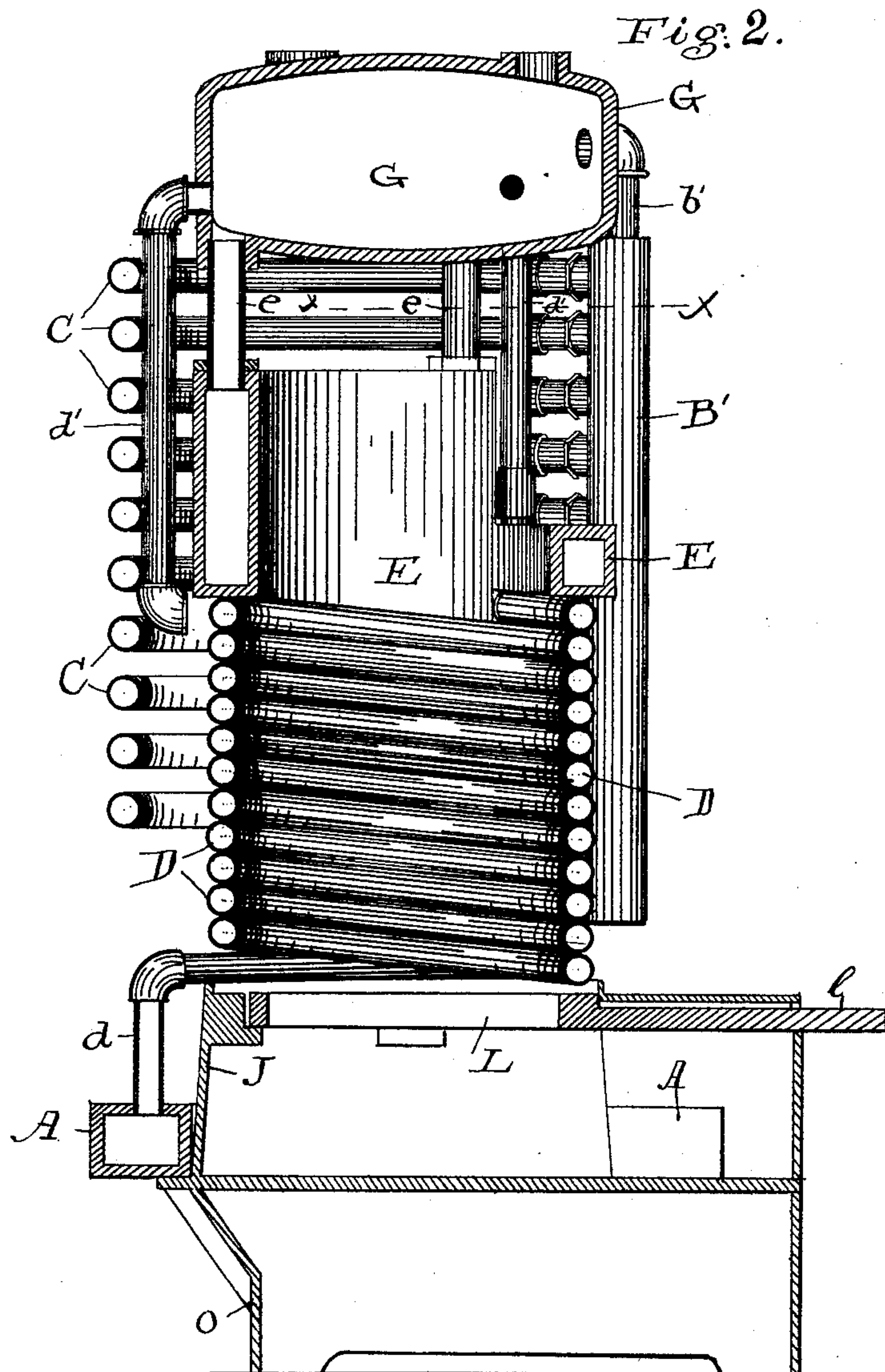
Witnesses:
Robert A. Davis,
Melvin F. Hunt.

Inventor:
Charles R. Nelson
by S. M. Bates
his atty.

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Robt. A. Davis,
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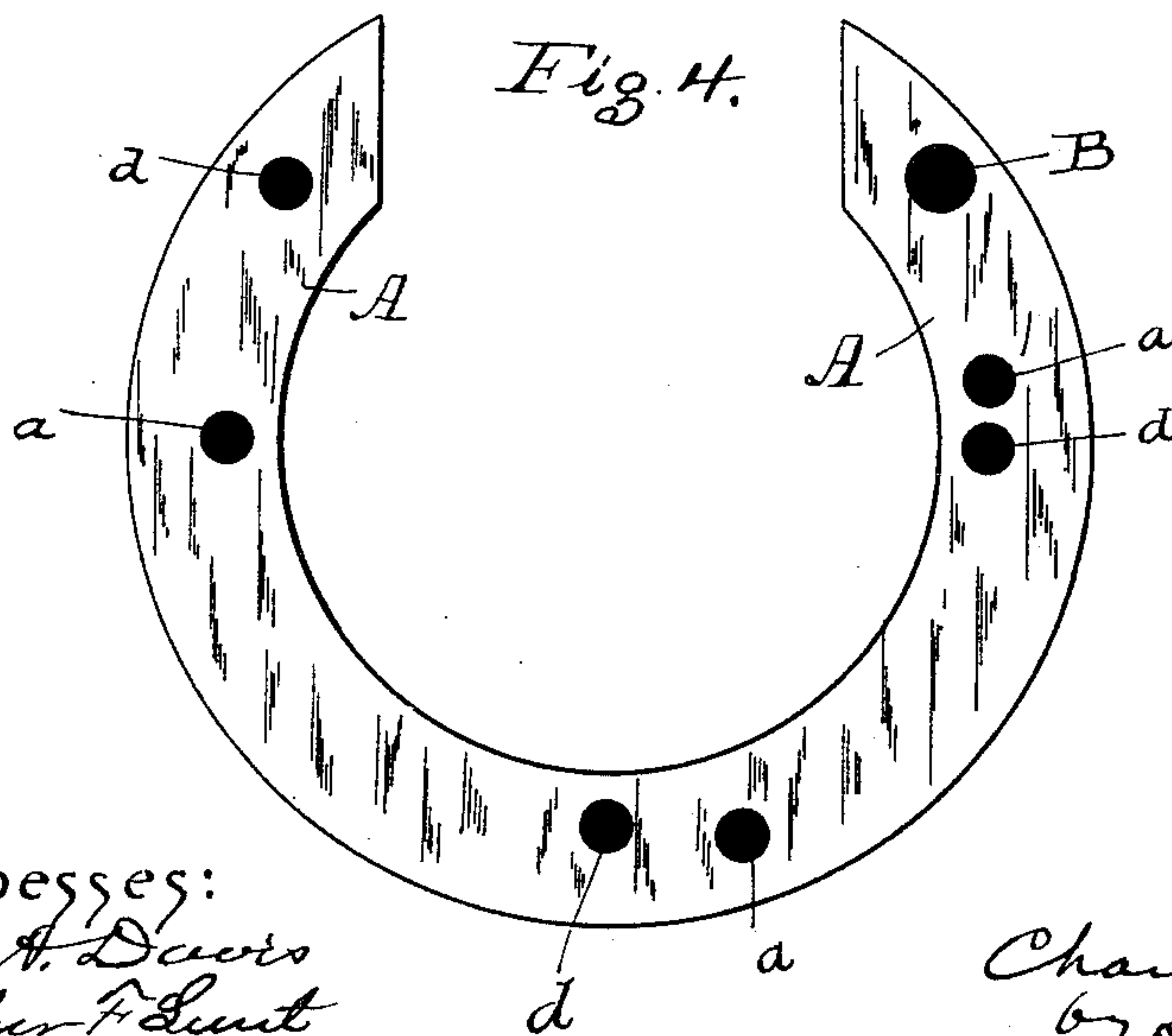
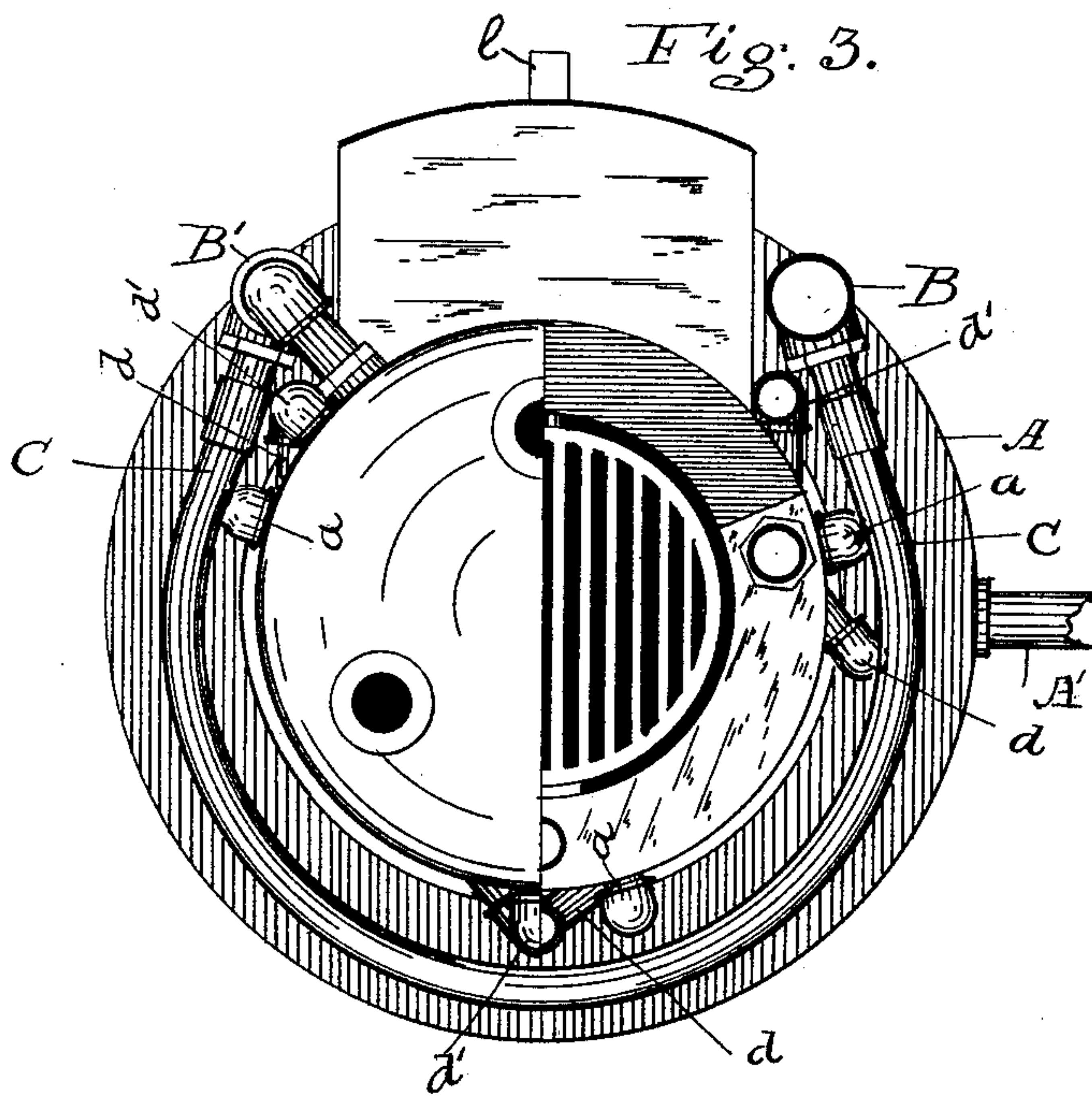
(No Model.)

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UNITED STATES PATENT OFFICE.

CHARLES R. NELSON, OF PORTLAND, MAINE.

HEATER.

SPECIFICATION forming part of Letters Patent No. 407,107, dated July 16, 1889.

Application filed November 30, 1888. Serial No. 292,203. (No model.)

To all whom it may concern:

Be it known that I, CHARLES R. NELSON, a citizen of the United States, residing at Portland, in the county of Cumberland and State of Maine, have invented certain new and useful Improvements in Heaters for Hot Water and Steam; and I do hereby 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.

My invention relates to heaters or boilers for hot water or steam; and its object is to provide a heater which shall have a large amount of heating-surface so disposed as to intercept the greatest possible amount of heat, which shall be capable of resisting any pressure which may come upon it, and which may be cheaply made.

The invention consists of various combinations of the following features, as hereinafter pointed out in the claims, namely: A hollow base; a coil above said base and connecting with it, said coil acting as the fire-box; an upper chamber or dome connecting with said coil; a ring or jacket above said fire-box and below said dome, and pipes connecting it with said base outside of said coil; a vertical pipe connected with said base; pipes extending from said vertical pipe around said coil and substantially concentric therewith and connecting with said dome, and a case inclosing said parts.

In the accompanying drawings I illustrate a heater which embodies my invention, although I do not wish to limit myself to the exact construction here shown and particularly described.

In the drawings, Figure 1 is a side elevation of my heater with the casing, being shown in section. Fig. 2 is a central vertical section. Fig. 3 is a part section on the line *x x* of Fig. 2 and part top view or plan. Fig. 4 is a plan of the hollow base.

The casing is omitted from all but the first figure.

In the drawings, A is a hollow base or ring. (Shown in Fig. 4, with its various openings marked with the same letters as the pipes which lead from it.) This base is in the form of a ring having a section removed to leave

a space for the ash-box. From a number of openings—in this case three—placed about equally distant from each other in the top of the base, rise three short vertical pipes *d*, which turn horizontally and form a close coil or fire-box D, the upper ends of the pipes, which I have lettered *d'*, rising upward from the top of the coil at intervals and entering a hollow chamber or dome G, placed at the top of the heater and above the fire-box or coil. A hollow annular jacket or ring E is superimposed on the coil D to form a continuation of the fire-box, the front portion being cut down to receive a chute *e'* (shown only in Fig. 1) to facilitate the admission of coal through the door *i*. This ring or jacket is connected with the base by pipes *a a* and with the dome by pipes *e e*. A vertical pipe or column B is connected with the base A outside of the coil D, and extends upward, as here shown, to about the height of the dome. Connecting with this vertical pipe there are a number of pipes—in this case ten—extending around the coil C and the jacket E, and concentric with them, their ends entering a similar vertical pipe B' on the other side of the heater, which is in turn connected with the dome.

g g are the hot-water or steam supply pipes, leading from the dome G, and A' is the cold-water-supply pipe entering the base.

A ring or casing J, of any well-known construction, fills the space below the coil D forming the ash-box and supporting a suitable grate L, of which *l* is the shaker. K is the flue, and *k k'* the usual lower and upper openings into it. These latter parts are all well-known parts of the ordinary hot-air furnace and need no special description.

The operation of my heater is evident from its construction. Three distinct systems of circulation are secured, namely: From the base the heated water passes up through the coil or fire-box and thence enters the dome. This coil D, being made of three separate pipes, as here shown, is much more effective than those made of a single pipe, because the water does not have so far to travel before reaching the top, and hence its circulation is much more rapid than it otherwise would be. The circulation being rapid, there is no tendency to make steam when the boiler is used for hot

water. A second system of circulation is formed by means of the pipes *a a* from the base to the lower part of the jacket E, and thence out at the top and through the pipes *e* to the dome. In this system the main portion of the heating-surface is in the jacket E, which forms the upper part of the fire-box. The third system is formed by the water-column B, the lower end of which connects with the base, thence through the pipes C around the outside of the fire-box, and to the vertical pipe B' and the dome G. This system receives the most of its heat by means of the indirect draft formed when the upper opening *k'* is closed and the lower one open, as indicated by arrows in Fig. 1. It will be seen that by means of these independent systems of circulation a large extent of heating-surface is exposed to the action of the heat, making the boiler a quick-heating and an economical one. The various systems all start from the base and enter the dome at the top, so that there is no chance of any obstruction in the circulation.

The jacket E and the dome G, I preferably make of cast-iron, although they may be made of boiler-iron and riveted in the usual way.

When the heater is to be used for steam, the water is simply drawn down so as to partially fill the dome, when it is run as an ordinary steam-boiler.

I claim—

1. The herein-described heater, consisting of a hollow base, a plurality of pipes connected with said base and coiled or wound to form a single-cylinder fire-box above it, and a dome or chamber above said coil and connected therewith, in combination with a case inclosing said parts, substantially as shown.

2. The herein-described heater, consisting

of a hollow base, pipes connected with said base and formed into a coil or fire-box, a chamber or dome above said coil and connected therewith, a hollow ring or jacket above said coil and below said dome, and pipes connecting said jacket with said dome and said base, in combination with a case inclosing said parts, substantially as shown.

3. The herein-described heater, consisting of a hollow base, pipes connected with said base and formed into a coil or fire-box, a dome or chamber above said coil and connected therewith, a vertical pipe or column connected with said base outside of said coil and extending above said base, and pipes extending from said column around said coil substantially concentric therewith and connecting with said dome, in combination with a case inclosing said parts, substantially as shown.

4. The herein-described heater, consisting of a hollow base, pipes connected with said base and formed into a coil or fire-box, a dome or chamber above said coil and connected therewith, a ring or jacket above said coil and below said dome, and pipes connecting it with said dome and said base, a vertical pipe or column connected with said base outside of said coil and extending above said base, and pipes extending from said column around said coil substantially concentric therewith and connecting with said dome, in combination with a case inclosing said parts, substantially as shown.

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

CHARLES R. NELSON.

Witnesses:

S. W. BATES,
SAMUEL D. RUMERY.