

N. BRAYER.
HOT AIR FURNACE.

No. 395,420.

Patented Jan. 1, 1889.

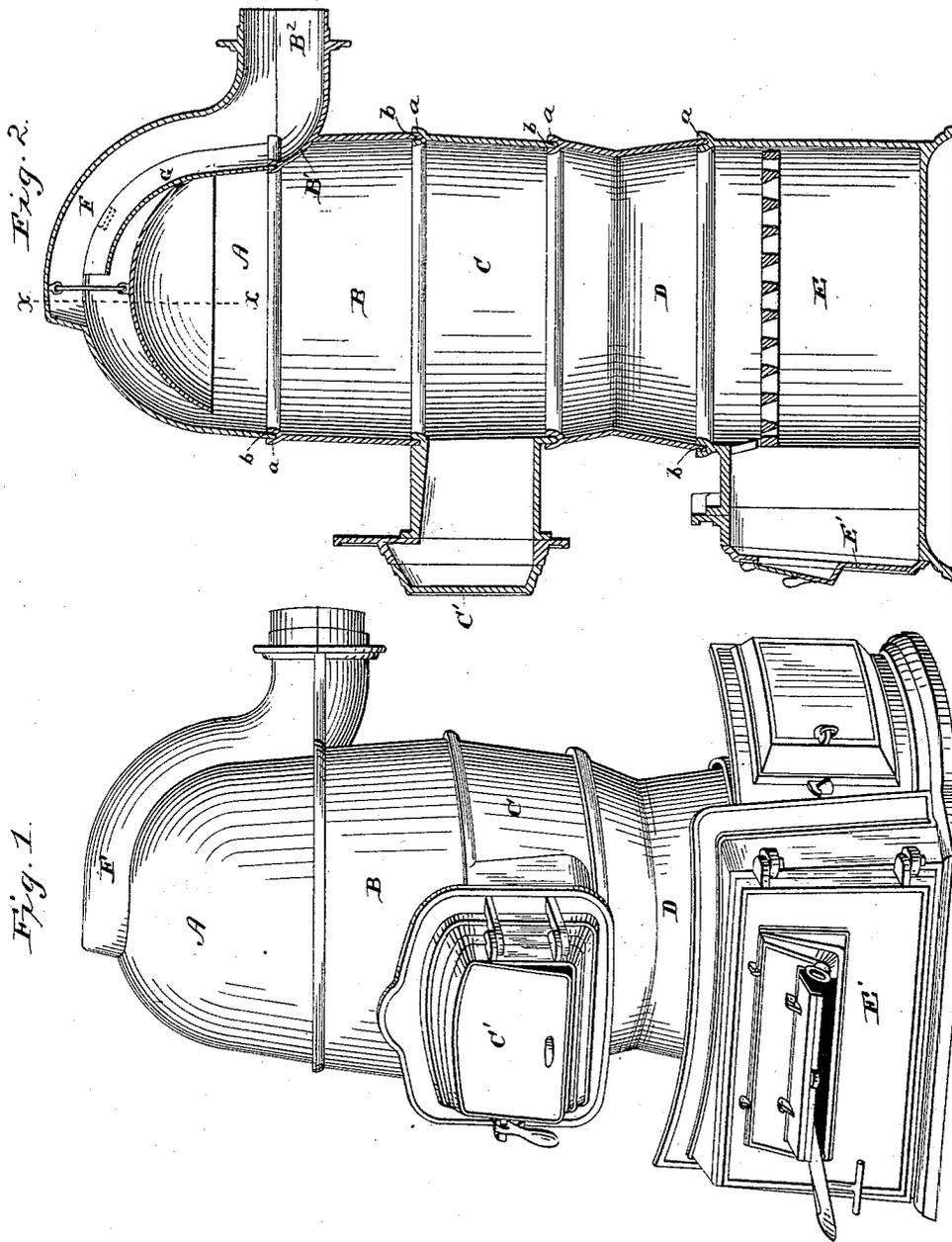


Fig. 1.

Fig. 2.

Witnesses.
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Fig. 3.

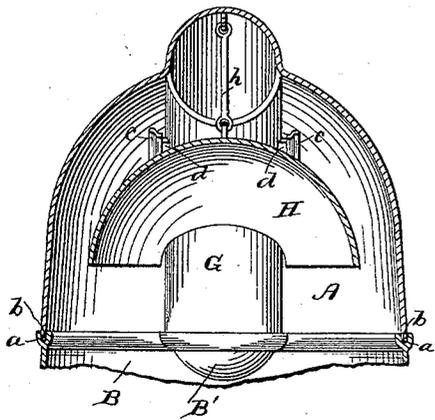


Fig. 4.

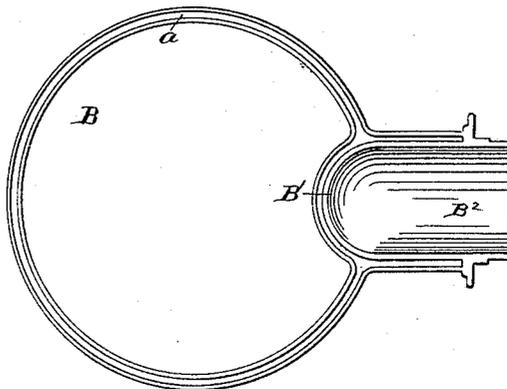


Fig. 6.

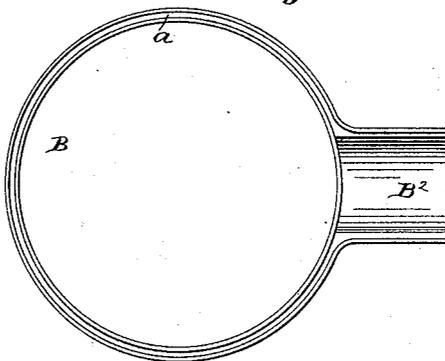


Fig. 5.

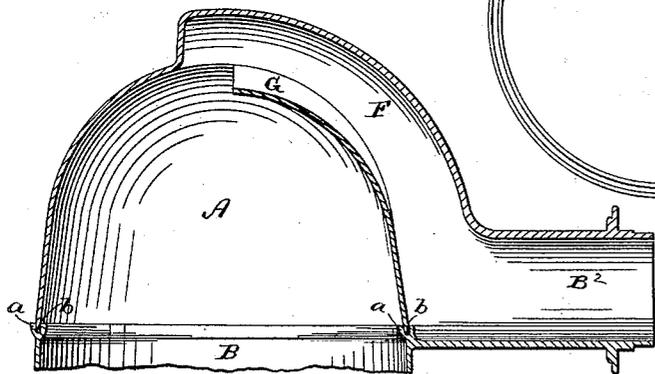
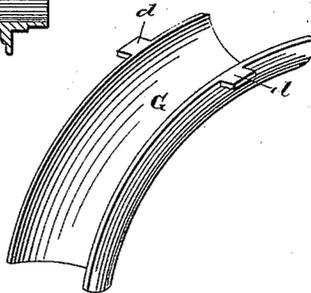


Fig. 7.



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UNITED STATES PATENT OFFICE.

NICHOLAS BRAYER, OF ROCHESTER, NEW YORK, ASSIGNOR TO THE CO-OPERATIVE FOUNDRY COMPANY, OF SAME PLACE.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 395,420, dated January 1, 1889.

Application filed May 16, 1888. Serial No. 274,067. (No model.)

To all whom it may concern:

Be it known that I, NICHOLAS BRAYER, of Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Hot-Air Furnaces; and I do hereby declare the following to be a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming a part of this specification, and to the figures and letters of reference marked thereon.

My present invention relates to hot-air furnaces, and has for its object to improve and simplify their construction, more particularly that of the radiating-chamber, and provide a suitable exit-flue for the smoke and products, though equally well adapted for use in a hot-air chamber into which the smoke and products do not come; and to this end it consists in certain novelties of construction and combinations of parts, all as will be hereinafter more fully described, and the novel features pointed out particularly in the claims at the end of this specification.

In the drawings, Figure 1 is a perspective view of a furnace constructed in accordance with my invention. Fig. 2 is a vertical sectional view; Fig. 3, a section taken on the line *xx* of Fig. 2; Fig. 4, a top plan view of one of the sections; Fig. 5, a sectional view of a modification; Fig. 6, a top plan view of the lower section thereof, and Fig. 7 a view of the flue plate or section removed.

Similar letters of reference in the several figures denote similar parts.

The general construction of the furnace as a whole is about the same as that of the ordinary hot-air furnace—that is to say, it is made up of superposed sections A, B, C, D, and E, having sealed joints between them formed by constructing each succeeding section below with a groove, *a*, into which the plain lower edge, *b*, of the section above enters, this groove then being filled with suitable packing material, such as sand.

The sections B, C, D, and E are constructed very slightly different from the ordinary, the lower one forming the ash-pit provided with a suitable opening and a door, *E'*, the next, D, forming the fire-pot and slightly contracted at the top for a purpose to be explained; the next one, C, containing the fuel-supply orifice and closed by a door, *C'*; the next, B,

forming a portion of the hot-air or combustion chamber; a portion, *B'*, of the exit-pipe being formed at the rear, while the uppermost one, A, forms the top of the chamber and of the furnace, and contains the more important features of the present invention. This section A is provided at its bottom with the usual edge, *b*, resting in the groove *a* in section B, is preferably rounded, as shown, and has formed in the rear side and extending from about the apex to the lower edge a recess or channel, F, forming a portion of the exit-flue for the smoke and products. At the lower portion this recess is continued out at the rear, at which point a collar or flange is formed for the attachment of the furnace-casing, as ordinarily, and for the smoke-pipe, the lower portion of the flue, where it extends outward, being formed on the section B, as shown in Figs. 2 and 3.

The exit-flue is formed by the covering or flue-plate G, applied to the inside of section A over channel F and extending from near the top to the portion B and co-operating therewith, when in place, to form a continuous passage from the center of the chamber to the smoke-pipe. It will be noted that this plan of forming a portion of the flue in the top section and providing an internal covering-plate, or even in dispensing the recess in the section, though I prefer to employ it, is an advantageous one, as it allows the formation of a flue entirely within the main furnace, having no joints requiring packing and requiring no coring in casting.

As perhaps the most convenient manner of holding the plate G in position and materially simplifying construction, I locate on either side the recess F in section A near the top two overhanging lugs or projections, *c*, with which are arranged to co-operate corresponding lugs, *d*, formed on the plate G, so that when the plate is inserted and the lugs are engaged the plate will be securely held. Of course it will be understood that suitable gains are formed at the edges of recess F, with which the edges of plate G co-operate to form a reasonably-tight joint.

The plate G might be held in position by any means when the lugs are engaged; but I prefer to construct the section B, as described, with the portion *B'*, into which the lower edge of the plate projects, not only completing the

flue, but this portion also serves to support the plate when in place. The joint here formed may be the same as the others—that is, of the tongue-and-groove form—or may consist of the ordinary half groove or gain and plain-edged plate; but this matter of detail is unimportant.

Instead of extending the portion B' as far into the combustion-chamber as in Figs. 1, 2, and 3, I may, and in some instances do, continue the groove formed in the top of section B around in circular form, as in Fig. 6, form the lower half of the end B² of the exit-flue on the outside, and let the lower end of plate G enter the groove to form the joint, as shown in Figs. 5 and 6. This form has the desirable feature of dispensing with the inward projection of the portion B', thus enabling me to cast section B more readily and the employment of a more simple pattern.

In the top of section A is suspended the deflector H by means of a suitable link, h, eyes being formed in the section and deflector, respectively, for its reception. A portion of the deflector is cut away at one side for the passage formed by plate G, as shown, and its object is to prevent direct passage of the smoke and products to the exit, throwing them out against the sides, and thus increasing the heat therein.

As before stated, the fire-pot section is contracted near the top and, it will be noted, forms a larger grate-surface, and also an extended surface at the sides, with which air can come in contact, while the tendency of the heated air being to rise in straight lines will cause this to be intensely heated.

The feature of having the downward passage and deflector is desirable, in that it permits of a more extended passage for the smoke and products, and also the exit, being low, permits the more ready application of the smoke-pipe and manipulation of the direct-draft damper, if one is employed, besides facilitating construction.

If desired, the channel F' might be dispensed with and the plate co-operate directly with the side of portion A; but in this event the plate G might have to be made too deep, besides which the cost of forming the channel is comparatively trifling.

The advantages of the arrangement shown as a whole are cheapness of construction, efficiency in operation, as a more extended heating-surface is provided, and facility in setting the furnace up and taking it down, combined with the readiness with which any of the parts can be replaced by new ones when burned out or broken. This latter is particularly true of the plate G, which is liable to be burned out by reason of the heat to which it is subjected, warping being prevented in a measure, as both sides of it are heated evenly or nearly so.

It will be understood that in use the ordinary sheet metal or other suitable casing is located around the furnace.

Various modifications of the device can be made by those skilled in the art without departing from the spirit of my invention; and I therefore do not desire to be confined to the arrangements shown.

I claim as my invention—

1. In a furnace constructed in sections, substantially as described, the combination, with the upper section, of the plate co-operating with the inside wall thereof and forming a passage communicating with the upper portion, and the succeeding lower section arranged to support said plate when in position, as set forth.

2. In a furnace constructed of superposed sections, the combination, with the top section, of the plate located on the inside thereof and co-operating with the side wall to form a passage communicating with the interior at the top, the interlocking lugs forming a connecting means, and the next lower section forming the support for the lower end of the plate, substantially as described.

3. In a furnace constructed of superposed sections, the combination, with the top section, of the plate located on the inside thereof and co-operating with the side wall to form a passage communicating with the interior at the upper portion, and means—such as interlocking lugs—connecting the plate and section and the next lower section having a portion of the exit-passage formed therein with which the end of the plate co-operates to form a continuation of the passage, substantially as described.

4. The combination, with the upper section having a portion of the exit-flue formed at the lower side thereof, of the plate located on the inside and co-operating with the side wall to form a passage communicating with the interior at the upper portion, means—such as interlocking lugs—for connecting the plate and section, and the lower section having a portion of the exit-flue formed thereon adapted to co-operate with that on the upper section, and with which the lower portion of the plate also co-operates, substantially as described.

5. In a furnace, the combination, with the upper section having the lower portion, of the exit-flue formed thereon, and the plate removably secured therein and co-operating with the side wall to form a passage opening into the chamber near the top of the next succeeding section, having the groove in its upper side, with which the lower side of the upper section and the end of the plate co-operates to form a joint, and having also a portion of the exit-passage formed thereon, also grooved to co-operate with the edge of the corresponding portion on the upper section, substantially as described.

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Witnesses:

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