

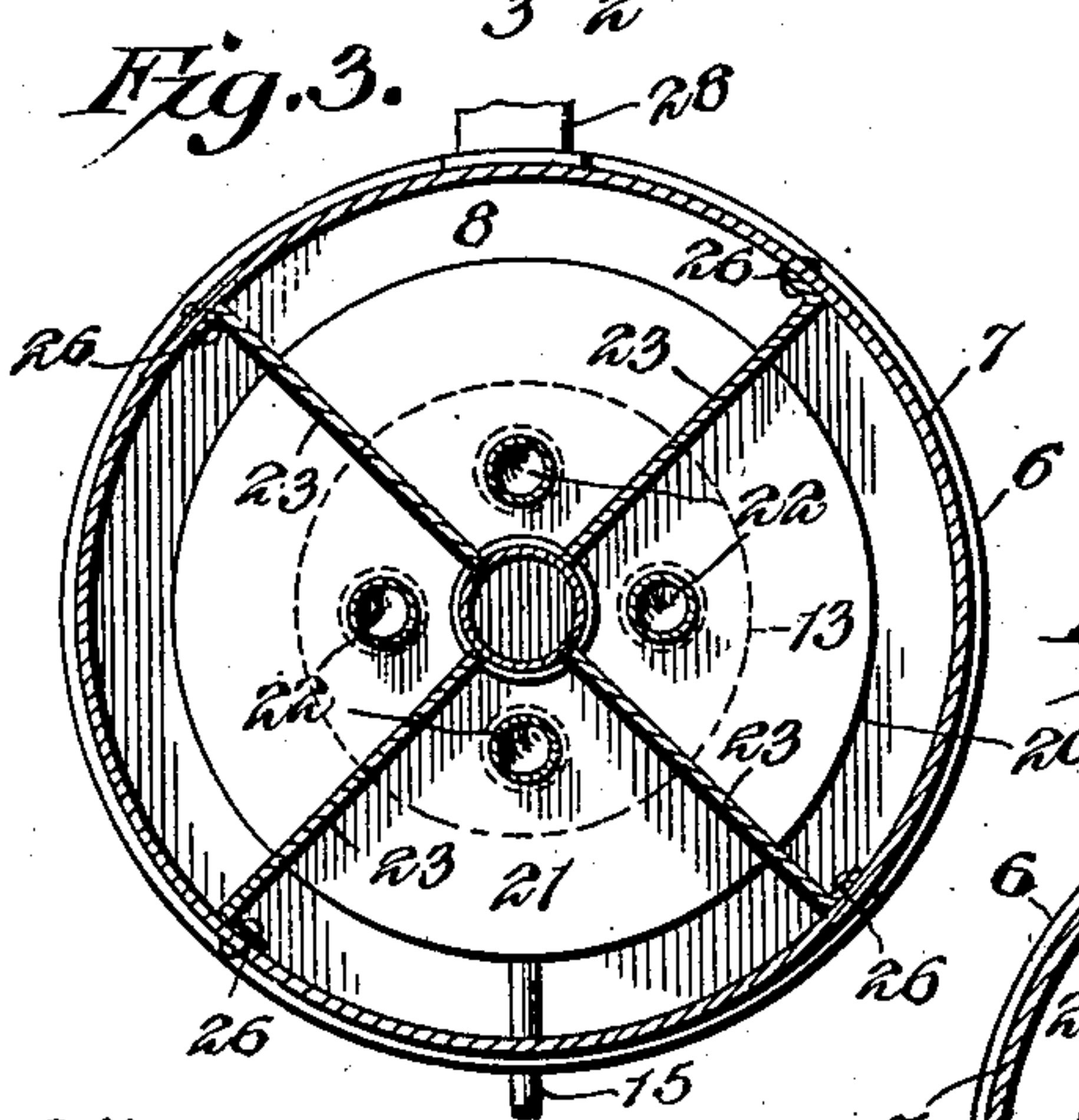
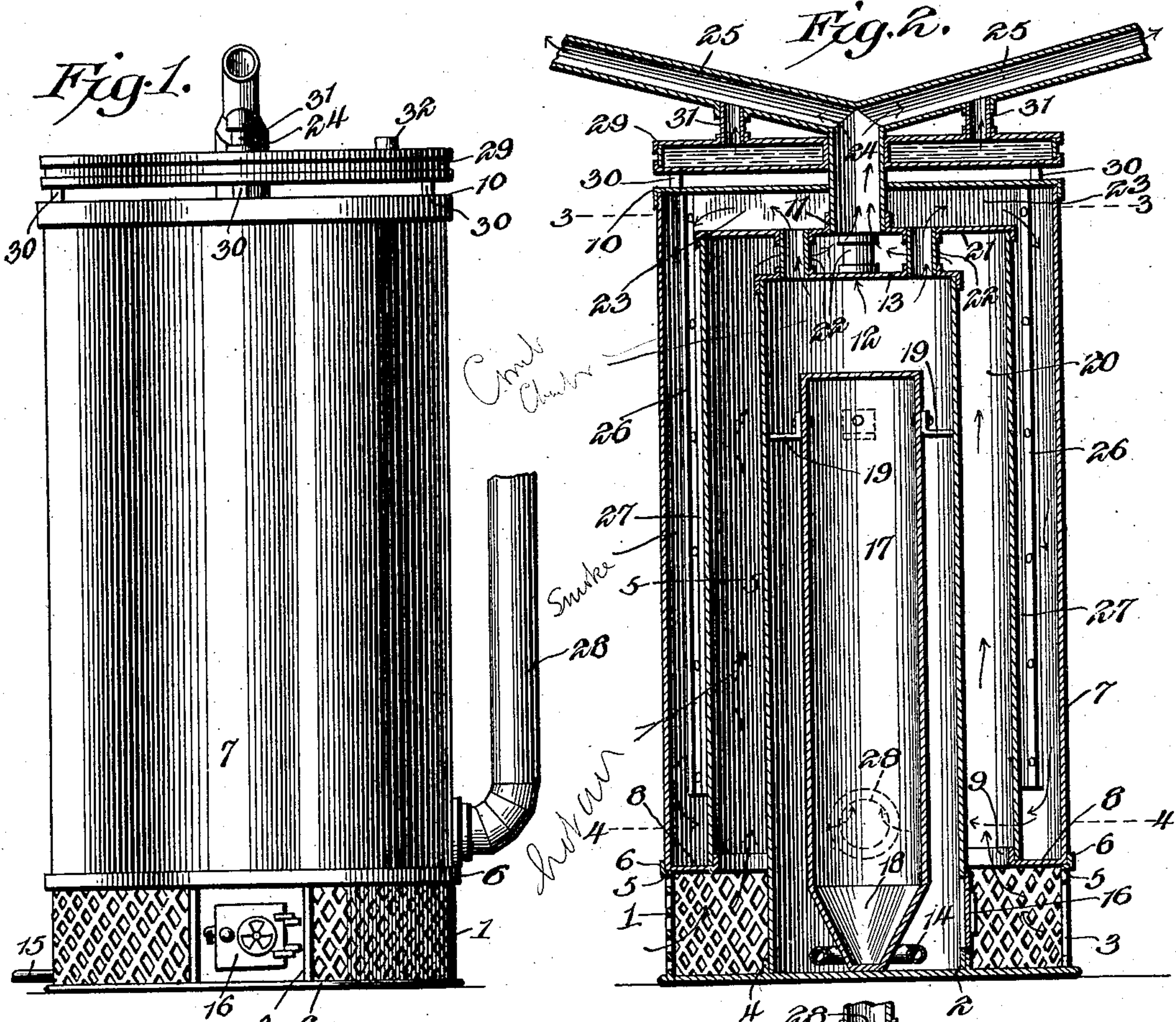
No. 723,514.

PATENTED MAR. 24, 1903.

E. S. CLOWER.
GAS FURNACE.

APPLICATION FILED SEPT. 29, 1902.

NO MODEL.



Witnesses
Howard D. Orr.
H. F. Shepard.

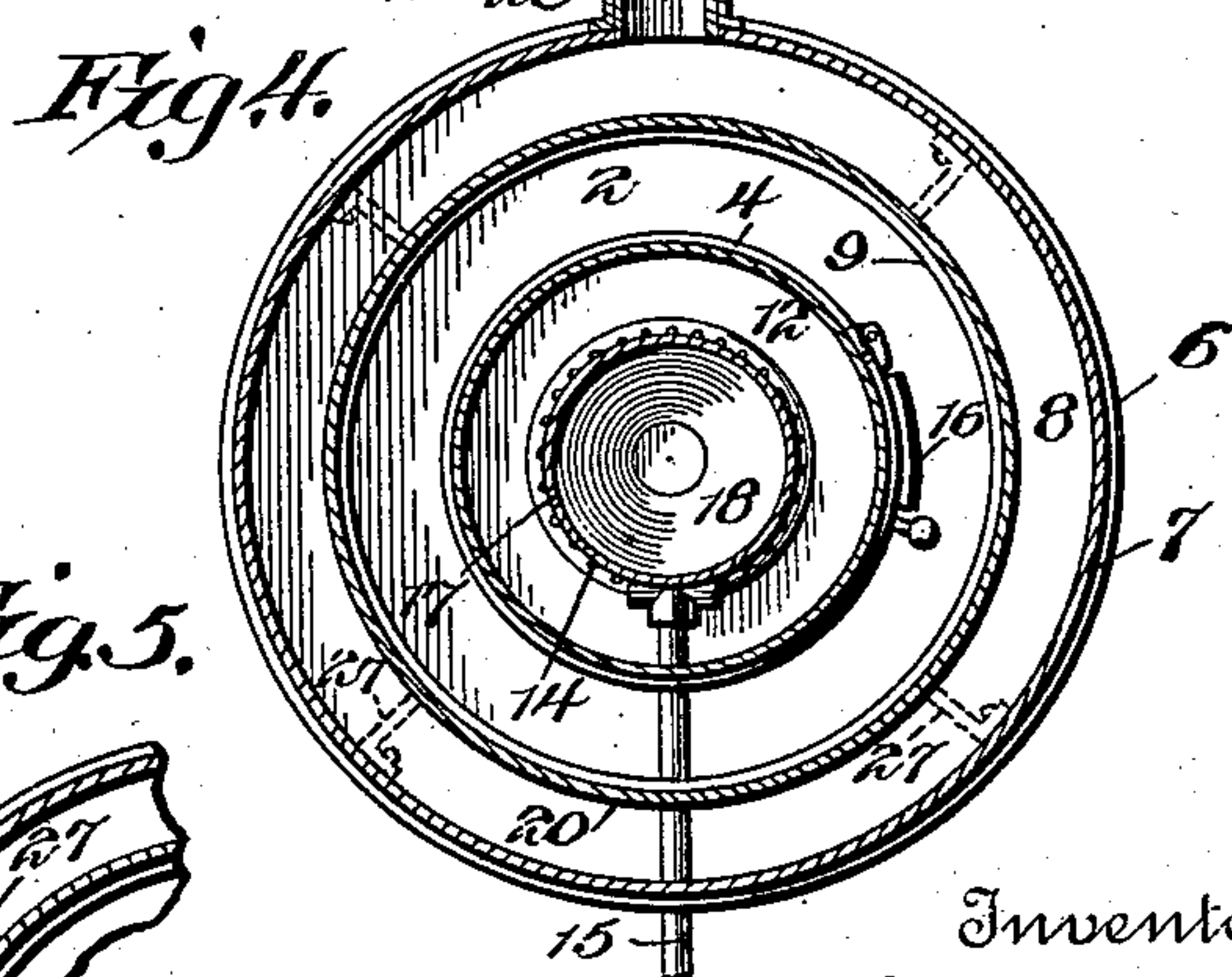
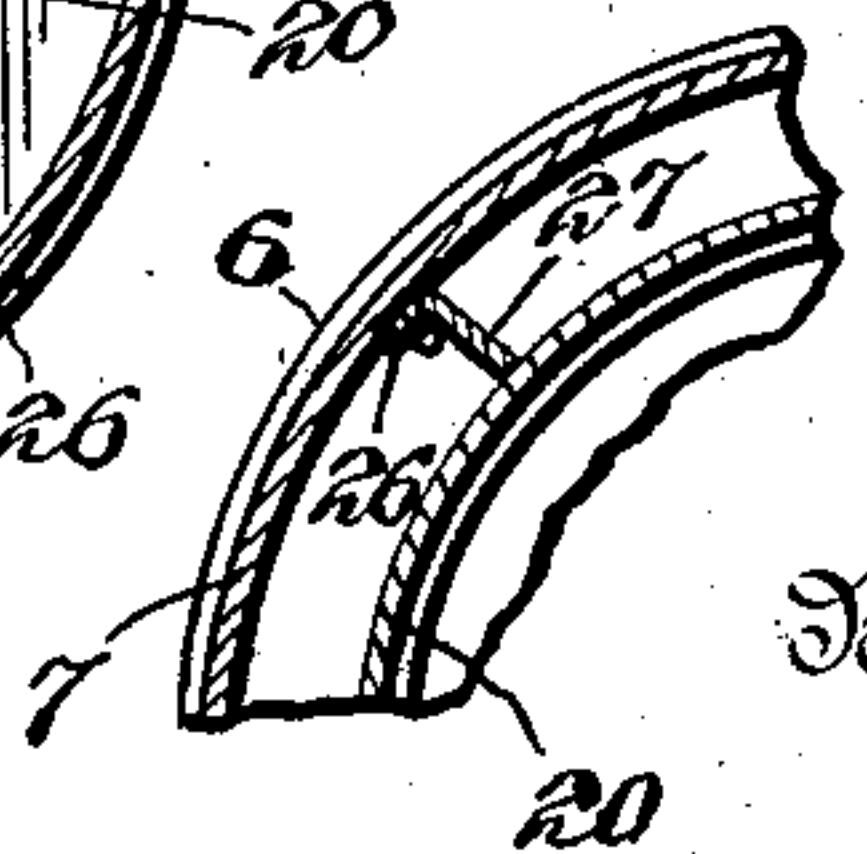


Fig. 5.



By

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UNITED STATES PATENT OFFICE.

EDWIN S. CLOWER, OF PHILADELPHIA, PENNSYLVANIA.

GAS-FURNACE.

SPECIFICATION forming part of Letters Patent No. 723,514, dated March 24, 1903.

Application filed September 29, 1902. Serial No. 125,230. (No model.)

To all whom it may concern:

Be it known that I, EDWIN S. CLOWER, a citizen of the United States, residing at Germantown, in the county of Philadelphia and State of Pennsylvania, have invented a new and useful Gas-Furnace, of which the following is a specification.

This invention relates to hot-air furnaces for hot-air heating systems, and has for its object to provide an improved furnace of this character which is adapted for burning ordinary illuminating-gas as a fuel.

It is furthermore designed to have the air first heated within the body of the furnace and then conducted by outlet-pipes to the usual service-pipe systems for conducting the heated air to points remote from the furnace.

Another object is to provide a large heat-radiating surface and a correspondingly large hot-air chamber in a comparatively small furnace.

A still further object is to provide for effectually supplying moisture to the heated air, so as to overcome the objection to dry hot air.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a side elevation of a gas-burning furnace constructed and arranged in accordance with the present invention. Fig. 2 is a longitudinal sectional view thereof. Fig. 3 is a cross-sectional view taken through the top portion of the furnace on the line 3 3 of Fig. 2. Fig. 4 is a similar view taken through the lower portion of the furnace on the line 4 4 of Fig. 2. Fig. 5 is a detail sectional view taken on the line 5 5 of Fig. 2.

Like characters of reference designate corresponding parts in all the figures of the drawings.

In carrying out the present invention there is provided a base 1 in the form of a cylindrical

dical grating or other perforate construction whereby fresh cold air may have access to the hot-air chamber of the furnace, as will be hereinafter described. This base has an open top and while not necessary is preferably provided with a bottom 2, and in one side of the base is an opening 3, whereby access may be had to the burner for lighting the same. When the bottom plate 2 is employed, it is provided with an upstanding concentric flange 4 to form a seat for the removable reception of the lower end of the combustion-chamber. At the top of the base there is an outwardly-directed peripheral flange 5, from the outer edge of which rises an upstanding cylindrical rim 6, which co-operates to form a peripheral seat for the upstanding cylindrical shell 7, that forms the body or outer casing of the furnace.

The lower end of the shell or casing 7 is removably supported upon the top of the base and is provided with a flat inwardly-directed peripheral flange 8, which has an upstanding rim 9 rising from its inner edge. The upper end of the shell is closed by means of a flanged removable top 10, which is provided with a central opening 11.

Located concentrically within the shell 7 is a combustion-chamber 12, consisting of an upstanding shell, the lower end of which is supported upon the bottom 2 of the base and is also removably and snugly fitted within the flange 4, whereby the shell is centered within the furnace and is held against displacement. At its top the shell 12 is provided with a cover 13.

Within the bottom of the combustion-chamber 12 is a gas-burner 14, consisting of a pipe-coil having its top perforated, with a supply-pipe 15 piercing the sides of the base and the combustion-chamber and communicating with a source of supply. (Not shown.) At a point in line with the opening 3 in the side of the base a damper-door 16 is provided in the side of the combustion-chamber, whereby access may be had to the burner for lighting the same, and the required supply of air is conducted to the burner.

While not absolutely essential it is desirable to have the flame and heated products of combustion maintained as close as possible to the inner walls of the combustion-cham-

ber, and therefore I employ a deflector consisting of a hollow closed cylinder 17, forming an interior dead-air space and located concentrically within the combustion-chamber, with its
 5 lower tapered end 18 projected downwardly through the center of the burner-coil 14, with its upwardly and outwardly flared sides overhanging the burner, thereby to deflect the flame outwardly into intimate contact with
 10 the walls of the combustion-chamber. There is of course an annular space between the cylindrical body portion of the deflector and the walls of the combustion-chamber, so as to permit of the free ascent of the heated products of combustion, and said deflector extends
 15 throughout the greater part of the length of the combustion-chamber, so as to confine the heated products of combustion in intimate contact with the walls of said chamber, but
 20 is terminated short of the top of the chamber, so as to provide an unobstructed space between the top of the deflector and the top of the chamber. The bottom of the deflector rests upon the bottom of the base as a support, while the upper portion of the deflector
 25 is provided with outwardly-directed spacing projections 19, which frictionally engage the walls of the combustion-chamber, so as to center the deflector therein without materially interfering with the free circulation of
 30 the products of combustion.

Surrounding the combustion-chamber and disposed substantially midway between the same and the external casing 7 is a hot-air
 35 chamber formed by the upstanding shell 20, which has its lower end removably supported upon the flange 8 of the external casing and snugly embracing the upstanding rim 9, the upper end of the shell being terminated short
 40 of the top of the casing and provided with a top or closure 21, which is disposed above the top of the combustion-chamber. It will here be noted that the flange 8 at the bottom of the external shell 7 terminates short of the
 45 combustion-chamber, whereby the hot-air chamber is open at its bottom, so as to receive an adequate supply of fresh cold air which passes inwardly through the perforate or grating base. The space between the hot-
 50 air chamber and the external shell 7 is a smoke-chamber, communication being had therewith from the combustion-chamber by means of upstanding flues 22, which pierce the top of the combustion-chamber and also
 55 pass through the top of the hot-air chamber, and thereby communicate directly with the smoke-space between the tops of the hot-air chamber and the external shell. This smoke-space is divided into compartments by means
 60 of radial partitions 23, preferably four in number, which extend from the central flue or pipe 24, which pierces the tops of the hot-air chamber and the external shell, so as to carry the hot air to the branch or main supply
 65 pipes 25 for conducting the heated air to the pipe system and thence to remote points. As plainly indicated in Fig. 3, it will be seen

that the radial partitions 23 have their outer ends provided with flanges 26, which are riveted or otherwise connected to the shell, 70 and at the outer edges of the partitions are pendent extensions 27, which fit snugly between the external shell and the hot-air chamber 20, so as to form individual upstanding smoke-flues, the extensions being terminated short of the bottom of the external shell 75 in order that all of the flues may communicate with the unobstructed annular space between the external shell and the hot-air chamber, there being a suitable smoke-pipe 80 28 piercing the external shell at a point below the ends of the partitions 27, so as to carry off the smoke and products of combustion.

Upon the top of the furnace is a water-tank 29, which is supported upon suitable legs 30 85 and is provided with upstanding pipes 31, which pierce the top of the tank and also pierce the under sides of the hot-air pipes 25, thereby to supply the desired moisture to the heated air after it has passed from the furnace and entered the supply-pipes 25. There 90 is a suitable filling-opening in the top of the tank, and said opening is provided with a removable closure 32.

In the construction of the present furnace 95 it is preferred to form the base of cast metal, with the several shells formed of sheet metal and removably supported upon the base, whereby the furnace may be readily set up 100 and taken apart, and should any of the shells burn out they can be readily replaced. Furthermore, the deflector 17 may be removed should it be found unnecessary in any particular case. By arranging the hot-air space concentrically between the combustion-chamber 105 and the smoke-chamber a very large heat-radiating surface is provided and a correspondingly large hot-air chamber is obtained.

A very important feature of the present furnace resides in the fact that no gas can 110 escape into the hot-air chamber, as the combustion-chamber is entirely closed, and as the hot-air chamber is thus entirely free from gas and products of combustion it is impossible for noxious gases to be conducted into 115 the rooms of the building with the hot air.

What is claimed is—

1. In a furnace, the combination of inner, outer and intermediate concentric combustion smoke and hot-air chambers, of which 120 the smoke-chamber is closed at its lower end and the hot-air chamber is open at its lower end for receiving fresh air, the tops of the chambers being closed with the top of the hot-air chamber disposed above that of the combustion-chamber and the top of the smoke-chamber above that of the hot-air chamber, flues piercing the tops of the combustion and hot-air chambers and communicating from the former to the smoke-chamber, and a hot- 130 air pipe leading from the hot-air chamber.

2. In a hot-air furnace, the combination of a central combustion-chamber, a hot-air chamber surrounding the combustion-cham-

ber and rising above the latter, a smoke-chamber surrounding the hot-air chamber and rising above the same, the tops of the several chambers being closed, with the upper portion of the combustion-chamber in communication with the top of the smoke-chamber, a hot-air pipe leading from the hot-air chamber and piercing the top of the smoke-chamber, radial partitions in the top of the smoke-chamber and leading from the hot-air pipe, the outer ends of the partitions being provided with pendent extensions fitting snugly between the walls of the hot-air chamber and the smoke-chamber and terminating short of the bottom of the latter, and a smoke-pipe piercing the smoke-chamber at a point below the lower ends of the extensions of the partitions.

3. In a hot-air furnace, the combination of a central combustion-chamber, a hot-air chamber surrounding the same with its upper end closed and disposed above the top of the combustion-chamber and also having an open lower end for the reception of fresh air, a smoke-chamber surrounding the hot-air chamber with its lower end closed and its upper end also closed and disposed above the top of the hot-air chamber, flues leading from the top of the combustion-chamber to the top of the smoke-chamber, a hot-air pipe leading from the top of the hot-air chamber and centrally piercing the latter and the top of the smoke-chamber, radial partitions leading from the hot-air pipe to the outer walls of the smoke-chamber and disposed between the respective flues leading from the combustion-chamber to the smoke-chamber, pendent extensions at the outer ends of the partitions and terminated short of the bottom of the smoke-chamber, whereby the latter is divided into vertical compartments, and a smoke-pipe piercing the smoke-chamber at a point below the lower ends of the extensions of the partitions.

4. In a hot-air furnace, the combination with a hollow perforate base with an open top and a peripheral seat at its upper end, of a shell supported in the seat and provided with an inner peripheral flange at its lower end, said lower end being otherwise open, an upstanding shell which is closed at the top and open at the bottom with its lower end supported upon the flange of the outer shell, a combustion-chamber disposed within the inner shell and provided with a closed top, flues leading from the top of the combustion-chamber to the top of the smoke-chamber between the inner and outer shells, a smoke-pipe leading from the smoke-chamber, and a hot-air pipe leading from the hot-air chamber between the inner shell and the combustion-chamber.

5. In a hot-air furnace, the combination of a hollow perforate base having an open top and an opening in one side thereof, a combustion-chamber supported centrally within the base, a damper-door in one side of the combustion-

chamber and alined with the opening in the base, a hot-air chamber surrounding the combustion-chamber with its lower end in communication with the interior of the base, a smoke-chamber surrounding the hot-air chamber and supported upon the base, a smoke-pipe leading from the smoke-chamber, and a hot-air pipe leading from the hot-air chamber.

6. In a hot-air furnace, the combination of a combustion-chamber, a burner-coil located at the bottom of the combustion-chamber, a deflector consisting of a hollow closed shell forming an interior dead-air space and extending upward from the bottom of the combustion-chamber throughout the greater part of the length of the same, its lower end being arranged within the burner, and a hot-air chamber surrounding the combustion-chamber, substantially as described.

7. In a hot-air furnace, the combination of a perforate base having an open top, a combustion-chamber supported within the base, a burner-coil within the bottom of the combustion-chamber, a deflector disposed centrally within the combustion-chamber with its lower downwardly-tapered end projected through the burner-coil and its sides rising substantially parallel with the walls of the chamber and terminating short of the top thereof, an external casing surrounding the combustion-chamber and supported upon the base, with an inner annular flange at the bottom of the casing and terminated short of the combustion-chamber, a hot-air shell supported upon the flange with its upper closed end disposed between the top of the combustion-chamber and the top of the outer casing, flues piercing the tops of the combustion-chamber and hot-air shell and leading from the interior of the combustion-chamber to the smoke-space between the hot-air shell and the outer casing, a hot-air pipe centrally piercing the tops of the hot-air shell and the outer casing, radial partitions extending from the hot-air pipe to the sides of the outer casing and provided with pendent extensions disposed between the hot-air shell and the outer casing and terminated short of the lower ends thereof, and a smoke-pipe piercing the outer casing at a point below the lower ends of the extensions of the partitions.

8. In a hot-air furnace, the combination of a combustion-chamber, a hot-air chamber, a hot-air pipe leading from the hot-air chamber and piercing the top of the furnace, branch pipes leading from the hot-air pipe and disposed above the top of the furnace, a water-receptacle supported upon the top of the furnace and below the branch pipes, and upstanding pipes leading from the top of the water-tank to the respective branch pipes for supplying moisture to the heated air.

9. In a hot-air furnace, the combination of an upstanding combustion-chamber, a hot-air chamber surrounding the combustion-cham-

ber and rising above the top thereof, a smoke-chamber surrounding the hot-air chamber and rising above the top of said chamber, flues piercing the tops of the combustion-chamber
5 and the hot-air chamber and leading from the former to the smoke-chamber, an upstanding hot-air pipe centrally piercing the tops of the hot-air chamber and the smoke-chamber and rising above the latter, branch pipes lead-
10 ing from the hot-air pipe, a water-tank supported upon the top of the smoke-chamber and surrounding the upstanding hot-air pipe, and upstanding pipes leading from the top of the water-tank to the branch pipes for sup-
15 plying moisture thereto.

10. In a hot-air furnace, the combination of a casing, a hot-air pipe extending from the casing, and an exteriorly-arranged closed water-receptacle communicating with the hot-air

pipe at a point above the level of the water, 20 substantially as described.

11. In a hot-air furnace, the combination of a casing, a hot-air pipe extending from the casing at the top thereof and provided with branches, a closed water-receptacle located 25 above the casing and supported by the hot-air pipe, and short pipes extending upward from the water-receptacle and communicating with the same and with the branches of the hot-air pipe, substantially as described. 30

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

EDWIN S. CLOWER.

Witnesses:

GEO. MECKE,

EDMUND B. SEYMOUR.