

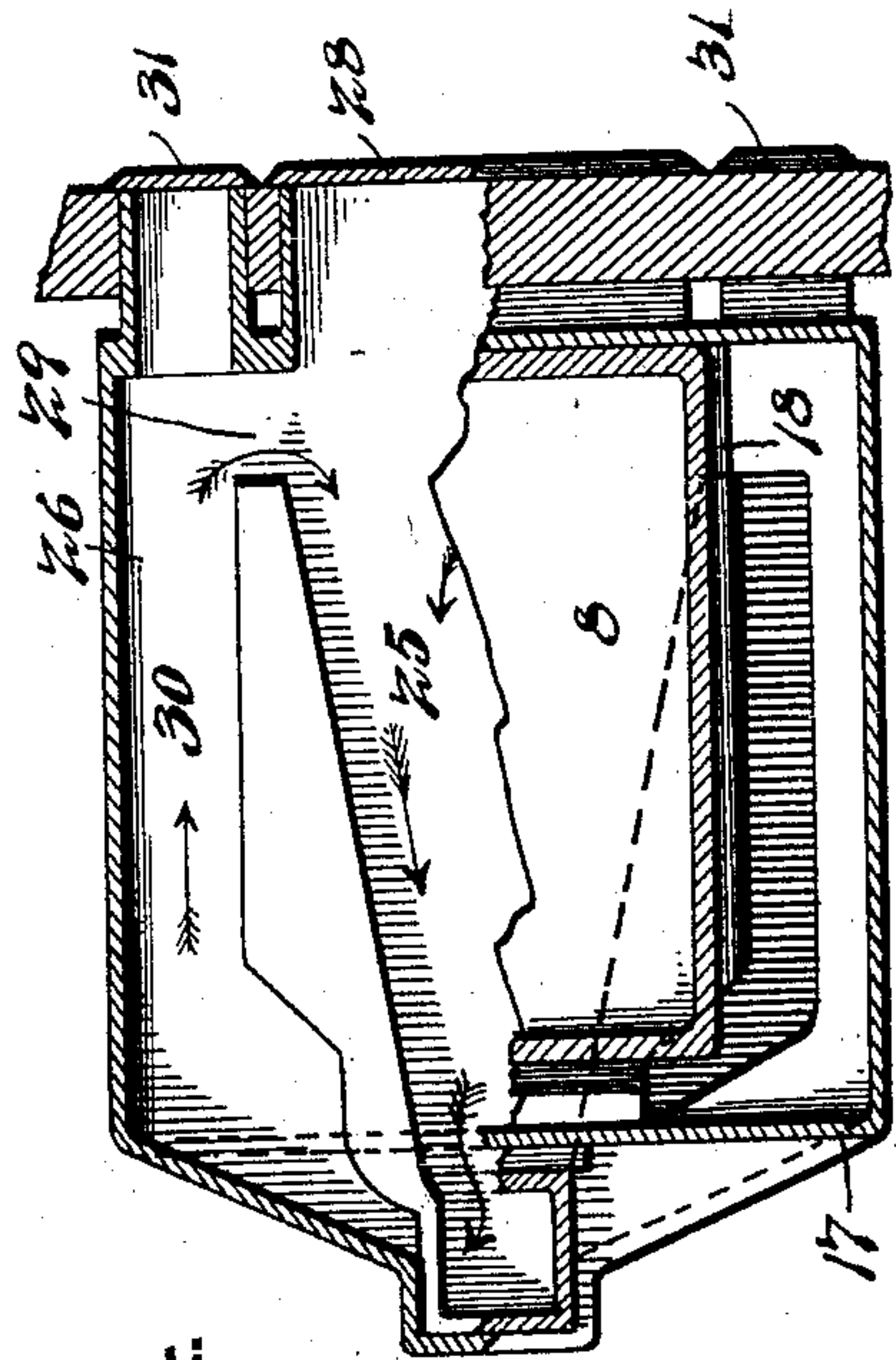
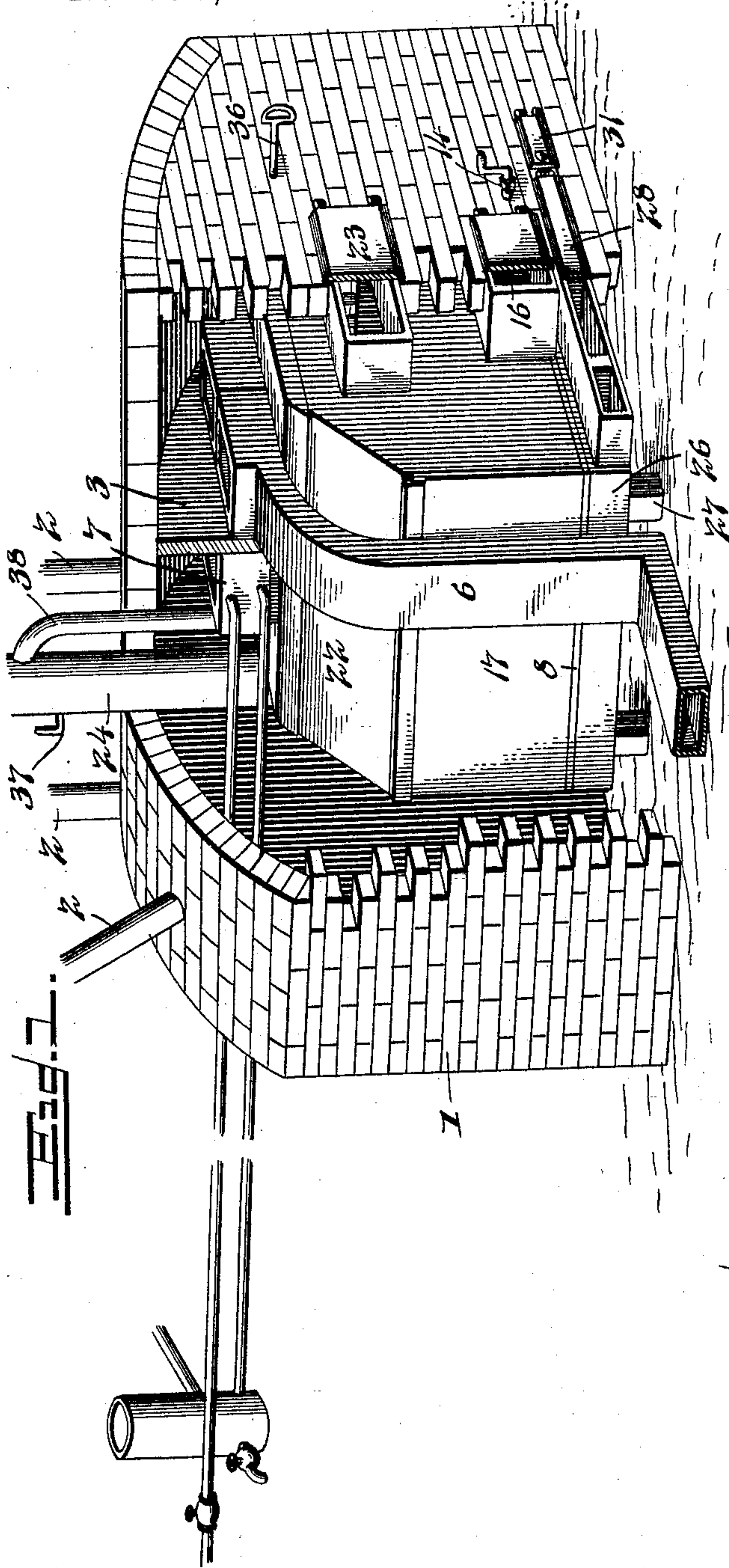
(No Model.)

2 Sheets—Sheet 1.

A. R. BLASSE.
HOT AIR FURNACE.

No. 603,809.

Patented May 10, 1898.



Witnesses

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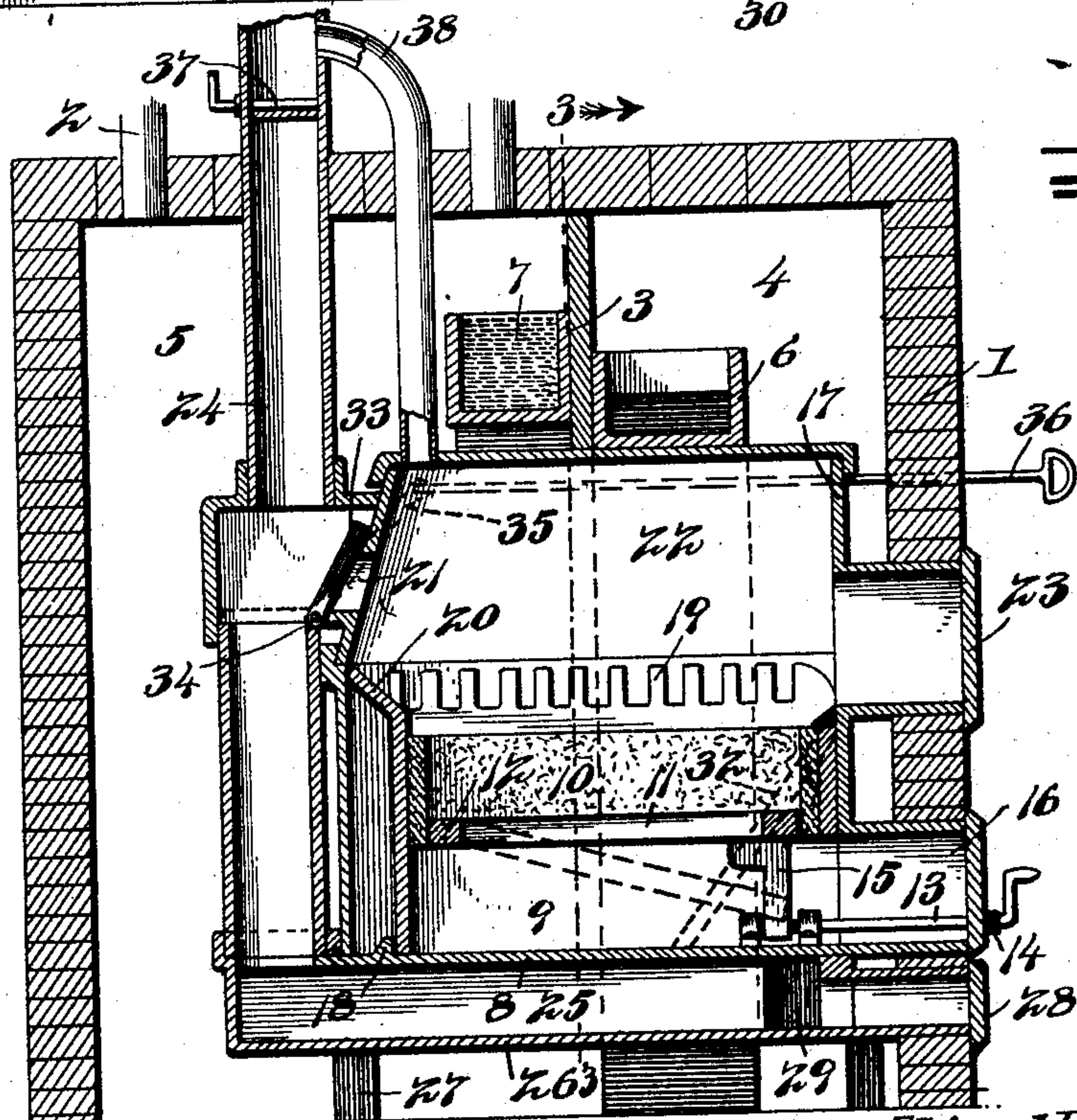
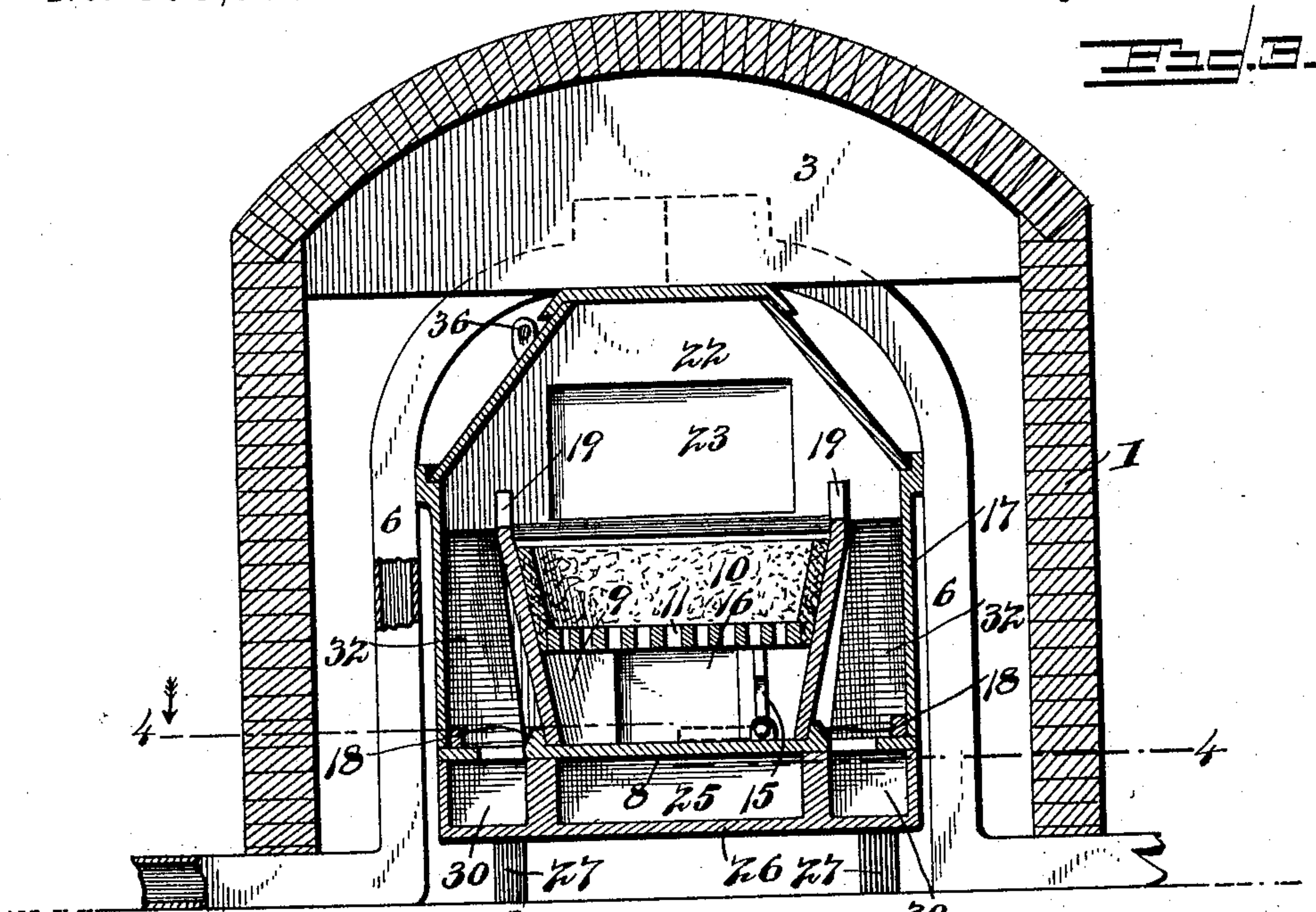
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UNITED STATES PATENT OFFICE.

ALFRED R. BLASSE, OF FROSTBURG, MARYLAND.

HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 603,809, dated May 10, 1898.

Application filed July 7, 1897. Serial No. 643,725. (No model.)

To all whom it may concern:

Be it known that I, ALFRED R. BLASSE, a citizen of the United States, residing at Frostburg, in the county of Allegany and State of Maryland, have invented a new and useful Hot-Air Furnace, of which the following is a specification.

My invention relates to hot-air furnaces, and has for its object to provide a simple, compact, and efficient construction and arrangement of parts whereby the air admitted to the distributing-pipes is heated without being brought into direct contact with an extensive heating-surface and hence without being burned or deprived of its vitality; to provide means for supplying the air for distribution with a sufficient amount of moisture to replace that of which it is deprived by contact with heated surfaces, whereby the air is supplied to the distributing-pipes in a hygienic condition; to provide means whereby the furnace radiates heat throughout its entire surface, inclusive of the bottom, whereby the maximum radiating-surface is provided without detracting from the compactness of the structure; to provide an efficient construction and arrangement of smoke and draft flues for controlling the passage of the products of combustion from the fire-box to the flue, and to provide means whereby the closing of the draft-damper does not interfere with the efficient escape of gas to prevent the discharge of the latter into the hot-air or distributing chambers.

Further objects and advantages of this invention will appear in the following description, and the novel features thereof will be particularly pointed out in the appended claims.

In the drawings, Figure 1 is a perspective view of a furnace constructed in accordance with my invention, the casing being partly broken away. Fig. 2 is a central vertical section of the same, taken in a plane extending from front to rear, showing in dotted lines the position of one of the side deflectors for conveying the products of combustion rearwardly for discharge into the side conductors, which are located below the plane of the grate.

Fig. 3 is a transverse vertical section on a plane indicated by the line 3 3 of Fig. 2. Fig. 4 is a horizontal section on the line 4 4 of Fig. 3.

Similar numerals of reference indicate corresponding parts in all the figures of the drawings.

In the preferred embodiment of my invention, 1 represents a masonry casing inclosing the furnace proper, which is supported with its walls out of contact with those of the casing to form a complete surrounding air-space, and 2 represents a series of hot-air-distributing pipes which communicate with the air-space at its top and in rear of a transverse partition 3, which separates the top of the air-space to form front and rear receiving-chambers 4 and 5 above the top of the furnace proper.

The furnace proper is constructed to form top, bottom, and side radiating-surfaces, as hereinafter more fully explained; but the casing is closed at its bottom to prevent the admission of air, and air-inlet conveyers 6, communicating with any suitable exterior source of supply, communicate with the interior of the casing in front of the transverse partition 3, and hence in the front air-chamber 4 and above the top of the furnace proper, from whence air passes under the partition into the rear chamber, where it is brought into contact with vapor supplied by the contents of a moisture-distributing device, consisting of a tank 7, which is located in rear of said partition and also above the furnace proper. The heated air thence passes into the distributing-pipes 2, by which it is conveyed to the apartments to be heated.

From the above description it will be seen that air supplied to the interior of the casing for distribution does not pass over an extensive radiating or heated surface, but, on the other hand, is admitted to a hot-air chamber at its top, where it is exposed to radiated heat, and thence passes into a second hot-air chamber, where it is again subjected to radiated heat and also to moisture, which it absorbs before entering the hot-air-distributing pipes.

The preferred construction of the furnace proper is as follows:

8 represents a base which forms the bottom of the ash-pit 9, and above the ash-pit is arranged a fire-box 10, provided with a tilting grate 11, this grate being preferably pivoted at its rear end, as shown at 12, and adapted

to drop at its front end to occupy an inclined position, (indicated in dotted lines in Fig. 2.) The means illustrated for normally holding the grate in its operative position consist of
 5 a rocking support having a spindle 13, mounted in suitable bearings on the base and terminating at its front end in a key-seat 14, and a wing 15, carried by the spindle and adapted to be raised to an approximately vertical position, as shown in full lines in Fig. 2, or
 10 dropped to an approximately horizontal position (see dotted lines in Fig. 2) to lower the grate at its front end. By thus dropping the grate at its front end and causing it to occupy
 15 an upwardly and rearwardly inclined position clinkers and cinders may be raked from beneath the incandescent contents of the fire-box through the ash-door opening 16.

The base of the furnace proper is of greater
 20 area than the fire-box and ash-pit and extends laterally and rearwardly beyond the same to support a preferably metallic shell 17; which is wholly out of contact with the walls of the exterior casing, and said shell being also out of contact with the contiguous
 25 walls of the fire-box at its sides and rear, the fire-box casting being seated between side and rear retaining-ribs 18, rising from the base. The fire-box is fitted with the usual fire-clay
 30 walls, and from the upper edge of the metallic walls rise the guards 19, a rearwardly and upwardly inclined deflector 20 being disposed at the center of the rear wall of the fire-box to direct products of combustion into the
 35 rear smoke-outlet 21 in a dome or hood 22, by which the top of the shell is closed. In the shell is formed a fuel-door opening 23.

Arranged in rear of the shell is the smoke-flue 24, which communicates at its lower end
 40 with a central longitudinal conductor 25, arranged beneath the ash-pit and having its lower wall formed by a metallic plate or sub-base 26, preferably coextensive with the base and spaced from the floor of the casing by
 45 means of supports or standards 27. This central conductor is closed at its front end by a cleaning-door 28 and communicates by lateral openings 29 at its front end with side conductors 30, also formed between the base and sub-base, and in communication with the central
 50 conductor only by way of the above-mentioned lateral openings 29. These lateral conductors are also provided in their front ends with cleaning-doors 31 and are in communication at their upper sides with the draft-spaces between the contiguous walls of the
 55 fire-box and the shell. Downwardly and rearwardly extending deflectors 32 are disposed in said draft-spaces, extending from the front wall of the shell, to prevent products of combustion escaping laterally over the sides of the fire-box and passing downwardly through the draft-spaces from passing directly to the openings 29, which connect the lateral
 60 conductors with the central conductor.
 65

Controlling the smoke-outlet of the dome is a damper 33, of which the spindle 34 is pro-

vided with an arm 35, having connection with a damper-rod 36, extending forwardly to and projecting beyond the front of the furnace-
 70 casing, where it is accessible to provide for opening direct communication between the fire-box and the smoke-flue during the starting of a fire and for closing the same after the contents of the fire-box have become suffi-
 75 ciently incandescent to dispense with a direct draft, whereupon products of combustion passing over the walls of the fire-box descend into the draft-spaces between the walls of the fire-box and the shell, thence into the side
 80 draft-conveyers forwardly and through the openings 29, thence into and rearwardly through the central conveyer, and finally enter the smoke-flue at its lower end. I also preferably provide the smoke-flue with a
 85 draft-damper 37 above the smoke-damper, and above this draft-damper the flue is tapped to communicate with a gas-outlet tube 38, which communicates with the space within the dome above the fire-box to carry off gase-
 90 ous products of combustion without materially affecting the draft, the cross-sectional area of said tube being insufficient to cause any appreciable draft, and yet forming an efficient exhaust to prevent the gas generated
 95 within the fire-box from forcing a passage through the joints between the members of the drum, consisting of the shell and dome, and gaining access to the hot-air chambers within the casing surrounding the drum. 100

From the above description it will be seen that the essential feature of the invention is the provision of such a construction and arrangement of parts as to form an extensive
 105 radiating-surface wholly surrounding the fire-box, including its front, admitting fresh air to the air-space surrounding this radiating-surface at a point above the plane of the uppermost point of the furnace proper, where it becomes heated without passing over the
 110 heated surfaces or coming into direct contact therewith, and thus avoiding the burning out of the vitality of the air, and finally exposing the air, after becoming partly heated, to an atmosphere surcharged with moisture be-
 115 fore the air for distribution is admitted to the distributing-pipes for conveyance to the apartments to be heated. Inasmuch as there is no supply of air at the bottom of the furnace there is no direct passage of the air for
 120 distribution over the superheated radiating-surfaces, with the advantages as above indicated.

It will be seen, furthermore, that in order to secure an initial heating of the air I cause
 125 the supply conductor or conductors to enter the casing at a point contiguous to the plane of its bottom, and thence rise and extend inwardly over the center of the furnace proper for discharge, as above described, at a point
 130 above the top of the furnace proper and in front of the transverse partition by which the air-chambers are divided. Obviously the radiation from the walls of the drum, of which

the subjacent conductors below the plane of the base may be considered parts, serves to heat the walls of the supply-conveyer, and thus cause an upward draft therein to insure a sufficient introduction of air from the exterior source.

The preferred embodiment of my invention as above described is in practice, however, susceptible of numerous modifications involving an equivalent function and operation of the parts, and therefore I desire to reserve the right to make changes in the form, proportion, and minor details of construction which may be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having described my invention, what I claim is—

1. A furnace having an inclosing compartmental casing interiorly divided by a transverse vertical partition 3, the furnace, proper, extending in front and in rear of the plane of said partition, and having its fire-box in communication directly and indirectly with a flue extending through the rear compartment of the casing, and said furnace also having a dome covering its fire-box, an air-supply conductor extending from a point outside of the casing contiguous to the bottom of the furnace, and terminating in an outlet located within the casing contiguous to and in front of said partition, and an open-topped moisture-distributing reservoir arranged above the furnace in rear of and contiguous to the plane of the partition and between the same and said flue, and provided with suitable supply and relief conductors, the reservoir being located above the rear portion of the furnace, proper, contiguous to the dome thereof, substantially as specified.

2. A furnace having an inclosing casing forming air-chambers and distributing-pipes in communication therewith, the furnace, proper, being provided with side and bottom radiating-surfaces, and means for supplying air, including a conductor entering the casing at its bottom, extending upward out of contact with said radiating-surfaces and discharging above the furnace, proper, substantially as specified.

3. A furnace having an inclosing casing provided with supply and distributing conveyers, the furnace, proper, comprising a combustion-chamber and an inclosing drum communicating directly and indirectly with a smoke-flue, said drum having a domed shell forming radiating-surfaces, a base and a

spaced subbase forming connected conductors in communication with a smoke-flue, and draft-spaces between the walls of the combustion-chamber and the walls of the shell, substantially as specified.

4. A furnace having an inclosing casing provided with supply and distributing conveyers, the furnace, proper, comprising an open-topped fire-box, a drum having a base supporting the fire-box and forming the floor of an ash-pit under the fire-box, a drum-shell supported by the said base and surrounding the fire-box with its walls spaced therefrom, the interior of the shell being in communication by a direct-draft opening with a smoke-flue, and said drum also having a subbase spaced from the base and divided by interior partitions to form a central conductor, in communication with the smoke-flue below said direct-draft opening, and side conductors in communication with the side spaces between the fire-box and the walls of the shell, and connected with the central conductor at points remote from the smoke-flue, substantially as specified.

5. A furnace having an inclosing casing provided with supply and distributing conveyers, the furnace, proper, comprising an open-topped fire-box, a base supporting the fire-box and forming the bottom of the ash-pit therefor, said base being of greater area than the fire-box, a subbase spaced from the base and having the intervening interval divided by partitions to form a central conductor and side conductors communicating with the central conductor at their front ends, a shell supported by the base with its sides spaced from the walls of the fire-box, to form chambers communicating through openings in the base with said side conductors, a smoke-flue communicating with the rear end of the central conductor, a dampered direct-flue opening connecting the interior of the shell above the fire-box with the smoke-flue, a draft-damper in the smoke-flue above the plane of the direct-draft opening, and a gas-escape tube connecting the interior of the shell with the smoke-flue above the draft-damper, substantially as specified.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

ALFRED R. BLASSE.

Witnesses:

JOHN H. SIGGERS,
HAROLD H. SIMMS.