

No. 757,174.

PATENTED APR. 12, 1904.

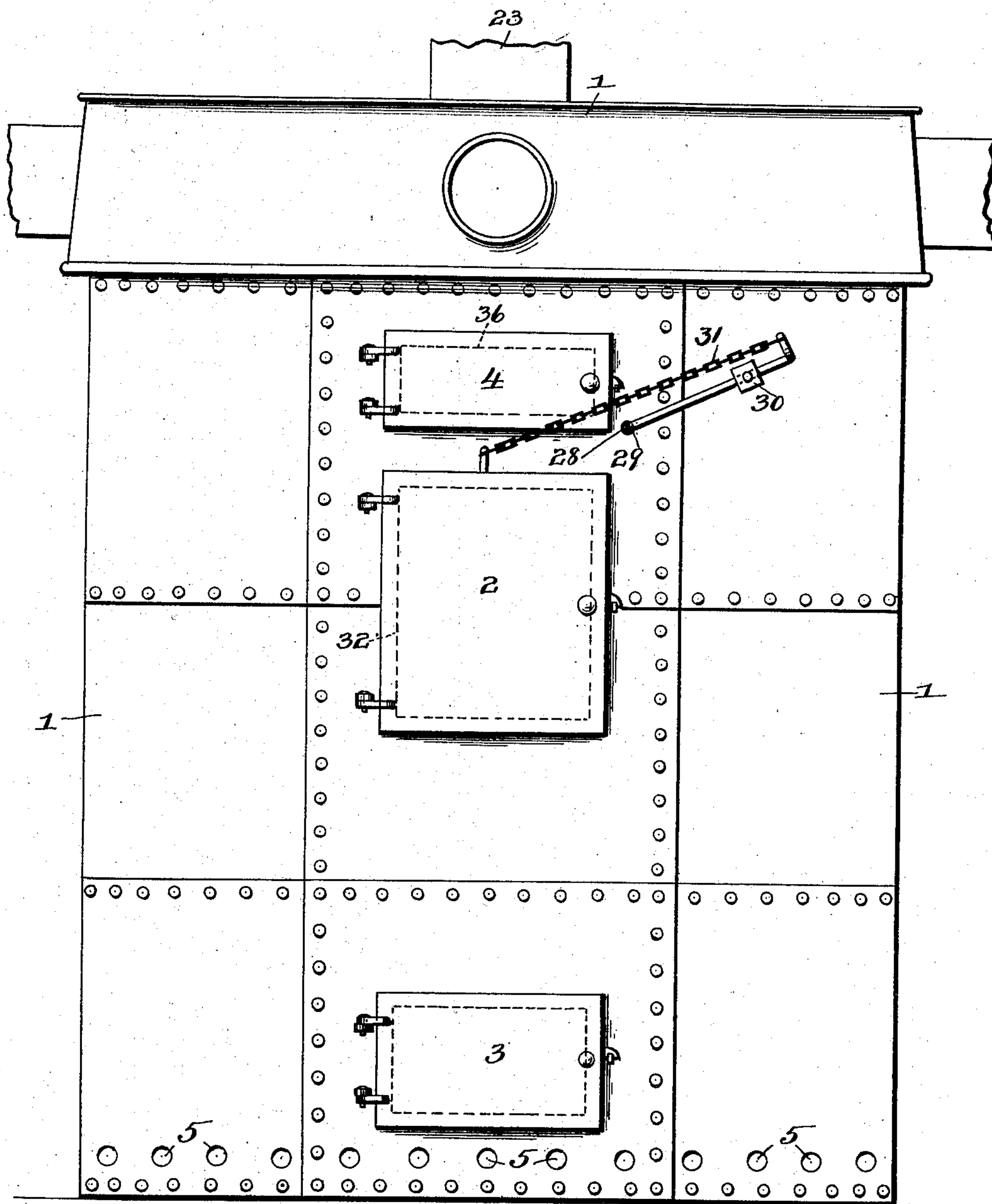
W. W. BRYAN.
HOT AIR FURNACE.

APPLICATION FILED MAR. 20, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.



Inventor

Witnesses

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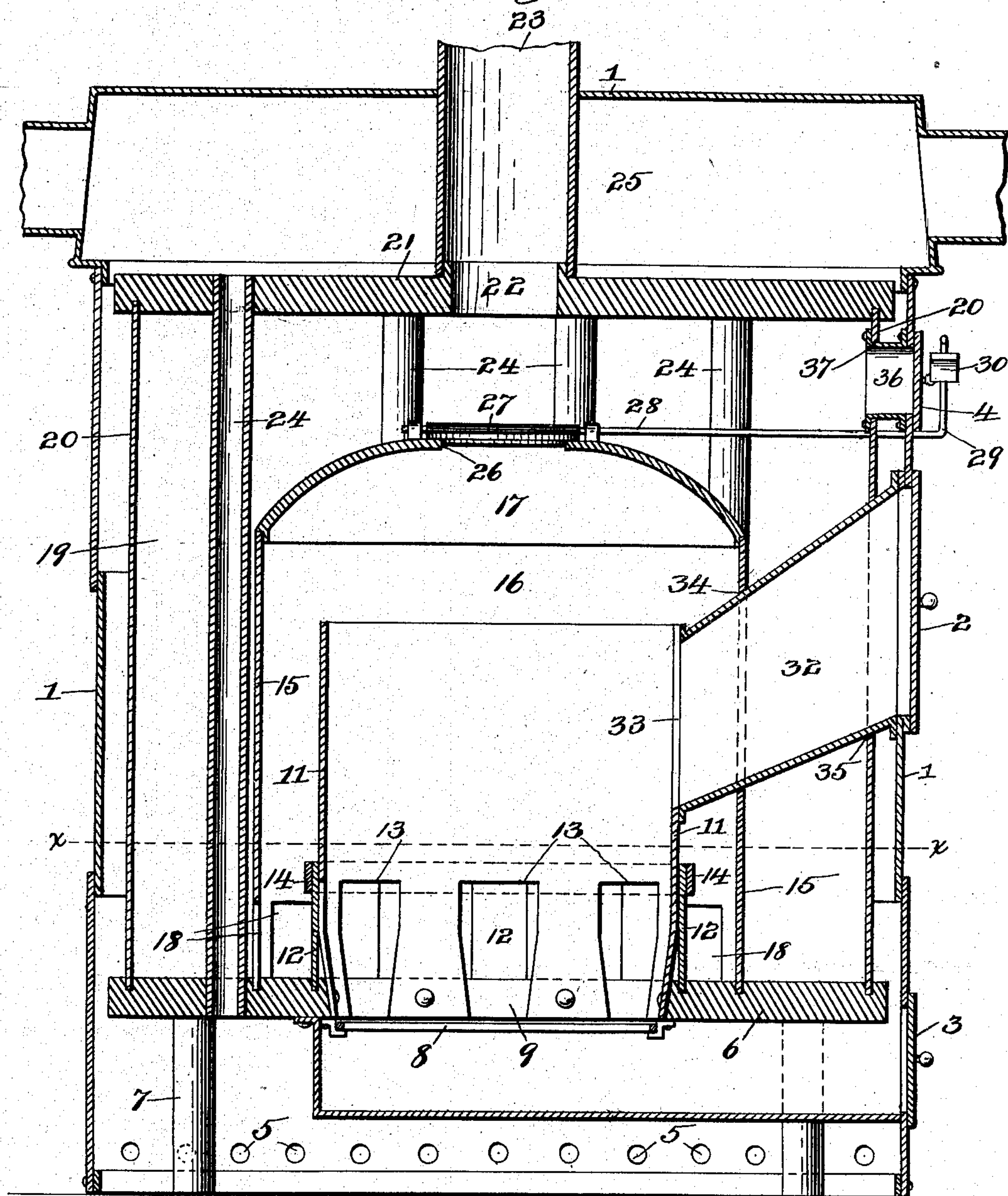
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3 SHEETS—SHEET 2.

Fig. 2.



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3 SHEETS—SHEET 3.

Fig. 3.

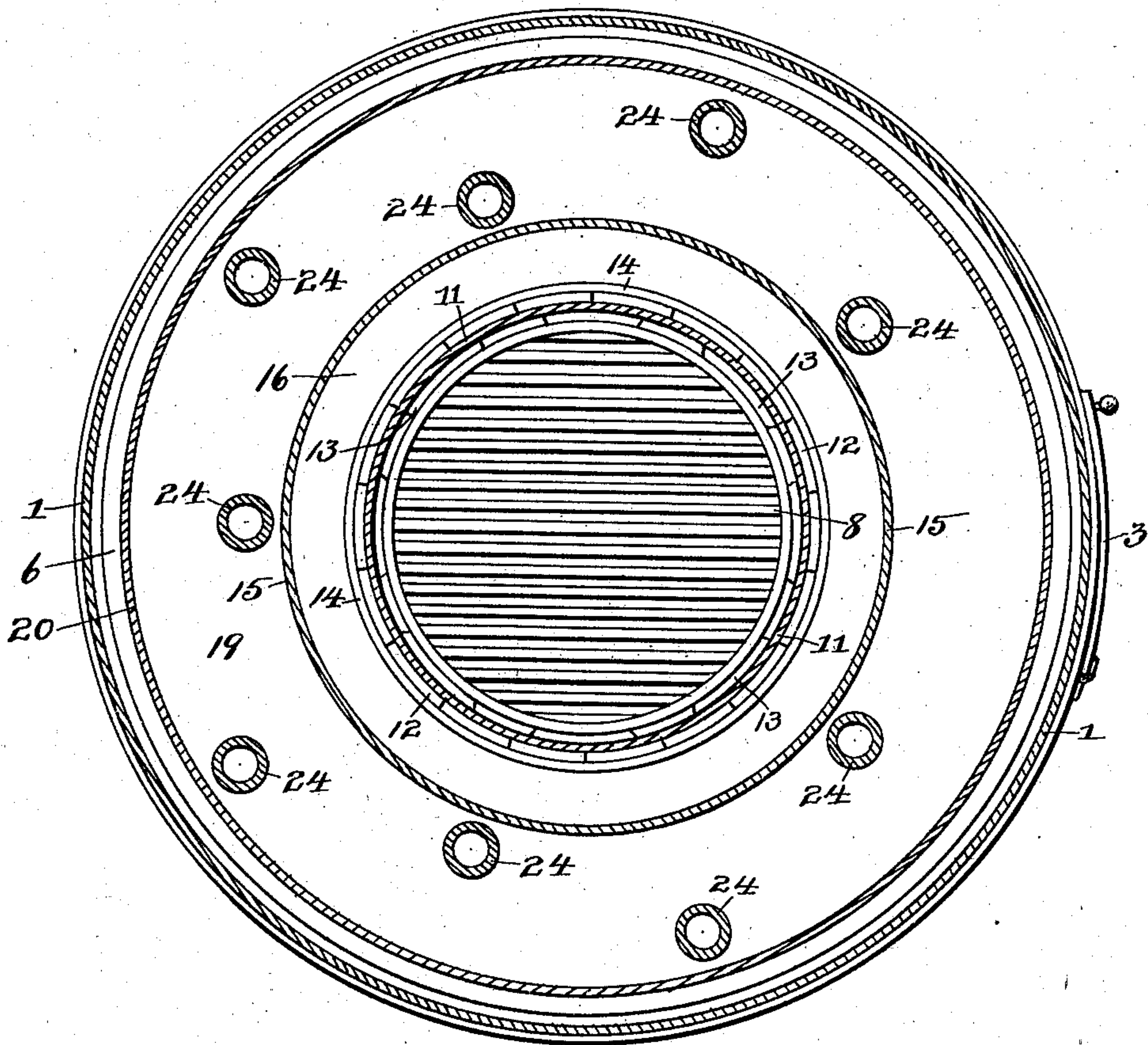
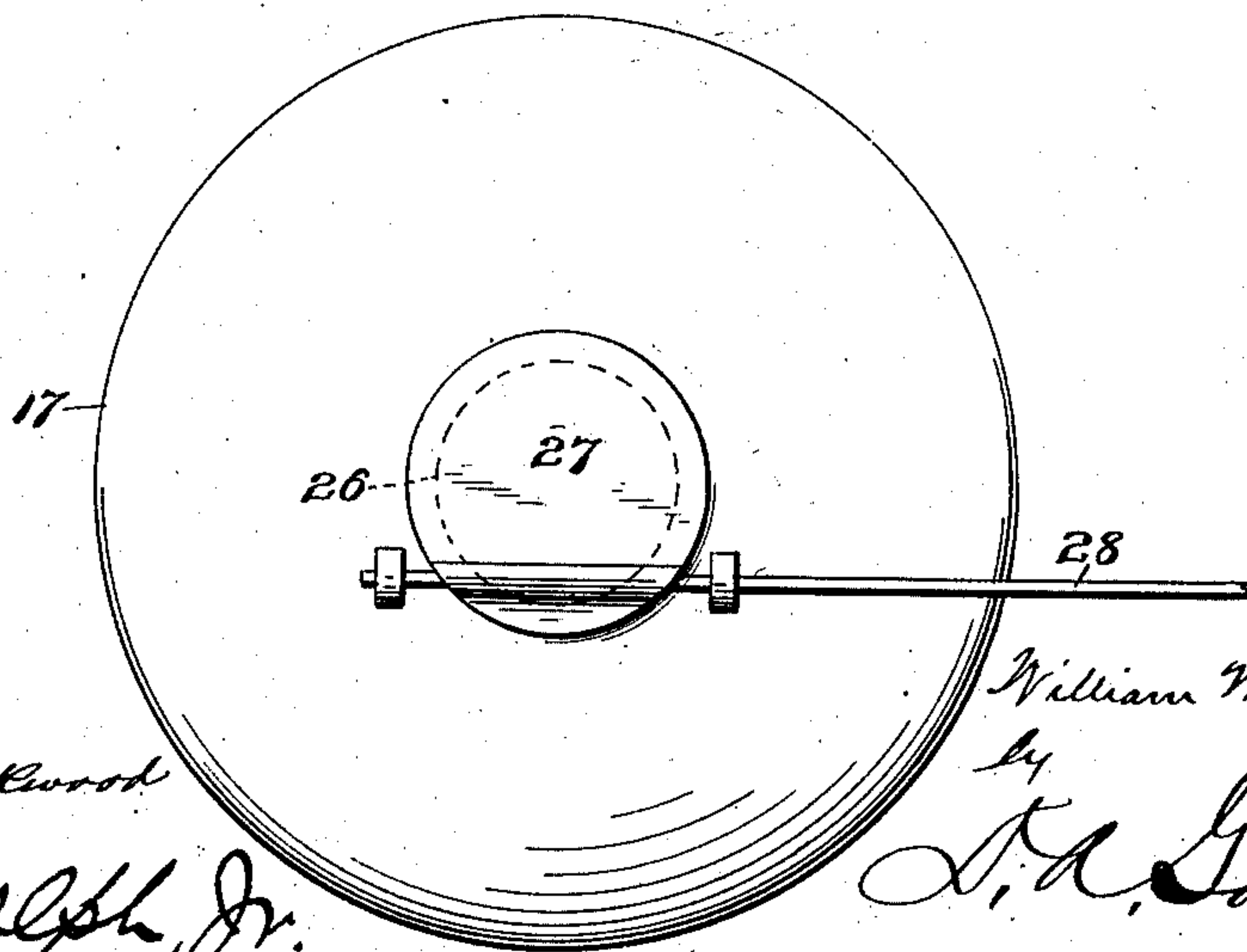


Fig. 4.



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UNITED STATES PATENT OFFICE.

WILLIAM W. BRYAN, OF ANGOLA, INDIANA.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 757,174, dated April 12, 1904.

Application filed March 20, 1903. Serial No. 148,691. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM W. BRYAN, a citizen of the United States, residing at Angola, in the county of Steuben and State of Indiana, have invented certain new and useful Improvements in Hot-Air Furnaces, of which the following is a specification.

My invention relates to hot-air furnaces employing tubes for conveying the air from the base of the furnace to the hot-air-distributing chamber, and has for one of its objects to provide a furnace in which the products of combustion are carried downward from a dome above the fire-pot and then upward around the air-pipes and then out through the smoke-flue, which being located in the center of the top of the furnace causes an equalization of the draft, so that the smoke, &c., is evenly distributed through the furnace, thus causing an equal heating of all the air-pipes.

Another object of the invention is to provide a damper above the dome in the fire-pot that may be opened to allow the products of combustion to pass directly to the smoke-flue and that is so constructed that it will open automatically to allow gas to escape in case of a larger amount developing in the combustion-chamber than can be quickly carried off through the regular passages. I also provide connections between the damper aforesaid and the door of the furnace, so that when the door is opened the damper will also be opened to permit egress of the gases developed in the combustion-chamber while the furnace is being refitted.

The advantages of my invention will more fully appear hereinafter and by reference to the accompanying drawings, in which—

Figure 1 is a front view of my furnace; Fig. 2, a central vertical sectional view; Fig. 3, a cross-section on the line *xx* of Fig. 2; and Fig. 4, a view of the top of the combination-chamber, showing in detail the damper employed in my device.

Referring to the drawings, in which similar reference characters indicate corresponding parts throughout the several views, 1 represents the outside casing of my furnace, which may be built of brick or of sheet-metal or other suitable material and provided with a

door 2, admitting to the grate for feeding the fire, an ash-door 3, and a door or hand-hole 4 for admitting to the top of the heating-chamber for cleaning, repairs, &c. The base of said casing 1 is also provided with openings 5 to admit cold air.

On the inside of casing 1 is erected a platform 6, supported by suitable legs 7. 8 represents a grate mounted in a central opening 9 in said platform and operated by any suitable means.

11 represents the fire-wall, suitably supported in said opening 9 and extending a considerable distance above the level of the bottom of door 2, while 12 represents staves of metal, fire-clay, or other suitable material secured to the outer side of said fire-wall to prevent ashes, &c., falling out between the opening 13 in said wall, 14 being a hoop to secure said staves in position.

15 represents the wall or casing of the combustion-chamber 16, arranged outside the fire-wall 11, which is surmounted by a dome 17 and provided around its base with openings 18 for the passage of the products of combustion outward into the heating-chamber 19, which is inclosed around its sides by a wall 20.

21 represents the top of the heating-chamber, in the center of which is an opening 22 to receive the smoke-flue 23, which passes out through the top of casing 1.

24 represents tubes for conveying air, which are arranged in said heating-chamber 19 and are designed to heat the air coming through the openings 5 in transit to the hot-air chamber 25 between the top 21 of heating-chamber 19 and the top of casing 1. It will also be seen that some air will pass upward between the casing 1 and wall 20 and be heated by the heat radiated by said wall.

In the center of dome 17 is provided an opening 26, in which is mounted a damper-plate 27, pivoted on rod 28, which passes outside of casing 1 and is bent, as shown at 29, and its end provided with a balance-weight 30, which is adjustable on said bent portion to provide for regulating the amount of pressure necessary to open said damper, the purpose of this construction being to permit escape of gases from the combustion-chamber should

there be danger of an explosion because of their sudden generation. I also connect the end of said bent portion 29 with the door 2 by means of a chain 31, so that when said door is

5 opened the damper is also opened to prevent gas from escaping through said door by providing a direct draft therefor through flue 23.

32 represents a casing connecting the opening for door 2 in casing 1 with an opening 33
10 in the fire-wall 11, 34 and 35 representing openings in the walls 15 and 20, respectively, for the passage of said casing 32, and 36 represents a casing connecting the opening for door 4 with an opening 37 in wall 20.

15 The operation of my invention will be readily understood from the above description. It will be noted that some of the gases arising from the burning fuel will be carried up by the fire-walls 11 to the combustion-chamber
20 16, where they will burst into flame, which will be carried downward between the fire-wall 11 and wall 15, where it will ignite the gases pouring from the openings 13 and through the crevices between staves 12, causing a secondary combustion. The heat and
25 smoke created will then pass out through the openings 18 into the heating-chamber 19 and then upward around tubes 24 to and through opening 22 to smoke-flue 23. By causing the
30 products of combustion to follow this circuitous path a maximum of heat is extracted from the products of combustion before being allowed to escape to the outer air.

Having thus described my invention, what
35 I claim is—

1. In a hot-air furnace, a fire-pot having openings around its base, and staves secured to the outside of said fire-wall, as and for the purpose described.

40 2. In a hot-air furnace, a casing, a platform erected therein, a fire-wall erected on said platform, having openings at its base, staves secured to the outside of said fire-wall, a combustion-chamber above and around said fire-wall,
45 a heating-chamber outside of said combustion-chamber, a flue-opening in the center of the top of said heating-chamber, and tubes connecting the platform with the top of said heating-chamber, substantially as shown and
50 described.

3. In a hot-air furnace, a casing having suitable doors, and openings at its base for the

admission of cold air, a platform erected in said casing, a fire-wall erected on said platform having openings around its base, staves 55 secured to the outside of said fire-wall, a combustion-chamber above and around said fire-wall, a heating-chamber outside of said combustion-chamber, a flue-opening in the center of the top of said heating-chamber, and tubes 60 connecting the platform with the top of said heating-chamber, substantially as shown and described.

4. In a hot-air furnace, a casing having suitable doors, and openings at its base for the admission of cold air, a platform erected inside of said casing, a fire-wall erected on said platform, having openings at its base, staves 65 secured to the outside of said fire-wall, a combustion-chamber above and around said fire-wall having an opening in its top, a damper pivotally mounted in said opening and controlled by a counterweight, a heating-chamber outside of said combustion-chamber, a flue-opening in the center of the top of said heating-chamber and in vertical alinement with 70 the damper-opening aforesaid, and tubes connecting the platform with the top of said heating-chamber, substantially as shown and described.

5. In a hot-air furnace, a casing having suitable doors, and openings at its base for the admission of cold air, a platform erected in said casing, a fire-wall erected on said platform having openings around its base, staves 80 secured to the outside of said fire-wall, a combustion-chamber above and around said fire-wall having an opening in its top, a damper pivotally mounted in said opening and controlled by a counterweight, a heating-chamber outside of said combustion-chamber, a flue-opening in the center of the top of the heating-chamber and in vertical alinement with 90 the damper-opening aforesaid, and tubes connecting the platform with the top of said heating-chamber, substantially as shown and described.

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

WILLIAM W. BRYAN.

Witnesses:

W. A. PALFREYMAN,
THAD K. MILLER.