

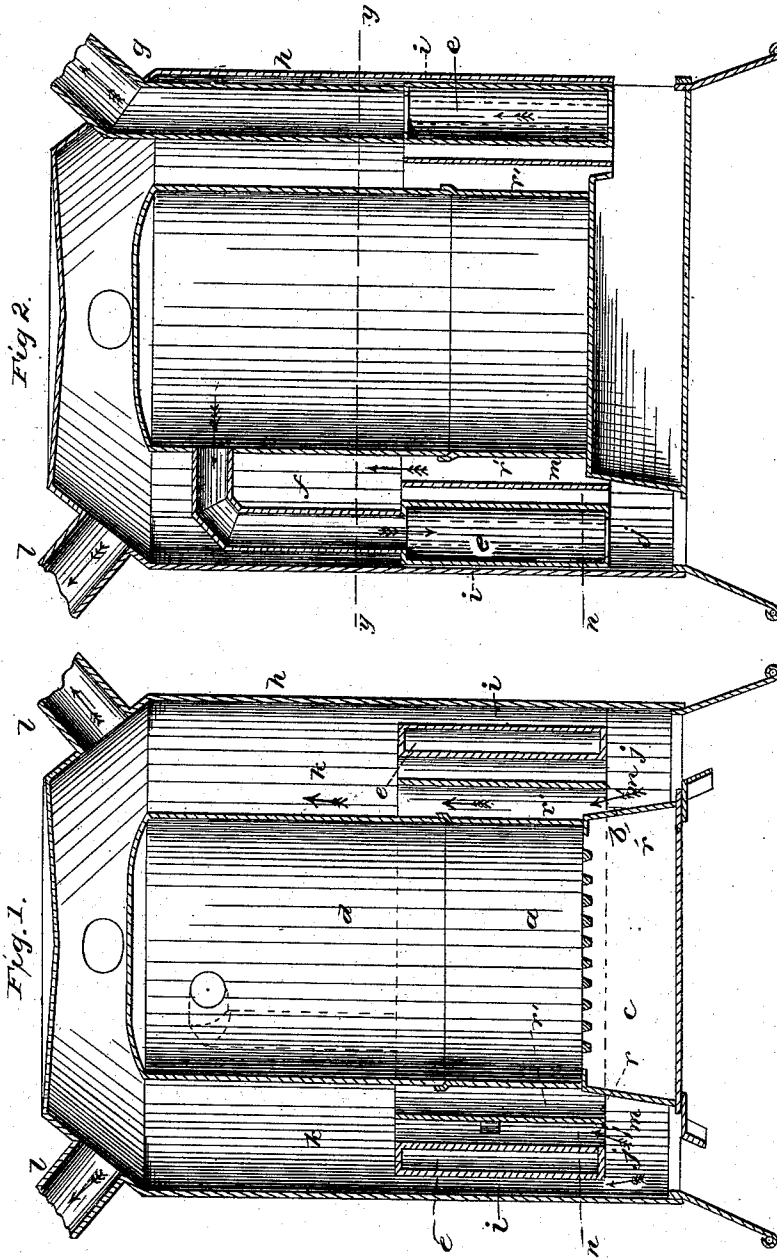
(No Model.)

3 Sheets—Sheet 1.

G. R. BROWN.
HEATING FURNACE.

No. 268,615.

Patented Dec. 5, 1882.



WITNESSES:

Mrs. L. Dietrich
W. E. Bowen

INVENTOR,

Geo. R. Brown
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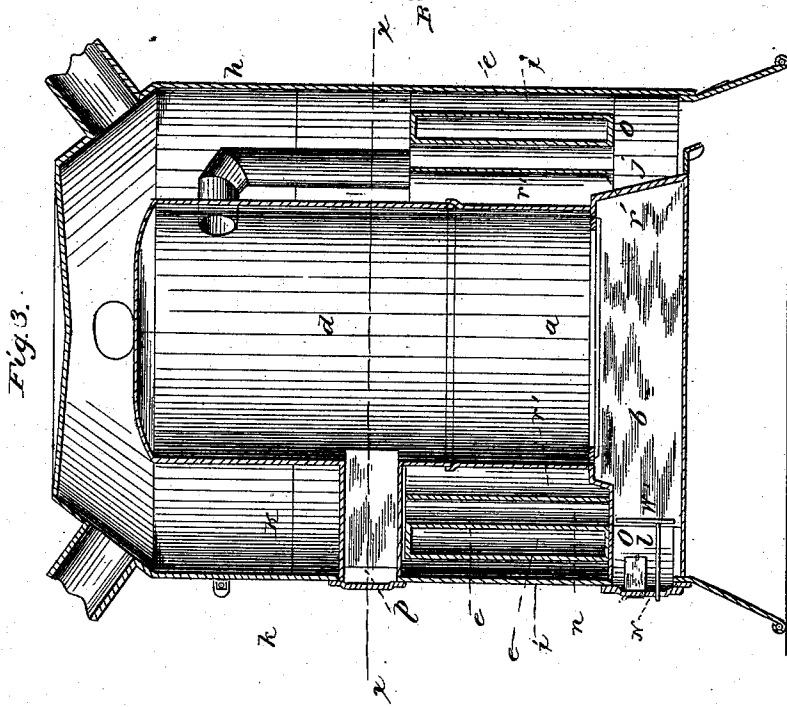
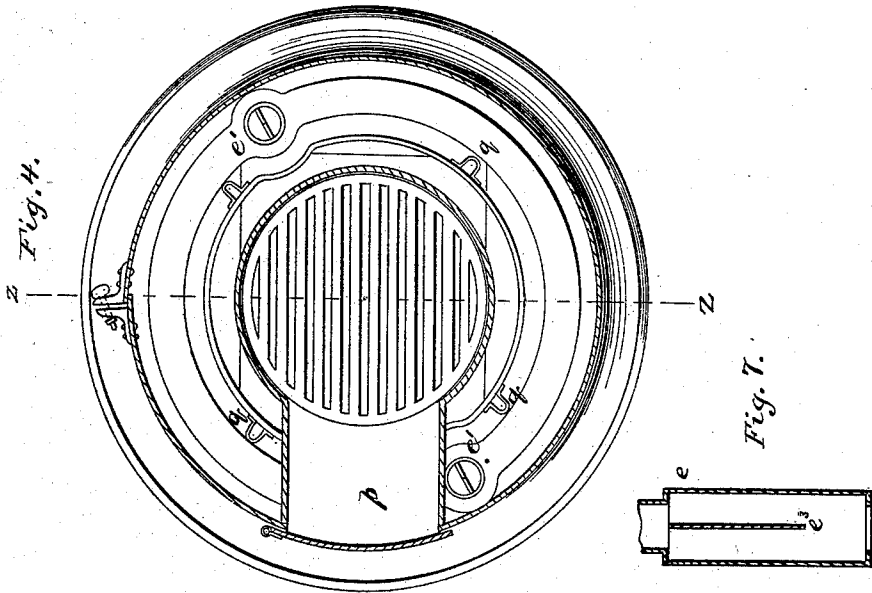
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3 Sheets—Sheet 2.

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HEATING FURNACE.

No. 268,615.

Patented Dec. 5, 1882.



WITNESSES:

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INVENTOR.

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UNITED STATES PATENT OFFICE.

GEORGE R. BROWN, OF CORNING, NEW YORK.

HEATING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 268,615, dated December 5, 1882.

Application filed August 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, GEORGE R. BROWN, a citizen of the United States of America, residing at Corning, in the county of Steuben and State of New York, have invented certain new and useful Improvements in Heating-Furnaces, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to improvements upon my furnace for which Letters Patent were granted to me June 20, 1882, No. 259,806, and has for its object, in common therewith, to admit the cold air in direct lines at the bottom of the furnace in contact with both sides of an auxiliary radiator surrounding the fire-pot, and to pass it directly into the hot-air chamber above the auxiliary radiator. The auxiliary radiator rests upon the ash-pit casting as a separate device, and a fender (also a separate device) is placed between the auxiliary radiator and the fire-pot, so as to rest upon the rear inside corner-bracket supports for said radiator and the front part of the ash-pit casting, for the purpose of forming an open space on the inner side of the auxiliary radiator for the entrance of cold air and to prevent the radiation of heat from the fire-pot and combustion-chamber to the auxiliary radiator. This construction gives three separate and distinct heating-spaces for the ascent of cold air directly from the bottom of the furnace in direct lines into the hot-air chamber at the top of the furnace. While it will be understood that I may make the radiator of any desired width at the top, I preferably make it much narrower thereat than at the bottom, whereby the upper portion will receive the greatest heat from the products of combustion which pass off from the combustion-chamber around through the auxiliary radiator. As in the furnace covered by my Letters Patent, so in this invention, the auxiliary radiator is provided with a valved opening at its front end communicating with the ash-pit, and by opening this valve when shaking the grate the fine ashes and dust will escape from the ash-pit into the radiator, and from thence into the chimney. They are thus prevented from coming out of the opening in

which the shaker-rod works, as the draft will then be upward from the ash-pit directly into the auxiliary radiator.

The distinguishing features of this invention or these improvements will be pointed out in the description to follow and in the claims.

In the accompanying drawings, Figure 1 is a vertical section, shown through the center on line *z z*; and Fig. 2 is a similar view of my furnace, taken through the smoke-pipe of the combustion-chamber on line *y y*. Fig. 3 is a similar section taken through the feed-entrance. Fig. 4 is a horizontal section taken through the feed-entrance. Fig. 5 is a similar section on the line *y y* of Fig. 2; and Fig. 6 represents an elevation, showing the manner of operating the dampers in the ash-pit and ash-pit door and in the smoke-pipe by cords or chains leading from the furnace-room to the room above the furnace to control the heat and draft. Fig. 7 represents a detached part, being a vertical section of radiator, taken on line *s s* of Fig. 5.

The fire-pot *a* is fitted upon an oblong casting, *b*, which forms the ash-pit *c*, and a drum, *d*, suitably fitted upon the fire-pot, forms the combustion-chamber and the radiator proper.

An auxiliary radiator, *e*, forms a separate narrow chamber of circular form, rests upon the ash-pit casting at several points, entirely surrounds the fire-pot, and communicates with the combustion-chamber at one of its enlargements, presently more fully described, by the elbow-pipe *f*, (shown in Fig. 2,) and at its other with the smoke-pipe *g*, (shown in Fig. 2,) so that the products of combustion pass through this narrow chamber and give out their heat to the ascending cold air as it first enters the bottom of the furnace.

A drum or casing, *h*, surrounds the auxiliary radiator, leaving an intervening space, *i*, and forming a cold-air chamber, *j*, entirely around or on all sides of the ash-pit casting, and also forming the hot-air chamber *k* around and over the radiator proper; and with the top of this drum or casing *h* the usual hot-air-flue connections *l* are made.

A fender, *m*, surrounds the fire-pot, is supported by projections from the auxiliary radiator and upon the ash-pit casting, leaving an

intervening space, *n*, between it and the auxiliary radiator.

The auxiliary radiator rests by foot-brackets *o*, projecting from the inner wall of the same, upon the ash-pit casting *b*, and its enlargements *e'* rest, one upon the front part of the ash-pit casting at the side of the feed-entrance *p*, and the other upon said casting at the rear thereof, as seen in Fig. 4. The purpose of these enlargements is to allow the ready passage of the products of combustion thereinto and their easy escape therefrom, and it is held in its proper relation with the ash-pit casting by its connection therewith and with the outer casing, as will be hereinafter described.

The fender *m* separates the radiators, is supported by or upon the foot-brackets *o* of the auxiliary radiator and upon the ash-pit casting *b*, and it is kept in its proper relation to the auxiliary radiator by sheet-iron or other suitable metal brackets, *q*, riveted or bolted to the bottom or top, as shown in Fig. 4. The radiator and fender thus connected and supported, in connection with the outer casing, form the cold-air spaces *i* and *n* on each side of the auxiliary radiator, open at the bottom and delivering the heated air directly into the top chamber, *k*, while openings *r* between the sides of the ash-pit casting and the fender *m* allow the cold air to ascend in the spaces *r'* between the fender and the fire-pot in direct contact with the walls of the latter and of the inner radiator or combustion-chamber, *a*. This construction gives three distinct and separate spaces for the direct ascent of the cold air in contact with heated walls and for the direct entrance of the heated air into the hot-air chamber, thus heating large volumes of air in its direct course to the hot-air-flue conductors.

The enlargements *e'* of the auxiliary radiator are provided at their lower ends with tubes *e''*, having suitable covers at their ends, and which pass through corresponding openings in the outer casing, and serve as clean-outs for the dust collecting at these points, while they also serve to hold the radiator in its proper relation to the ash-pit casting and to the outer casing. Both these enlargements are provided with vertical partitions *e''*, extending downward about two-thirds of the depth of the auxiliary radiator. The object of the partitions in the enlargements of the auxiliary radiator is to divide the smoke and heated air so they will pass around the radiator and out of the discharge-flue freely, and will not affect the momentum of each other, as would be the case if no partitions were placed in the enlargements. It will be seen that by this arrangement the products of combustion will be divided as they leave the elbow and enter the radiator, a portion passing each way around to the exit-pipe, when the oppositely-approaching heat and smoke currents will be deflected out through the other enlargement by its partition. This distribution of the heat and smoke currents

through the radiator thoroughly utilizes their heat, and therefore augments the heating capacity of the furnace.

The bottom of the enlargement of the auxiliary radiator, near the feed-entrance, is provided with an opening, *t*, and the ash-pit-casting top is provided with a corresponding opening, both of which are closed by a valve, *u*, pivoted or sliding within the enlargement, and operated by a rod, *v*, passing out through the covered end of the clean-out tube *e''*, as shown in Fig. 5. The object of this valved connection between the ash-pit and the radiator is to provide for allowing the dust from the ash-pit, when shaking the grate, to be drawn by the draft up into the radiator by opening the dust-flue valve *u* by pushing in or out the valve-rod, so that dust will not escape from the ash-pit through the shaker-rod opening. The ashes collecting in the radiator can be cleaned out through the openings.

I provide for controlling the fire without going into the furnace-room by hanging the damper *W* on the inside of the ash-pit door *x*. The damper *y* on the upper side of the smoke-pipe *g*, the closing of the ash-pit damper, and the opening of the smoke-pipe damper have the effect to check the fire. This latter damper for this purpose is hinged to the outer side of the pipe *g* and arranged over an opening in the upper side of the said pipe *g*, to open outward to prevent the draft through the furnace by admitting cold air in the pipe *g*. The damper on the ash-pit door closes on an incline by its own weight, and the operating chain or rod passes through a hole in the door and over a projection on the inside of the door, and is attached to the damper at a point near the hinges of the door, so that the damper will not be affected by the opening and closing of the door.

The water pot or vessel *p'* is placed by the side and bottom of the ash-pit, at one side of the feed-entrance, and has a spout, *p''*, projecting through an opening in the casing, with a cover, *p'''*, to close the same, so that it may be raised to fill the vessel *p'*.

O O is a joint consisting of two angular brackets, one secured to one edge of the casing and the other secured to its lapping edge, a set-screw, *O'*, being passed through said brackets, which is provided with a thumb-piece at one end, and having the other end working in a nut, *O''*. This joint effects the ready securing of the edges of the casing together and the tightening of the same when necessary.

I claim and desire to secure by Letters Patent—

1. In a hot-air furnace, the combination, with the combustion-chamber and the outer casing, of the auxiliary radiator, circular in form, and having the enlargements, provided with open passages for heat and smoke, disposed one at the side of the feed-entrance and the other at the rear of the furnace, and connecting with

the combustion-chamber and with the smoke flue or pipe, substantially as set forth.

2. In combination, the combustion-chamber having smoke-flue connection with the auxiliary radiator, as described, the auxiliary radiator, circular in form, and connected to discharge smoke-flue, said radiator formed with enlargements partially divided by vertical partitions, substantially as shown and specified.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE R. BROWN.

Witnesses:

E. HOWELL HOWELL,
JOHN W. LYNAHAN.