

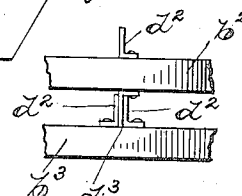
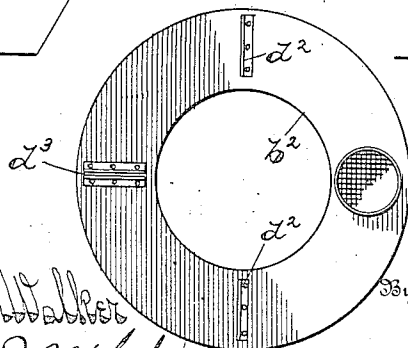
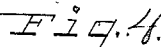
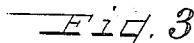
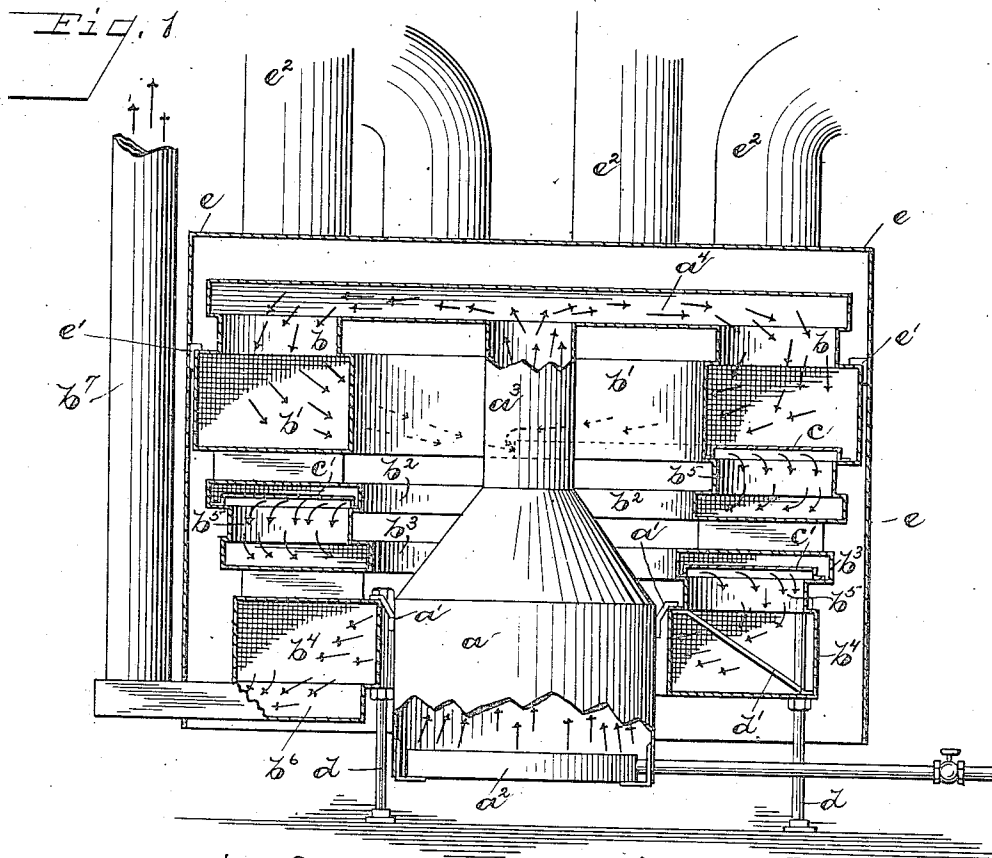
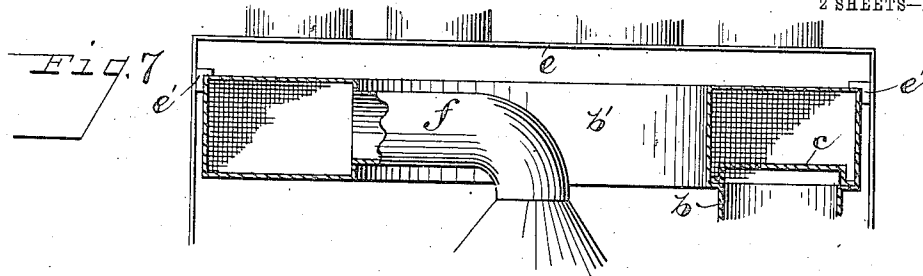
No. 816,276.

PATENTED MAR. 27, 1906.

R. S. THOMPSON.
GAS FURNACE.

APPLICATION FILED NOV. 23, 1904.

2 SHEETS—SHEET 1.



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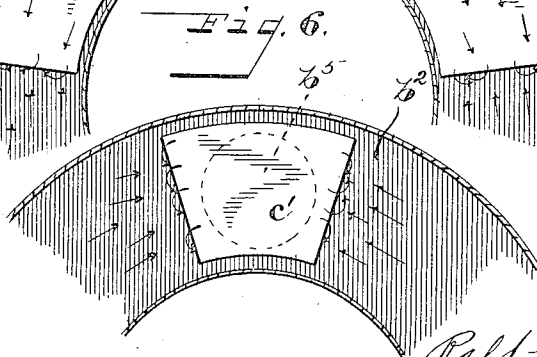
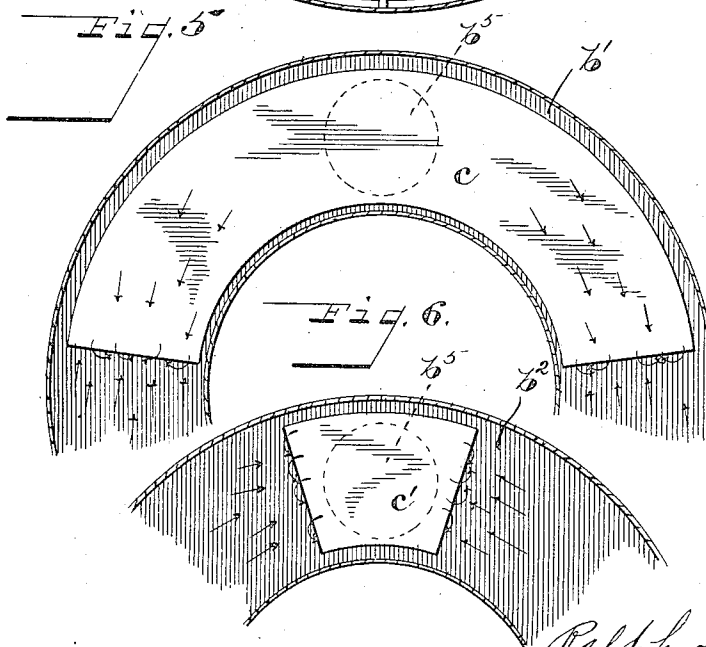
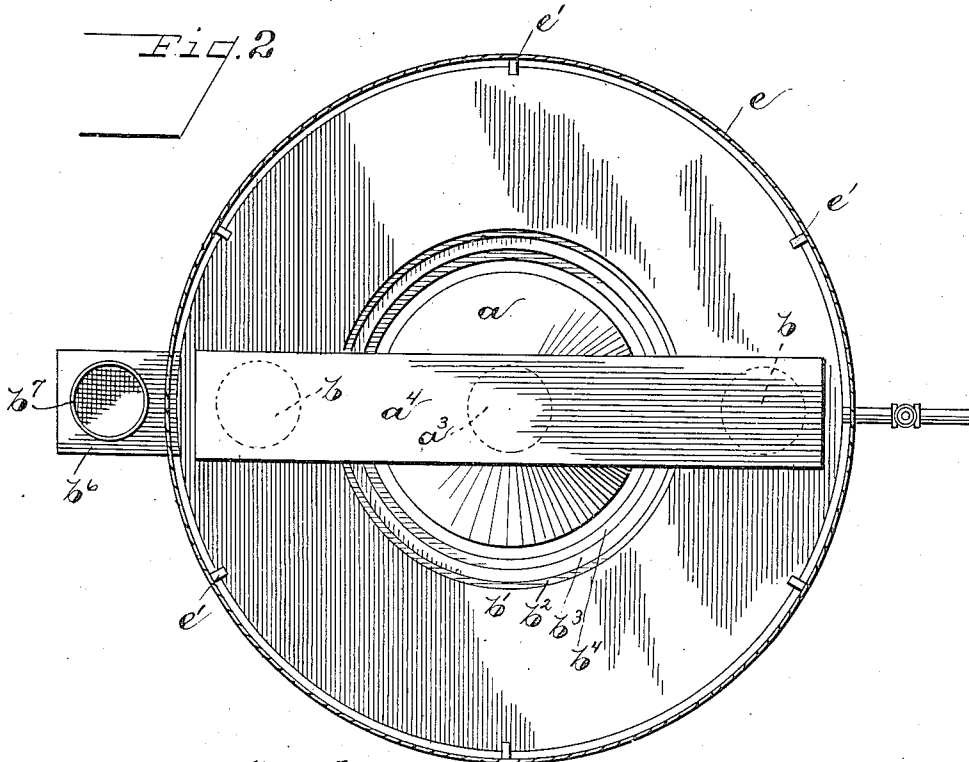
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2 SHEETS—SHEET 2.



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GAS-FURNACE.

No. 816,276.

Specification of Letters Patent.

Patented March 27, 1906.

Application filed November 23, 1904. Serial No. 233,982.

To all whom it may concern:

Be it known that I, RALPH S. THOMPSON, a citizen of the United States, residing at Springfield, in the county of Clark and State of Ohio, have invented certain new and useful Improvements in Gas-Furnaces, of which the following is a specification.

My invention relates to heating apparatus, and particularly to such apparatus designed to use gas as fuel.

The object of my invention is to provide a simple compact structure cheap in construction and efficient in operation, by means of which a high percentage of the heat units usually lost by escape through the chimney may be utilized. This is accomplished by the arrangement of the circulation of the smoke and gaseous products of combustion on the way to the chimney and of the air as it passes through the furnace-casing on its way to enter the hot-air-distributing pipes. The relation of these is such that all the heat contained in the gaseous products except a small per cent. which is necessary to maintain the draft is taken from them by the air and used to heat the building.

A further object is to provide a structure in which there shall be a more perfect combustion of fuel.

With the above primary and other incidental objects in view my invention consists of the means, construction, and devices or their equivalents hereinafter described, and set forth in the claims.

In the drawings, Figure 1 is a vertical sectional view of the apparatus. Fig. 2 is a plan view, the top of the casing being removed. Fig. 3 is a detail plan view of one of the separator-rings. Fig. 4 is a detail of the supporting and spacing means for the separator-rings. Fig. 5 is a detail of the baffle-plate in the first or uppermost separator-ring. Fig. 6 is a detail of the baffle-plate as used in subsequent separator-rings. Fig. 7 shows modified form of connecting the fire-box with the first of the separator-rings.

Like parts are indicated by similar characters of reference throughout the several views.

In the drawings, *a* is a cylindrical sheet-metal fire-box having a conical top. The fire-box *a* is supported by bracket-arms *a'*, which rest upon the lower or last of the series

of separators hereinafter described. A gas-burner *a²* of any suitable design is secured within the fire-box *a*. A connecting-pipe *a³* extends upwardly from the conical top of the fire-box *a* and in conjunction with a transverse conduit *a⁴* forms a T, by which the products of combustion are delivered through short vertical conduits *b b* into the first separator-ring *b'* at two diametrically opposite points.

The separator-rings *b'*, *b²*, *b³*, and *b⁴* are hollow rings of sheet metal, preferably rectangular in cross-section, but may be formed in other shapes. Each succeeding separator-ring of the series is of slightly-smaller diameter than that of the ring next above it, and the first and last separator-rings are preferably of greater height than the intermediate rings.

The successive separator-rings of the series are connected by short vertical conduits *b⁵*, and the inlet and outlet of each ring are located at diametrically opposite points. Over the outlet of each separator-ring is placed a baffle-plate, as shown in Fig. 1 and in detail in Figs. 5 and 6. The baffle-plate *c* of the first separator-ring *b'* extends substantially half-way around said separator-ring, as in Fig. 5. The object of the extended baffle-plate *c* is to compel the proper circulation of the products of combustion, which may be admitted to this separator-ring from the transverse conduit *a* through the conduit *b* immediately over the outlet-conduit *b⁵*. The course of the products of combustion is fully indicated by the arrows in Fig. 1. Over the outlet of each of the subsequent separator-rings there is a comparatively small baffle-plate *c'*, as shown in detail in Fig. 6.

The lower separator-ring *b⁴* is provided with supports *d* and is at several points braced or trussed by bars *d'*. Each of the separator-rings is supported upon the ring immediately below it and is slightly separated therefrom by spacing devices *d²*, which are preferably L-shaped pieces of sheet metal secured to said rings.

In order that each ring may be properly located and a stable structure formed, each ring is preferably provided at one point with a pair of such spacing devices as shown at *d³*, between the extended arms of which the arm of a spacing device attached to the next suc-

cessive ring is adapted to fit, as illustrated in Fig. 4. Secured to the lowermost separator-ring of the series is a lateral conduit b^6 , communicating with a flue b^7 .

5 Surrounding the structure of fire-box and separator-rings and supported by bracket-arms e' , resting on the uppermost separator-ring b' , is a sheet-metal casing e , which extends downwardly to a point below the lower-
10 most separator, but not entirely to the base of the structure. The casing e is surmounted by a series of hot-air-distributing pipes e^2 , which lead to the various parts of the building.

15 Since the first or upper separator-ring b' is substantially equal in diameter to the casing e and each successive ring of smaller diameter until the last or lower ring is of but slightly-larger internal diameter than that
20 of the fire-box and through the comparatively small intervening spaces between the successive separator-rings, the cold air which enters beneath the lower edge of the casing e on its passage toward the hot-air-distributing
25 pipes e^2 must pass between two adjacent heated surfaces. The air entering below the edge of the casing e first contacts with the lower separator-ring b^4 and extracts any heat which may still remain in the spent products
30 of combustion passing through said ring on their way to the flue. The current of air thus slightly warmed contacts with each successive ring, acquiring additional heat until it reaches the first separator-ring b' , through
35 which are passing the live products of combustion. There the air-current receives a final heating and enters the distributing-pipes at a very high temperature, having in its
40 course extracted from the products of combustion substantially all the heat units contained therein.

In the drawings there are shown but four separator-rings in the series. It is to be understood, however, that the number may be
45 increased or diminished according to the fuel used and its heat-producing qualities, sufficient separator-rings being employed to separate from the products of combustion all heat units except sufficient to maintain the chimney-draft.

50 In Fig. 7 is shown a modified form of connecting the fire-box a with the first separator-ring b' , wherein the transverse conduit a^4 is

omitted and the fire-box and separator connected through an elbow f .

Having thus described my invention, I claim—

1. In a heating apparatus as described, the combination with a casing, an inlet and an outlet therein, of a series of superposed independent separator-rings, the diameters of the
60 successive separator-rings decreasing in regular order from top to bottom; a combustion-chamber, a connection from said combustion-chamber to the uppermost separator-ring, connections between the successive separator-rings and a flue connecting with the lowermost separator-ring whereby the products of
65 combustion will be carried in a downward course through the successive separator-rings, substantially as and for the purpose specified.

2. In a heating apparatus as described, a casing an air-inlet and an air-outlet therein, a series of superposed separator-rings of various
75 diameters, the external diameter of the uppermost separator-ring being substantially equal to the internal diameter of the casing, and the internal diameter of the lowermost separator-ring being approximately
80 equal to the external diameter of the combustion-chamber, and the intermediate separator-rings varying in regular order, each separator-ring being separated from adjacent separator-rings by intervening space; a combustion-chamber, connections from the
85 combustion-chamber to the uppermost separator-ring, connections between successive separator-rings and a flue connecting with the lowermost separator-ring, the whole composing a structure wherein the products
90 of combustion will be conducted in a downward course from the topmost separator-ring through the successive separator-rings to the flue, and wherein the air in its passage from the inlet to the outlet will pass between
95 the adjacent heated surfaces of the separator-rings, substantially as specified.

In testimony whereof I have hereunto set my hand this 16th day of November, A. D. 1904.

RALPH S. THOMPSON.

Witnesses:

CHAS. I. WELCH,

CLIFTON P. GRANT.