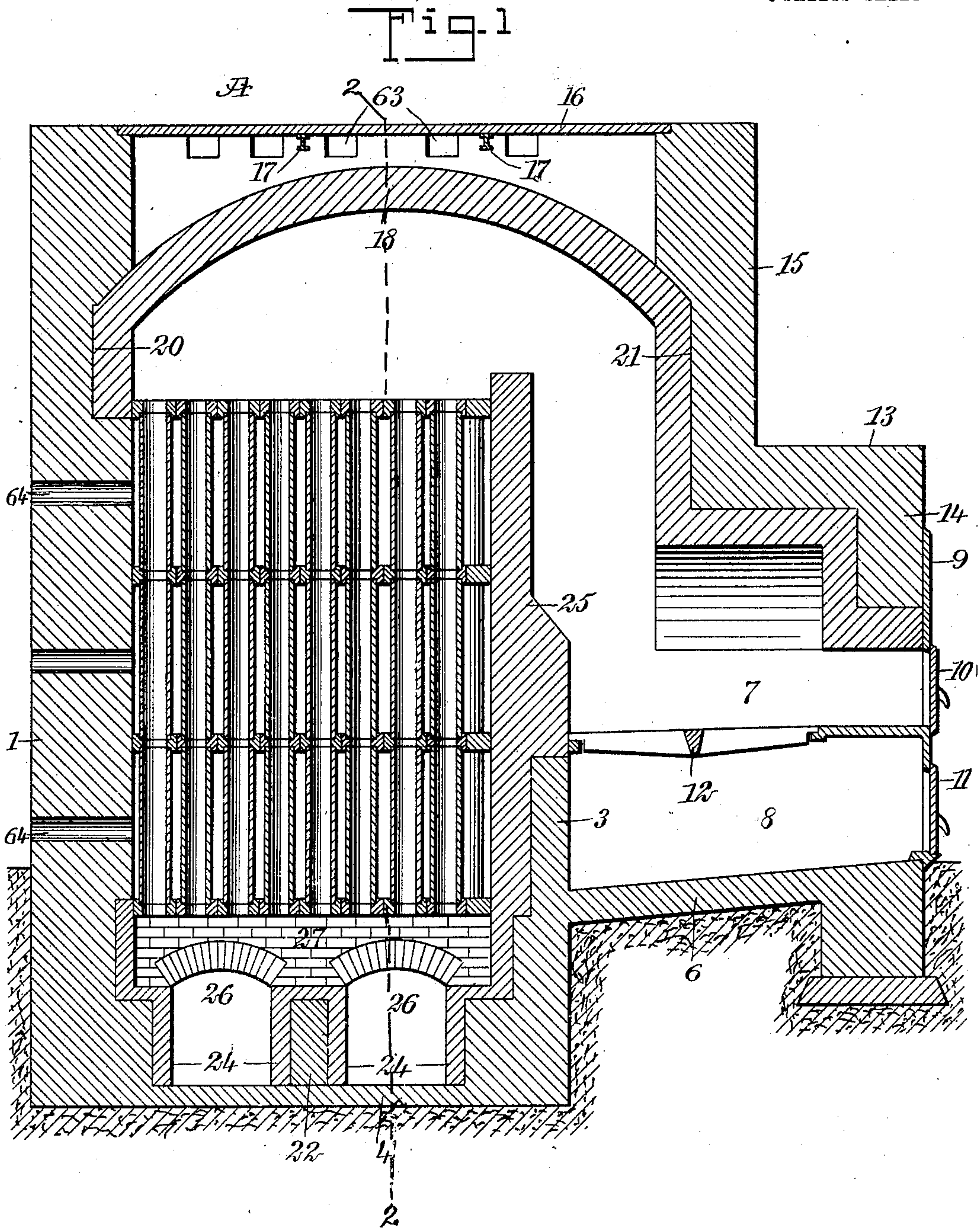


No. 836,009.

PATENTED NOV. 13, 1906.

C. L. BOWNE.  
HOT AIR GENERATOR.  
APPLICATION FILED JUNE 1, 1906.

3 SHEETS—SHEET 1.



WITNESSES

*J. A. Proply*  
*W. H. B. C.*

INVENTOR

*Charles L. Bowne*

BY *Mumford*

ATTORNEYS



No. 836,009.

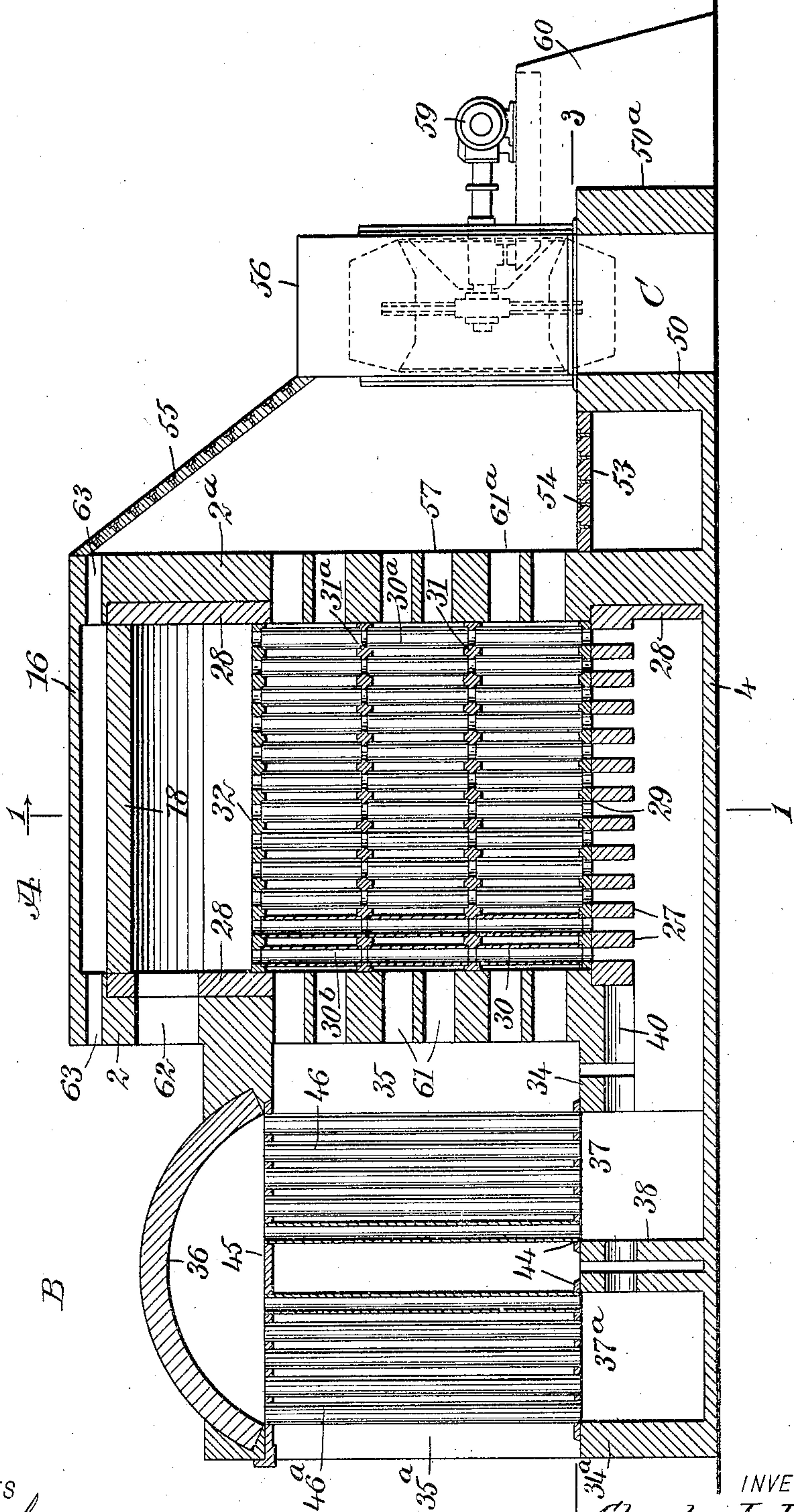
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3 SHEETS—SHEET 2.

Fig. 2



WITNESSES  
*J. A. Propoy*  
*W. H. H. H. H.*

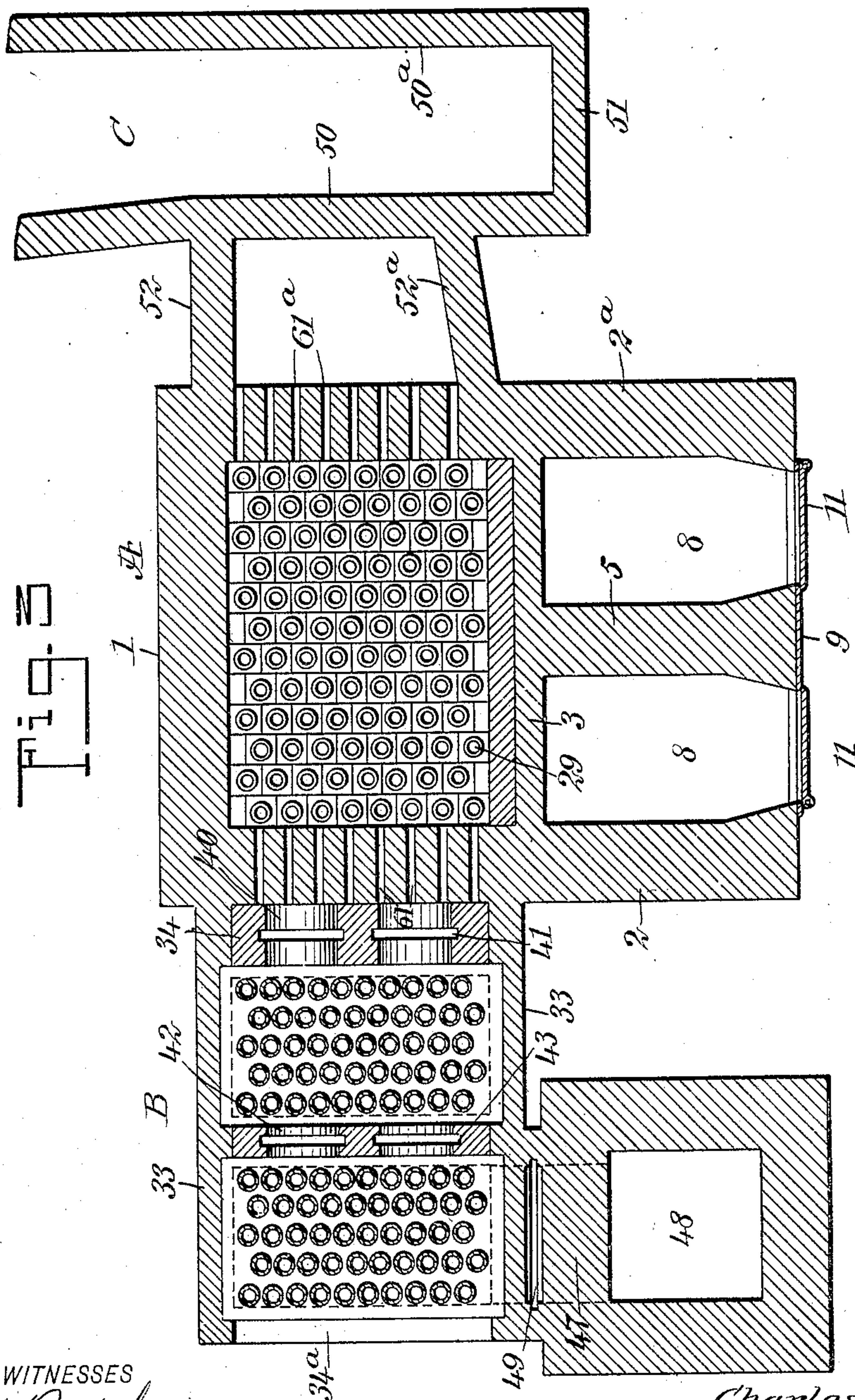
INVENTOR  
*Charles L. Bowne*  
BY *Mumma & Co.*  
ATTORNEYS

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3 SHEETS—SHEET 3.



WITNESSES  
*J. A. Propoy*  
*W. H. Holt*

INVENTOR  
*Charles L. Bowne*  
BY *Mumme & Co*  
ATTORNEYS



# UNITED STATES PATENT OFFICE.

CHARLES LEROY BOWNE, OF KEYPORT, NEW JERSEY.

## HOT-AIR GENERATOR.

No. 836,009.

Specification of Letters Patent.

Patented Nov. 13, 1906.

Application filed June 1, 1906. Serial No. 319,728.

*To all whom it may concern:*

Be it known that I, CHARLES LEROY BOWNE, a citizen of the United States, and a resident of Keyport, in the county of Monmouth and State of New Jersey, have invented a new and Improved Hot-Air Generator, of which the following is a full, clear, and exact description.

This invention is an improved apparatus for the generation of hot air, designed primarily for use in drying brick, but may be used with advantage in other relations, especially for heating drying-rooms for different purposes.

Among other objects of the invention is the production of an apparatus of this character which will economically heat the air to any desired temperature and force it through a duct or tunnel to the place where it is to be used; also, to so construct the generator that it will be impossible for the smoke and gas coming from the furnaces to intermingle with the air so heated, which is the source of much inconvenience in generators as now constructed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a transverse vertical section through one of the fire-boxes and adjacent set of flues contained in the central housing, the view being taken on the line 1 1 of Fig. 2. Fig. 2 is a longitudinal vertical sectional view of the generator complete on the line 2 2 of Fig. 1, and Fig. 3 is a horizontal section on the line 3 3 of Fig. 2.

Referring to the drawings, A represents the central housing of the generator, composed of a back wall 1, connected with side walls 2 and 2<sup>a</sup>, said walls being constructed of brick, concrete, or other suitable material, as also the walls hereinafter described. The walls 2 and 2<sup>a</sup> are connected about the center of their length by a wall 3, parallel to the wall 1 and having a foundation of the same depth, both resting on a flooring 4. The wall 3, however, rises only a short distance above the floor 4 and is gradually stepped off, as shown in Fig. 1, to decrease its thickness as its upper end is approached.

A wall 5 extends perpendicular to the wall 3 intermediate of the walls 2 and 2<sup>a</sup> and rests

on a rearwardly-inclined flooring 6. This wall extends forward the same distance as the walls 2 and 2<sup>a</sup> and forms with them fire-boxes 7 and ash-pits 8, said fire-boxes and ash-pits being provided with a metal front 9, having, respectively, the usual doors 10 and 11 and separated from each other by grate-bars 12. The walls 2 and 2<sup>a</sup>, at the front end of the fire-boxes, arch over to the center wall 5, as shown at 13 in Fig. 1, contracting the front end of the fire-boxes by a short downwardly-projecting wall 14 and supporting a perpendicular wall 15 at its rear end, rising to the height of the wall 1. These walls are covered over by a flat concrete or brick roofing 16, supported on longitudinal metal beams 17. Underneath the roofing 16 and slightly separated from it is an arch of fireproof material 18, let into the wall 1 at 20 and also passing into the wall 15 at 21, following this wall downwardly, as also the arch 13 and wall 14, providing fireproof linings for the fire-boxes.

A longitudinal wall 22, resting on the floor 4, divides the space between the walls 1 and 3 in half, as shown in Fig. 1. This wall only rises to the height of the first stepped portion in the wall 3 and also a similar stepped portion in the wall 1, all of which are covered with a fireproof material 24, said fireproof material adjacent to the wall 3 passing upwardly to within a short distance of the arch 18, forming a backing 25 for the fire-boxes. The walls 1, 22, and 3 divide the space between them into ducts 26, which are connected overhead by a series of spaced arches 27. (Best shown in Fig. 1.) These arches are preferably built of fireproof brick, as also the linings 28 for the side walls 2 and 2<sup>a</sup>.

Resting on the arches 27 is a base formed of square apertured tilings 29. These tilings are counterbored about their apertures and are placed in staggered relation with the apertures resting over the interstices between the arches 27. Resting in the counterbores of the tiling 29 are a series of short perpendicular flues 30, joined to a similar series of flues 30<sup>a</sup>, which in turn connect with a similar series of flues 30<sup>b</sup>, the connections between said flues being formed by tilings 31 and 31<sup>a</sup>, similar to the tilings 29, but differing in that they are counterbored in both their top and bottom faces. The last set of flues 31<sup>a</sup> are also capped by tilings 32, identical to the til-



ings 29, but placed with their counterbored faces downward. It is thus seen that the flues are composed of a series of tiers forming continuous passages.

5 A wing B is formed at the left side of the housing A, comprising two perpendicular walls 33, extending at right angles to the wall 2 and connected with side walls 34 and 34<sup>a</sup>, respectively. The walls 34 and 34<sup>a</sup> are cut  
10 out intermediate their lengths at 35 and 35<sup>a</sup> and are joined together at their upper ends and with the walls 33 by means of a transverse fireproof arched roof 36. The space between the walls 34 and 34<sup>a</sup> is divided into  
15 two ducts 37 37<sup>a</sup> by means of an intermediate transverse wall 38. These ducts 37 and 37<sup>a</sup> are at right angles to the ducts 26, which lead into them by means of connecting  
20 arches 40, having damper-slots 41. The wall 38 is also provided with similar alining arches 42 with damper-slots 43.

Seated on top of the wall 38 and the walls 34 and 34<sup>a</sup> at the bottom of their cut-out portions 35 and 35<sup>a</sup>, respectively, are flue-sheets 44. These flue-sheets are provided  
25 with a plurality of openings alining with a like number of openings in a flue-sheet 45, fixed at the base of the arch 36, said openings of the flue-sheets having expanded into them  
30 two sets of perpendicular flues 46 and 46<sup>a</sup>.

Connected at one end of the duct 37<sup>a</sup> through a passage 47 is a stack 48 for carrying off the products of combustion after they have passed through the last set of flues.  
35 This connecting-passage 47 has an intermediate damper-slot 49, similar to the damper-slots 41 and 43, for regulating the draft of the fire.

A duct or tunnel C, composed of walls 50 and 50<sup>a</sup>, connected by an end wall 51, is  
40 placed at the right-hand side of the housing A and connected therewith by walls 52 and 52<sup>a</sup> substantially in alinement with the walls 1 and 3, respectively, and covered over with  
45 concrete or brickwork 53, reinforced by metal bars 54.

A similar reinforced concrete or brickwork 55 is downwardly inclined from the top of the wall 2<sup>a</sup>, connecting it with a fan-casing  
50 56, seated over the tunnel C, forming an inclosed chamber 57, connecting the housing A with said casing. In the fan-casing is journaled a fan 58, adapted to be rapidly driven by a motor 59, seated on any suitable foundation—as, for example, 60—as shown in  
55 Fig. 2.

In the operation of the improved apparatus fires are built in the boxes 7, which heat the surrounding walls, discharging the products  
60 of combustion over the fireproof backing 25, after which they are deflected downwardly by the arch 18, through the vertical flues 30<sup>a</sup> and 30, into the ducts 26, then out into the duct 37, up the series of vertical flues 46,  
65 where they are deflected over by the arch 36

down through the vertical flues 46<sup>a</sup> into the duct 37<sup>a</sup> and out into the stack 48. If the fires in the boxes 7 should burn too fast, a damper-plate can be slipped into the slot 49, as also can the fires be regulated by slipping  
70 damper-plates into the slots 41 and 43. When the flues and walls of the generator become sufficiently hot, the fan 58 is set in motion by the motor 59, which draws the cold air in through the opening 35<sup>a</sup> between the  
75 heated tubes 46 and 46<sup>a</sup> through openings 61 in the wall 2, which then circulates between the flues in the housing A, passing out through similar openings 61<sup>a</sup> in the wall 2<sup>a</sup> into the  
80 chamber 57, from which the fan 58 takes it and forces it through the tunnel C to any desired place where it is to be used.

As shown, the housing A is provided with a cleaning-hole 62, passing through the wall 2 above the flues 30<sup>b</sup>, and also has passages 63  
85 in the upper ends of the walls 2 and 2<sup>a</sup>, connecting the space between the arch 18 and roof 16 with the outer atmosphere and chamber 57, thereby utilizing what heat passes through the arch 18 by conduction.  
90

In the back wall 1 of the housing A a number of openings 64, placed one above the other, pass through it and serve as peep-holes in  
95 ascertaining the condition of the flues in the housing.

Although I have described the invention in detail, it is to be understood that its scope is limited only by the annexed claims.

Having thus described my invention, I claim as new and desire to secure by Letters  
100 Patent—

1. In a hot-air generator, the combination of a housing, and a series of vertical flues therein, said flues being made up in sections  
105 joined together by counterbored tiling arranged in horizontal planes, as described.

2. In a hot-air generator, the combination of a housing, fire-boxes and vertical flues therein, composed of a series of tiers with layers  
110 of tiling therebetween, forming continuous passages, a fireproof arch for deflecting the products of combustion from the fire-boxes downward through the vertical flues, openings at each side of the housing for the free circulation of the air between the flues, a roofing  
115 over the housing slightly separated from the arch, openings at each side of the housing between the roofing and the arch, a chamber at one side of the housing into which all of said openings lead, and a fan for exhausting the  
120 air from the chamber.

3. In a hot-air generator, a housing, a series of continuous, vertical flues in said housing, a fire-box adjacent to said housing for heating the flues, a wing extending from the  
125 housing, two groups of vertical flues in the wing, and means for conducting the products of combustion from the lower ends of said first-named flues successively through each of said groups of flues.  
130



4. In a hot-air generator, the combination  
of a housing, and a series of vertical flues  
therein, composed of a series of tiers with  
layers of tiling therebetween forming con-  
5 tinuous passages, said tiling being counter-  
bored to maintain the tiers in positive aline-  
ment.

In testimony whereof I have signed my  
name to this specification in the presence of  
two subscribing witnesses.

CHARLES LEROY BOWNE.

Witnesses:

JOHN MASON, Jr.,  
MARCUS B. TAYLOR.