

(No Model.)

W. H. RILEY.
FURNACE OR HEATER.

No. 590,167.

Patented Sept. 14, 1897.

Fig. 1.

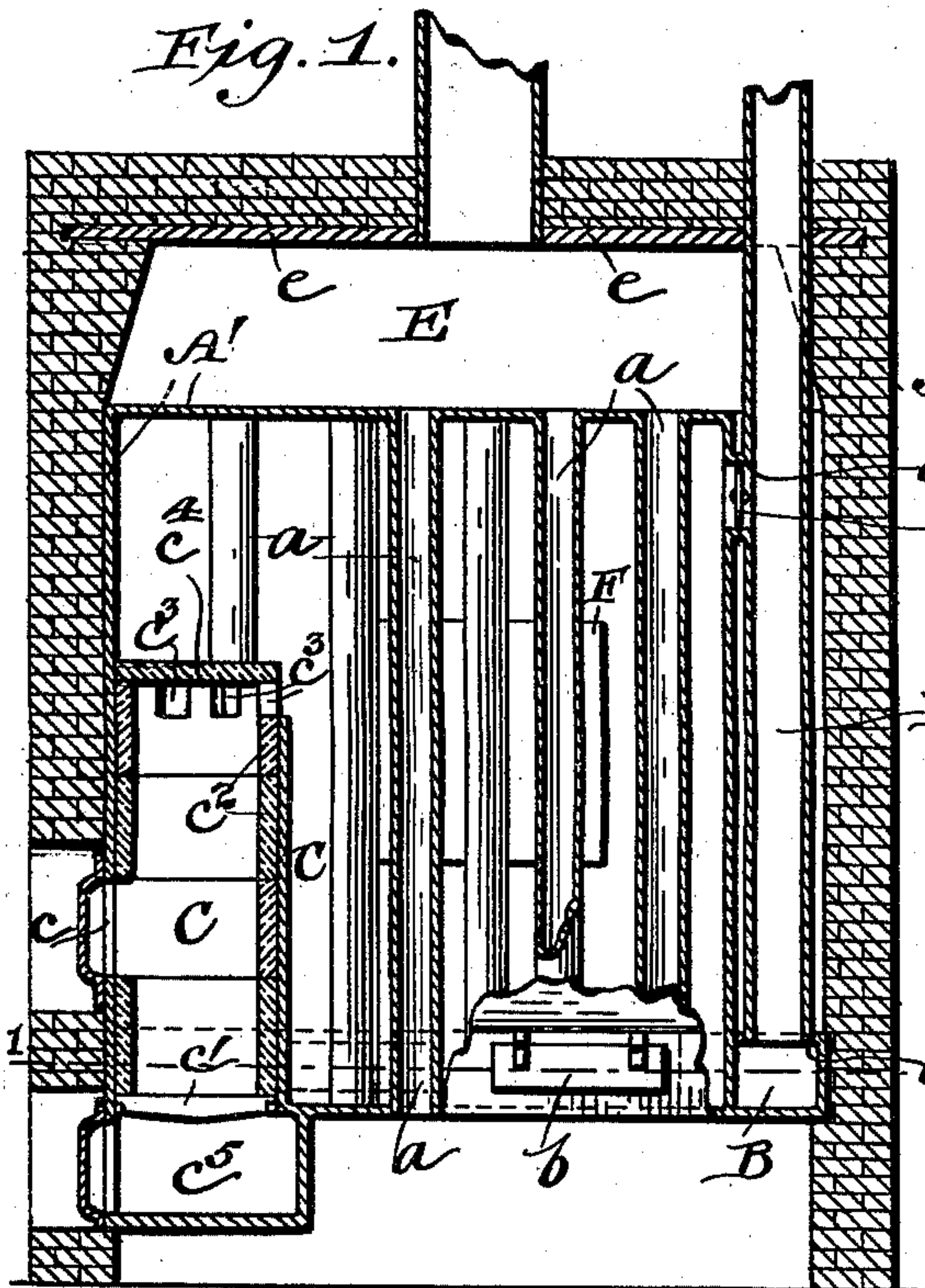


Fig. 2.

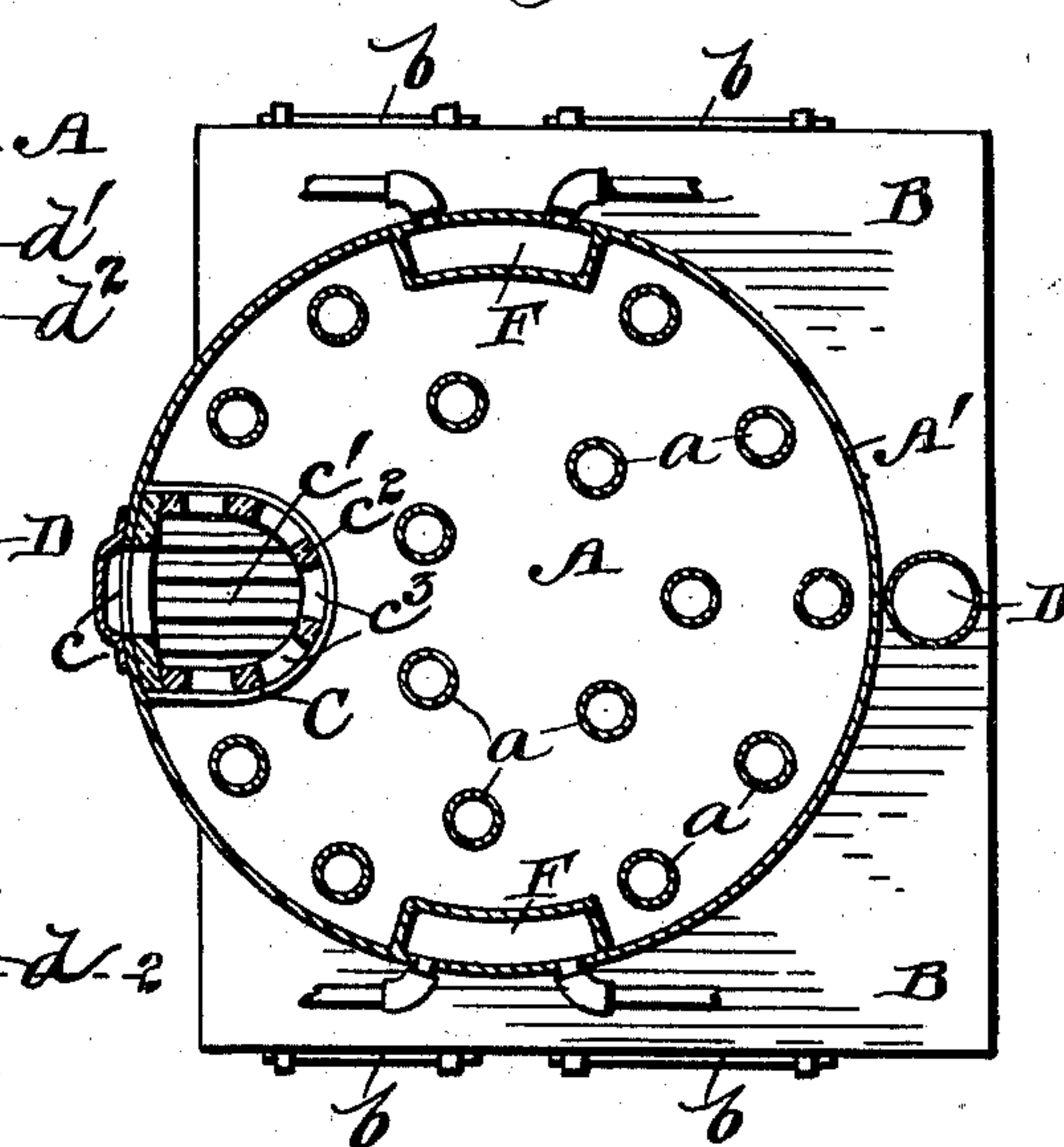


Fig. 4.

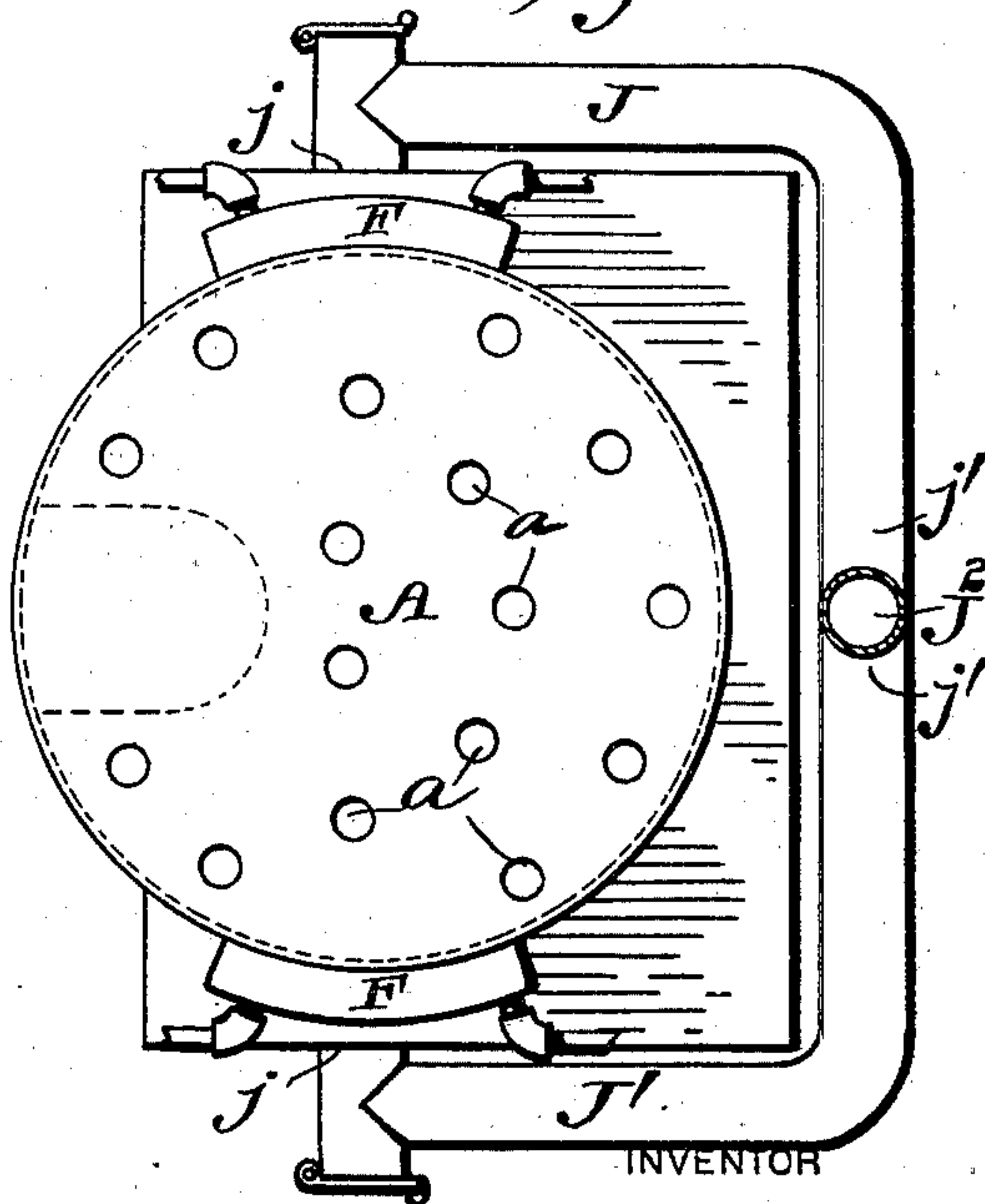
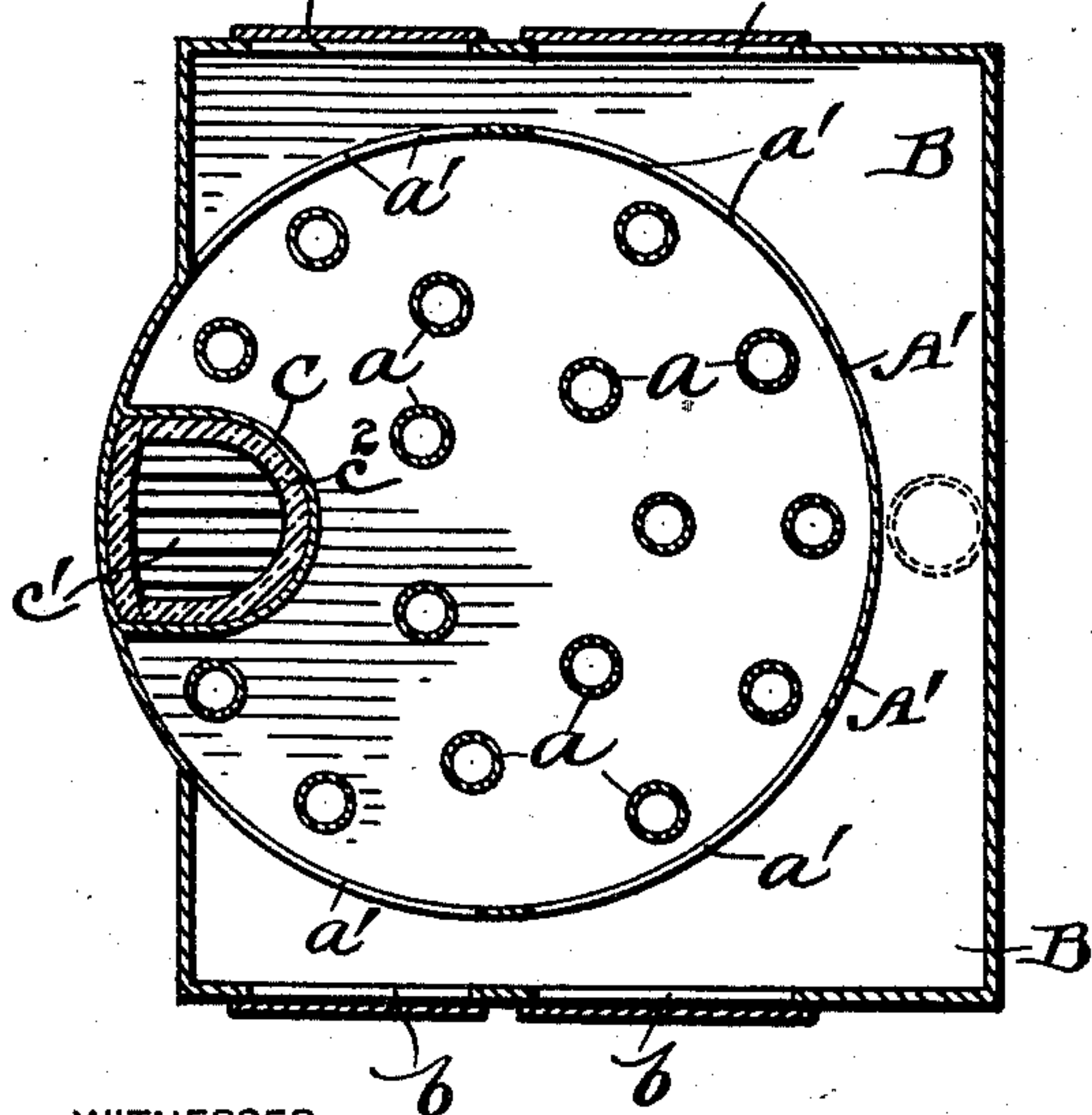


Fig. 3.



WITNESSES

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UNITED STATES PATENT OFFICE.

WILLIAM HENRY RILEY, OF DAYTON, OHIO.

FURNACE OR HEATER.

SPECIFICATION forming part of Letters Patent No. 590,167, dated September 14, 1897.

Application filed January 23, 1897. Serial No. 620,466. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM HENRY RILEY, a citizen of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Furnaces or Heaters; 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 improvements in tubular hot air and water furnaces or heaters; and it consists in certain novel constructions, combinations, and arrangements of parts, as will be hereinafter fully described and claimed.

In the accompanying drawings, forming a part of this specification, Figure 1 represents a vertical cross-section through the fire-box and heating-chamber and smoke-flue of a furnace constructed in accordance with my invention. Fig. 2 represents a horizontal cross-section of the furnace. Fig. 3 represents a horizontal cross-section of the same through the base thereof on the line 1 2 of Fig. 1, and Fig. 4 represents another manner of connecting the smoke-pipe with the furnace.

A represents a furnace; B, a base therefor; C, a fire-box, and D a smoke-pipe.

The furnace A is formed with a shell or heating-drum A', preferably constructed of metal and secured at its lower end to the base B, the said shell extending through the said base to the bottom thereof, as illustrated. Hot-air pipes or tubes *a a*, extending through the shell A' and through perforations in the top and bottom thereof, are adapted to convey cool air from below the furnace up through the same, whereby it becomes thoroughly heated and ready for use.

The base B preferably extends around the shell A' except at the front and is of a generally rectangular shape and hollow. It communicates with the interior of the shell by openings *a' a'* in the sides thereof. The smoke-flue D is secured at its lower end in an opening *d* in the top of the base B just in the rear of the shell A' and extends upward parallel with said shell. The flue D is connected with the interior of the shell by a short pipe or flue *d'*. This pipe *d'* may, if desired,

be provided with a damper, as at *d²*, by which the draft in the said flue may be controlled. This damper *d²* may, however, be dispensed with and the draft be controlled by the use of small doors *b b* in the sides of the base B. These doors *b b* also afford access to the interior of the base B when it is necessary to clean the same.

In the front part of the shell A' is arranged the fire-box C, which is much smaller than the shell A' and preferably secured to the front wall thereof. The door *c* of the fire-box is arranged about half-way of its height and in the lower part of the front wall of the shell A'. The fire-box C is provided with a grate *c'*, preferably about flush with the bottom of the shell A'.

The fire-box C is lined with fire-brick *c²*, which extends a little above the box C proper. In this extended portion are formed port-holes or apertures *c³ c³*, and fire-brick or tiling *c⁴* is placed over the top of the said extended portion, so that the heat is deflected and passed out the ports *c³ c³*. An ash-pit *c⁵* of ordinary form is secured in place beneath the grate *c'*.

The furnace proper, comprising the shell A and the base B, is preferably incased in brickwork constructed about the same, which supports the shell A' in such a manner as to admit cold air from a duct or other means to the lower ends of the tubes *a a*. The brickwork is extended above the top of the shell a sufficient distance to form a hot-air reservoir E, the top of which is covered by a metal plate *e*, and brick, gravel, or other similar material may be placed on top of the plate *e* to prevent the possibility of fire. The air after entering the space below the furnace passes up through the pipes *a a*, where it becomes heated, into the reservoir E, whence it may be led away by suitable pipes to register in different parts of a building to heat the same. If preferred, the brickwork may be dispensed with and the same purposes accomplished by the use of a metal casing.

One or more water heaters or reservoirs F may be riveted to the shell either on the outside or on the inside, but preferably on the inside, as shown in the drawings. This casing or reservoir F is supplied with water by a suitable pipe connected with a tank or any suitable supply. Pipes leading from this res-

ervoir supply hot water for household purposes at any desired point.

It will be noticed that by the use and arrangement of the air-pipes *a a* the air to be
5 heated is exposed to a large amount of heating-surface and has a chance to become thoroughly heated before it is used.

In starting a fire the direct draft through the short pipe or flue *d'* is used until the fire
10 is well under way. Then the draft is changed either by the manipulation of the damper or the doors *b b*, so as to be no longer allowed to pass directly to the smoke-pipe *D*, but is forced to go down among the pipes *a a* into
15 the base *B* and thence into the main flue *D*. In this way the tubes *a a* are kept very hot and thoroughly heat the air passing through the same.

In the modification shown in Fig. 4 in place
20 of only the base branch pipes *J J'* may be used, communicating with the interior of the shell at the bottom thereof on both sides, as at *j j*, and leading to the smoke-flue *J²* in the rear, as at *j' j'*. In this construction the
25 course of the draft will be the same as hereinbefore described.

My furnace is found to be very cheap of construction and most effective in heating
30 quality and is yet very economical in the use of fuel.

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

1. In a furnace, the combination of a shell, air-heating tubes extending through the same, 35 a hollow base portion secured to the shell externally thereof, the said shell extending through the said base to its bottom and having openings in its sides to establish communication between the shell and the base, and 40 a draft-flue connected with the shell and the said base, and means for causing the draft to pass directly to said flue from the shell or indirectly from the shell through the external base at will, substantially as described. 45

2. In a furnace the combination of a shell having air-heating tubes passing through the same, a fire-box within said shell, comprising an outer casing, a lining of fire-brick extending above the casing and provided with ports 50 or apertures opening into the interior of the said shell and a top portion of fire-brick, and a draft-flue, substantially as described.

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

WILLIAM HENRY RILEY.

Witnesses:

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JOS. W. HUMPHREY.