

(No Model.)

T. G. NEAL.
HOT AIR FURNACE, &c.

No. 605,329.

Patented June 7, 1898.

Fig. 1.

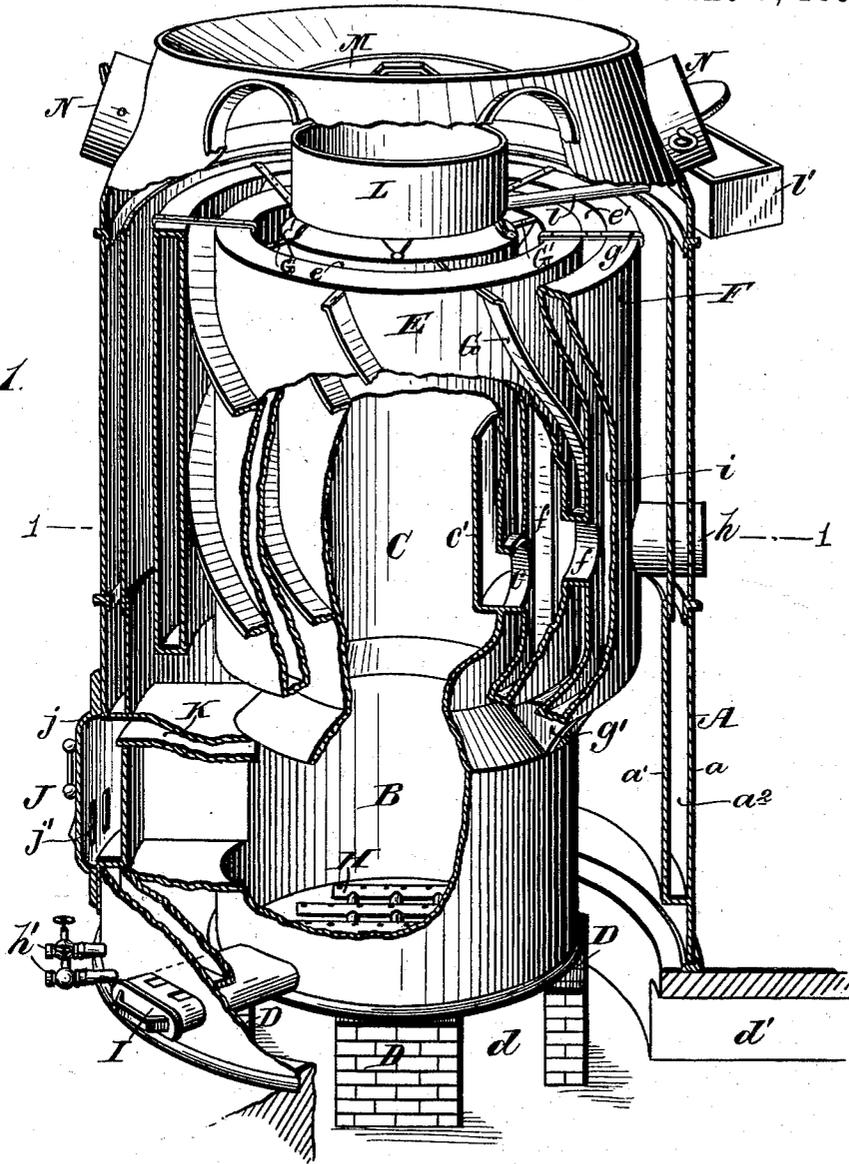
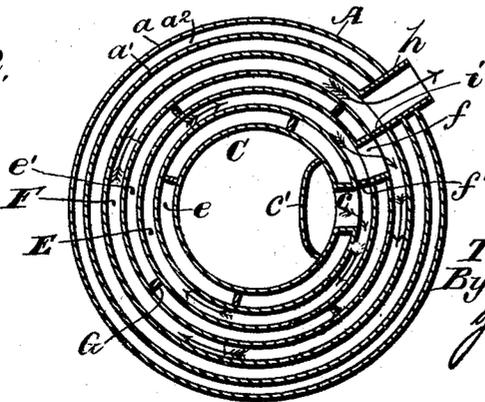


Fig. 2.



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UNITED STATES PATENT OFFICE.

THOMAS G. NEAL, OF WARREN, PENNSYLVANIA.

HOT-AIR FURNACE, &c.

SPECIFICATION forming part of Letters Patent No. 605,329, dated June 7, 1898.

Application filed November 11, 1897. Serial No. 658,166. (No model.)

To all whom it may concern:

Be it known that I, THOMAS G. NEAL, a citizen of Canada, (but having declared my intention to become a citizen of the United States,) residing at Warren, in the county of Warren and State of Pennsylvania, have invented new and useful Improvements in Hot-Air Furnaces, &c., of which the following is a specification.

My invention relates to improvements in hot-air furnaces for heating currents of air to be conducted to the apartments of houses.

The invention relates more particularly to that class of furnaces employing gas, either "natural" or artificial, as a combustion, but with slight obvious changes is equally applicable for use in furnaces employing other combustible material, such as coal, oil, and the like.

My invention consists in a novel construction and arrangement of the air-flues with relation to the heating-drum and heat-radiators, whereby a large heating-surface is presented to the incoming cold air and the same is thoroughly heated before passing out of the furnace to the hot-air flues.

My invention further consists in a novel construction of furnace-door, whereby air is conducted into the top of the combustion-chamber to aid in procuring a more perfect combustion.

My invention further consists in certain details of construction and arrangement of parts, all of which will more fully hereinafter appear.

In the accompanying drawings, Figure 1 represents, in elevation, my improved furnace, certain of the parts being broken away to illustrate the construction; and Fig. 2 is a horizontal section on the line 1 1 of Fig. 1.

The letter A indicates the outer casing of the furnace, which is made of sheet metal. This casing is made double—that is, it has an outer wall *a* and an inner wall *a'*, arranged to form an air-space *a²* between them. Arranged centrally within the casing A is the fire-box or combustion-chamber B and the heating-drum C, which parts may be made in one, as shown. The casing A and combustion-chamber B are suitably mounted and supported at their bottoms on brickwork D in such manner as to provide an air-chamber *d*, connect-

ing with an air-inlet passage *d'* beneath the furnace, the bottom of the casing A being open to admit air into the furnace to be heated.

Surrounding the heating-drum C is a radiator E, an annular air-space *e* being provided between the drum and radiator, within which space and extending from the top to the bottom thereof are arranged a series of deflectors or retarders *G'*. An outlet *c* connects the heating-drum C with the radiator E. A deflector *c'*, secured to the interior of the heating-drum before the outlet *c* and extending upward toward the top of the drum, compels the heated products of combustion to rise to a point near the top of said drum and pass over the deflector before issuing from the outlet *c*. Surrounding the radiator E is a second radiator F, an annular air-space *e'* being provided between the two radiators. An outlet *f* connects radiator E with radiator F. Extending vertically between the walls of the radiator E from top to bottom thereof is a partition *f'*, which is located between the outlets *c* and *f* in such manner that heated products of combustion issuing into radiator E through outlet *c* from the heating-drum have to pass entirely around within said radiator to the other side of partition *f'* before issuing through outlet *f*.

Arranged spirally within the annular space between the radiators E and F and extending from the top to the bottom thereof are a series of deflectors or retarders *G* for the currents of air, which are secured at their tops and bottoms by iron plates *g*, secured in any suitable manner to the deflectors and bolted to the radiators E F. The radiators E F are supported at their bottoms on standards *g'*, secured to the combustion-chamber, and may further be braced laterally, if found necessary or desirable, by any suitable means. (Not shown.)

An outlet *h* leads from the radiator F to the chimney, and a vertical partition *i*, similar to and operating in the same manner as the partition *f'*, is secured in the radiator F between the outlets *f* and *h*.

Supported in the bottom of the combustion-chamber B is the gas-burner H, which may be of any preferred construction and is controlled by the valves *h'*. An air-regulator I

leads through the casing to the combustion-chamber to control the amount of air supplied thereto.

The letter J indicates my improved door, which is hollow and closed at the bottom and open at the top, as indicated at *j*. Near the bottom of the door are draft-openings *j'*.

Supported within the furnace in any suitable manner, as by making the same integral with or otherwise securing it to the combustion-chamber B, is a flat flue K, which is as wide as the inner side of the door J, one open end of which registers with the opening in said door and the other open end of which extends into the combustion-chamber near the top thereof. Air entering the draft-openings *j'* passes upward and out of the opening *j* through the flue K and enters the combustion-chamber at the top thereof, where it aids in securing a more perfect combustion of the gaseous products. By this arrangement the cold air passing through the door and out at its top will also tend to keep the casing above the door cool.

On the dome of the heating-drum I may place a water-pan L, connected by a pipe *l* with a water-pan feed *l'*, located on the outside of the casing. In the top of casing A may be provided a water-pan cover M.

The letters N N indicate the valved outlets for the heated air issuing from the furnace, to which are attached the flues leading to the different apartments of a house.

The operation of the device has been sufficiently indicated in the description to render it clear. It may be stated, however, that cold air being deflected to take a circuitous route between the two heat-radiators E and F by means of the deflectors G will be exposed to a very large heating-surface and will issue from the furnace in a highly-heated condition. By arranging the vertical partitions *f'* between the outlets, as described, I also insure that the heated products of combustion shall impart the greater part of their energy to the cold air before leaving the furnace.

While I have shown and described two ra-

diators, I wish it understood that I may employ any given number, according to the requirements of the case.

It will be noted that the outlets *e*, *f*, and *h* are located in the lower portions of the radiators, whereby an indirect circulation of the products of combustion is provided and the heating capacity of the furnace greatly increased.

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

1. In a hot-air furnace, the combination with the outer casing and inner heating-drum, of a plurality of vertically-disposed radiators encircling said drum and each other, a plurality of deflectors circuitously arranged between said radiators, outlets connecting, respectively, the heating-drum with the adjacent radiator and the radiators with each other and an outlet connecting the outermost radiator with the chimney; said outlets being located in the lower portions of said radiators whereby to provide an indirect circulation of the products of combustion, substantially as described.

2. In a hot-air furnace, the combination with the outer casing and inner heating-drum, of a plurality of vertically-disposed radiators encircling said drum and each other, a plurality of deflectors circuitously arranged between said radiators, outlets connecting, respectively, the heating-drum with the adjacent radiator and the radiators with each other and an outlet connecting the outermost radiator with the chimney, said outlets being located in the lower portions of said radiators, and vertical partitions in each radiator located between the inlet and-outlet openings thereof, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

THOMAS G. NEAL.

Witnesses:

GEO. BALL,
A. G. CARROLL.