No. 767,614. PATENTED AUG. 16, 1904.

F. WARNER.

HOT AIR FURNACE.

APPLICATION FILED JULY 22, 1903.

NO. MODEL. 2 SHEETS—SHEET 1.

Fig. 3.

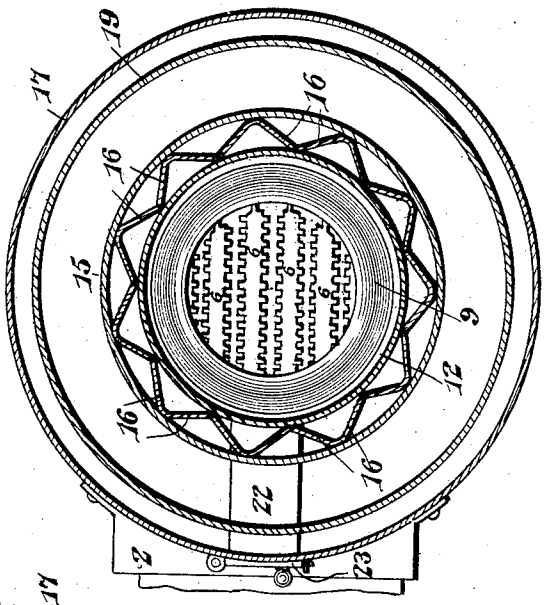
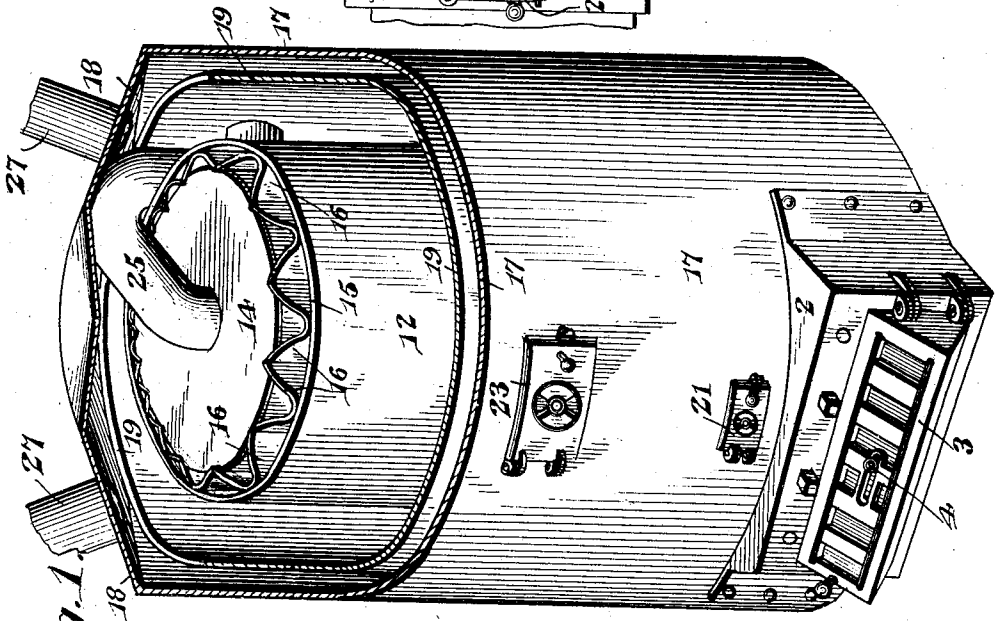



Fig. 1.




Witnesses
Jas. L. McCathran
H. J. Riley

Frederick Warner Inventor

By E. G. Siggers

Attorney

No. 767,614. PATENTED AUG. 16, 1904.

F. WARNER.

HOT AIR FURNACE.

APPLICATION FILED JULY 22, 1903.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

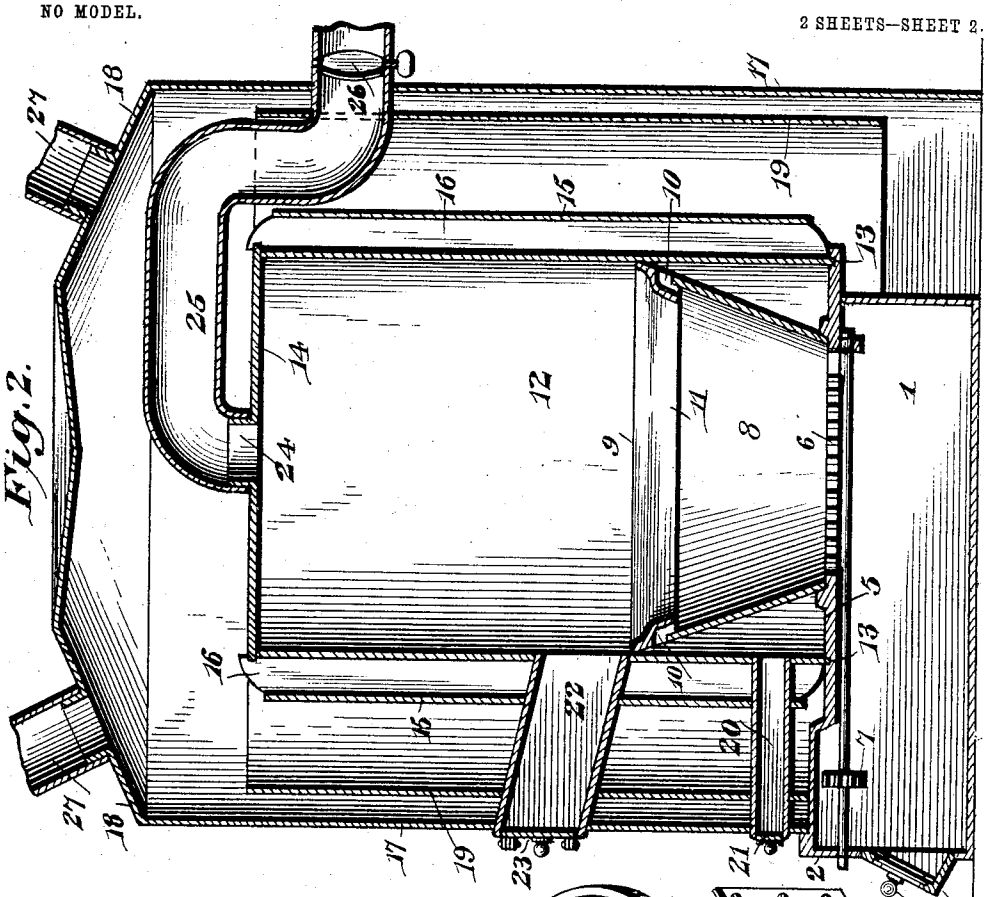



Fig. 4.

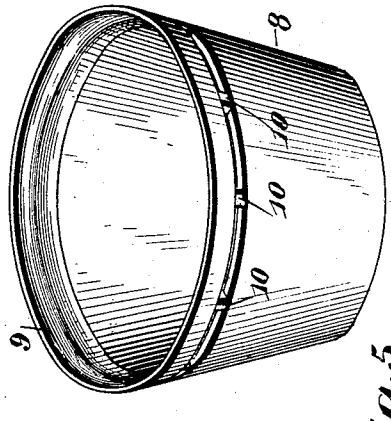
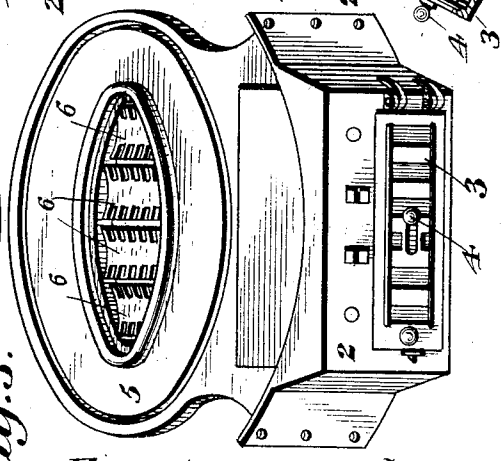



Fig. 5.




Witnesses
Jas. F. McCathran
T. F. Riley

Frederick Warner, Inventor
By C. G. Siggers
Attorney

No. 767,614. Patented August 16, 1904.

# UNITED STATES PATENT OFFICE.

FREDERICK WARNER, OF GNADENHUTTEN, OHIO.

## HOT-AIR FURNACE.

SPECIFICATION forming part of Letters Patent No. 767,614, dated August 16, 1904.

Application filed July 22, 1903. Serial No. 166,627. (No model.)

*To all whom it may concern:*

Be it known that I, FREDERICK WARNER, a citizen of the United States, residing at Gnadenhutten, in the county of Tuscarawas and State of Ohio, have invented a new and useful Hot-Air Furnace, of which the following is a specification.

The invention relates to improvements in hot-air furnaces.

The object of the present invention is to improve the construction of hot-air furnaces and to provide a simple and inexpensive one designed for heating buildings and adapted to present a maximum amount of heating and radiating surfaces and capable of affording a maximum amount of hot air at the expenditure of a minimum amount of fuel.

With these and other objects in view the invention consists in the construction and novel combination and arrangement of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended, it being understood that various changes in the form, proportion, size, and minor details of construction within the scope of the claims may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a perspective view of a hot-air furnace constructed in accordance with this invention, a portion of the outer casing and the lining thereof being broken away to illustrate the construction of the hot-air drum or radiator. Fig. 2 is a central vertical sectional view of the hot-air furnace. Fig. 3 is a horizontal sectional view of the same. Fig. 4 is a detail perspective view of the fire-pot. Fig. 5 is a similar view of the base of the hot-air furnace, illustrating the arrangement of the grate-bars.

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

1 designates the base of the furnace, constituting the ash-pit and consisting, preferably, of a casting, as clearly illustrated in Fig. 5 of the drawings. The ash-pit is approximately rectangular in horizontal section, and it has an extended front portion 2 arranged at the front of the furnace and provided with a door 3. The door 3, which is hinged, affords access to the ash-pit and is preferably provided with a suitable damper 4 to assist in controlling the draft. The ash-pit is provided at the top with a circular opening, and it has an annular seat 5, surrounding the same. A series of pivoted grate-bars 6 is arranged at the opening at the top of the ash-pit, as clearly shown in Figs. 2 and 5, and these grate-bars, which are journaled in suitable bearings, are connected by gears 7 and may be operated by any suitable means. The grate-bars are preferably removable by being inverted and forced inward to disengage their front ends, and they are then dropped downward and drawn outward to disengage their rear ends and to remove them. The rear bearings of the grate-bars are made sufficiently large to permit this operation.

Mounted upon the ash-pit is a downwardly-tapered fire-pot 8, and arranged upon the upper edge of the latter is a ring forming a cap-piece 9, provided at intervals with supporting-lugs 10, which space the ring from the upper edge of the fire-pot and provide an annular air-passage. The air-passage through the space or passage between the upper edge of the fire-pot and the ring 9 is to support combustion, and air may also be admitted at the base of the fire-pot through the apertures of the door 3. The ring, which presents an inwardly-inclined outer face, has a depending inner inclined flange 11, which extends downward within the fire-pot to a point below the upper edge of the said fire-pot. The upper edge of the ring fits against the inner face of the cylindrical portion of a heating-drum or radiator 12, which is fitted upon the ash-pit in an annular groove 13 of the circular or annular seat 5. The heating-drum or radiator 12 consists of the said cylindrical body portion and a horizontal top 14, and the ring 9, which fits against the interior of the body portion of the heating-drum or radiator, closes the space at the top of the fire-pot and causes the air to pass downward and inward through the intervening space between the upper edge of the fire-pot and the superimposed ring.

The hot-air drum or radiator extends from the top of the ash-pit, and the body portion consists of a single piece of sheet metal, as clearly illustrated in Fig. 2 of the drawings, and it thereby dispenses with cement joints and the like, and there is no liability of the escape of coal-gas. The top of the heating-drum or radiator will in practice be securely riveted to the cylindrical body portion. The heating-drum or radiator is provided with an annular series of flues formed by a sheet-metal jacket 15 and an annular series of upright approximately V-shaped partitions 16, arranged as shown in Fig. 3 and interposed between the body portion of the heating-drum or radiator and the jacket 15 and supporting the latter. These upright partitions besides forming the annular series of flues serve to conduct the heat to the outer jacket, which also operates to heat the air within an outer casing 17. The outer casing, which consists of a cylindrical body portion and a connecting top 18, is provided with an inner cylindrical lining 19, which may be supported in any desired manner and which prevents the heat from being radiated from the furnace and which also forms radiating-surfaces for heating the air within the outer casing.

The furnace is provided at the front above the ash-pit with a horizontal draft tube or flue 20, preferably rectangular in cross-section, and provided at the front with an exteriorly-arranged door 21. The door 21 is provided with suitable apertures, and it has a pivoted plate or damper for controlling the draft through the same, and it may be opened to increase the draft. Air enters the horizontal draft tube or flue 20 and passes into the annular space surrounding the fire-pot and becomes heated. It then passes over the upper edge of the fire-pot and enters the latter, and by this arrangement a positive draft is effected, and the combustion may be readily controlled. An inclined tubular chute 22 is arranged above the draft tube or flue 20 for enabling the furnace to be supplied with fuel. The fuel-chute 22 is provided at its outer end with a door 23, having suitable means for controlling the draft. The draft tube or flue and the fuel-chute pierce the outer casing, the cylindrical lining thereof, and the adjacent side of the radiator, as clearly shown in Fig. 2.

The heating-drum or radiator is provided with a central flanged aperture 24, which receives a smoke-pipe 25, and the latter extends rearward over the top of the radiator and downward between the same and the lining of the outer casing. The smoke-pipe pierces the lining or casing at a point below the top of the radiating or heating drum and is provided at the exterior of the casing with a suitable damper or cut-off 26. The top of the outer casing is provided with hot-air-supply pipes 27, which are designed to extend to the apartments or rooms to be heated.

Cold air may be admitted to the space between the radiator and the outer casing by any suitable means, as will be readily understood. The casing or lining, which is concentric with the cylindrical portion of the outer casing, is spaced from the same and terminates short of the top and bottom thereof. The jacket 15, which is concentric with the body portion of the drum, terminates short of the top and bottom of the same.

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

1. In a furnace of the class described, the combination of a fire-pot, a body spaced from and surrounding the fire-pot, and a superimposed cap-piece fitted against the body and provided with lugs resting against the fire-pot, said cap-piece being also provided with a depending flange fitting within and extending below the fire-pot and spaced therefrom, substantially as described.

2. In a furnace of the class described, the combination of a tapered fire-pot, a cylindrical body spaced from and surrounding the fire-pot, and a superimposed ring fitted against the body and provided with lugs resting upon the fire-pot, said ring being also provided with a flange fitting within and depending below the upper edge of the fire-pot and spaced therefrom, substantially as described.

3. In a furnace, the combination of a casing, a fire-pot, a combined heating-drum and radiator comprising a body portion surrounding the fire-pot and spaced therefrom to form an interspace, the latter communicating with the interior of the fire-pot, a jacket surrounding the body and spaced therefrom, the space being provided with a series of flues, and a top closing the upper end of the body and terminating short of the flues, and a flue piercing the combined drum and radiator and communicating with the space between the same and the fire-pot and with the exterior of the furnace, substantially as described.

4. In a furnace of the class described, the combination of an ash-pit provided with an annular seat, a fire-pot mounted upon the ash-pit, a combined heating-drum and radiator closed at the top and mounted on the annular seat of the ash-pit and having a projecting series of upright flues, a ring mounted within the combined drum and radiator and fitted against the same and spaced from the upper edge of the fire-pot, an outer casing having an inner lining, and a draft tube or flue piercing the outer casing, the lining, and the combined heating-drum and radiator and communicating with the space surrounding the fire-pot, substantially as described.

5. In a furnace of the class described, the combination of an ash-pit provided with an annular seat and having an annular groove concentric with the said seat, a fire-pot supported by the said seat, a combined drum and

radiator composed of an inner body portion fitted in the annular groove and surrounding the fire-pot, an outer jacket spaced from the body portion and terminating short of the lower end thereof, a continuous series of approximately U-shaped partitions arranged in the space between the body portion and the outer jacket and supporting the latter, an outer casing, and an inner lining arranged adjacent to the outer casing and terminating short of the top and bottom thereof, said lining being interposed between the said outer casing and the combined drum and radiator and extending from the top to the bottom of the latter, substantially as described.

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

FREDERICK WARNER.

Witnesses:

WILLIAM WARNER,

FRANK WOLFE.