(No Model.) 3 Sheets—Sheet 1.

G. R. BROWN.

HEATING FURNACE.

No. 259,806. Patented June 20, 1882.

Fig. 2.

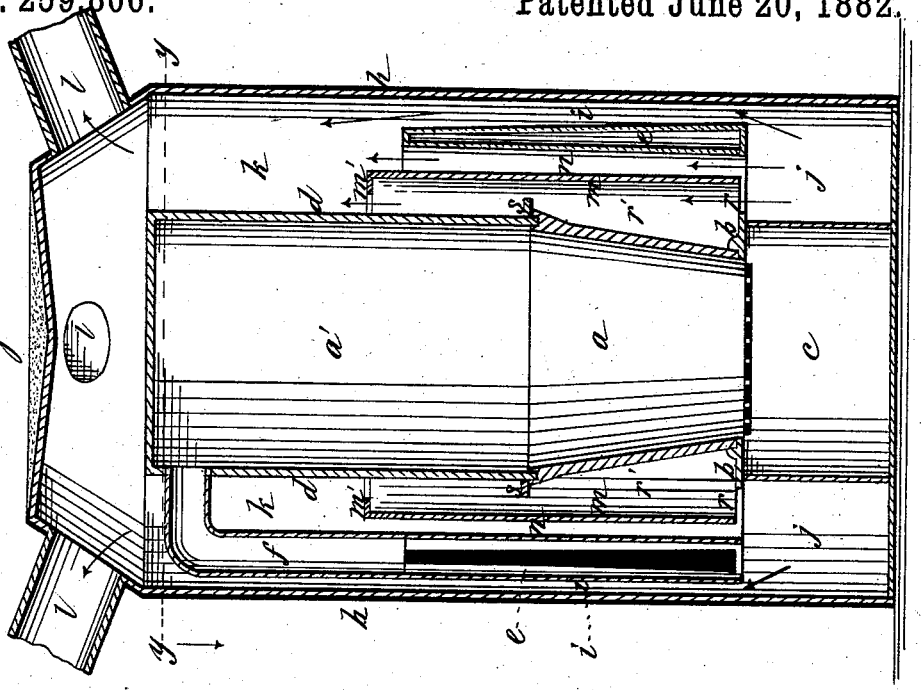
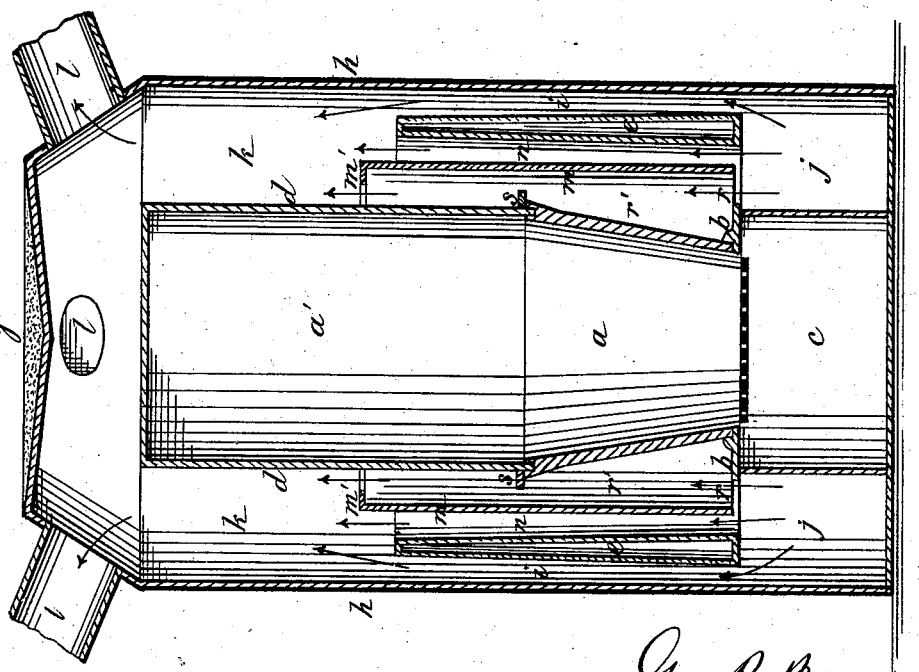


Fig. 1.



Attest;
F. W. Howard
Edmund Brodhag

Geo. R. Brown,
Inventor;
by Johnson and Johnson
Attys

(No Model.) 3 Sheets—Sheet 2.

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Fig. 6.

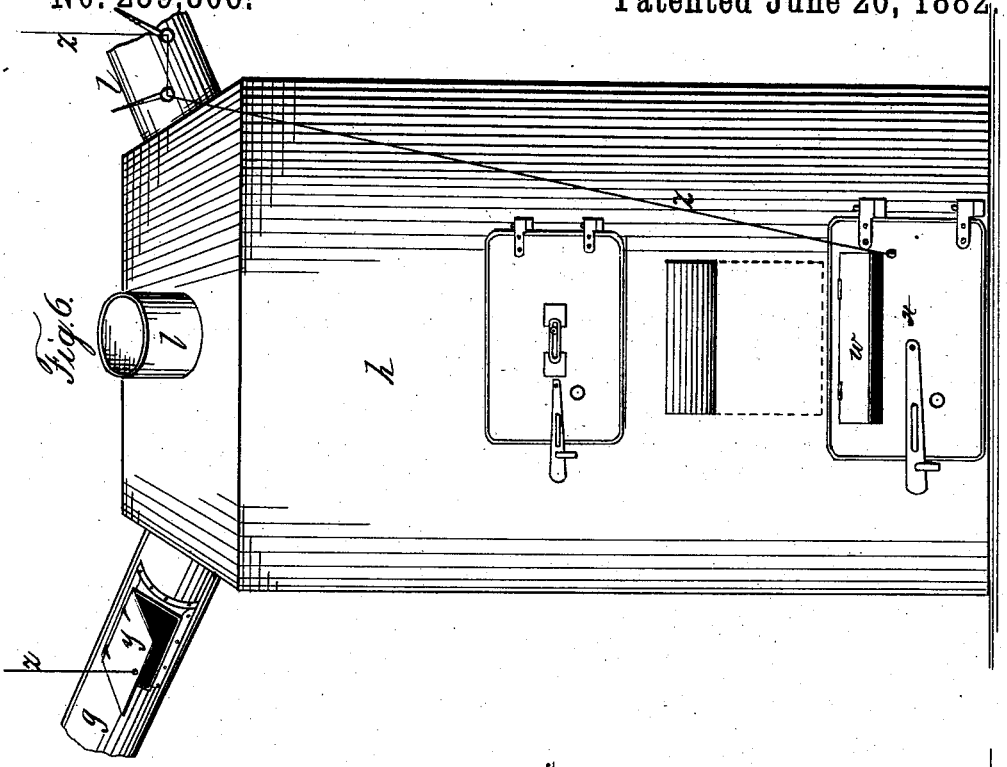
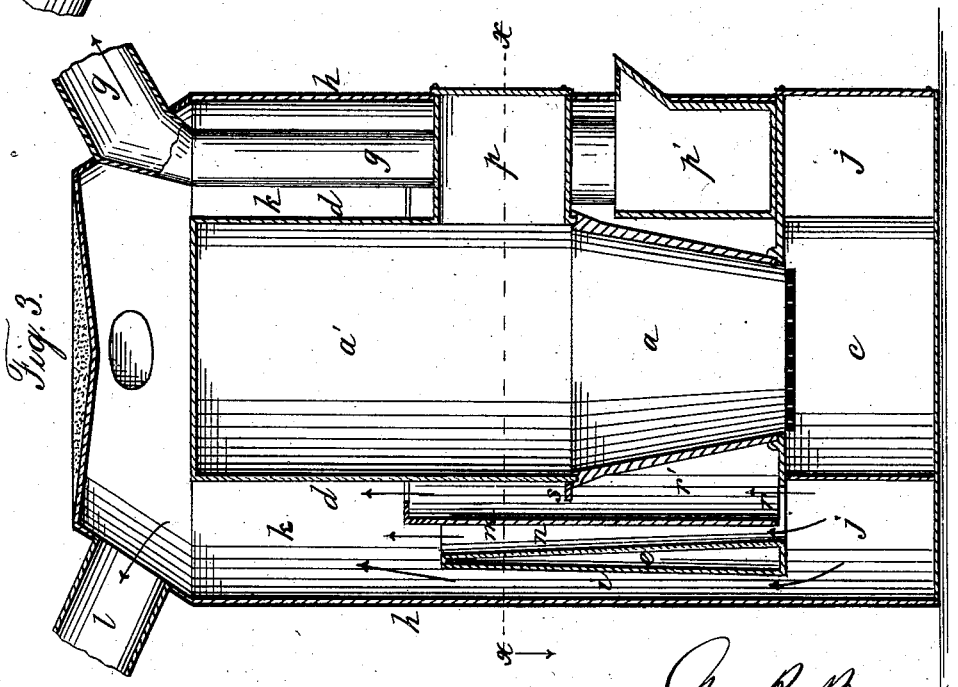


Fig. 3.



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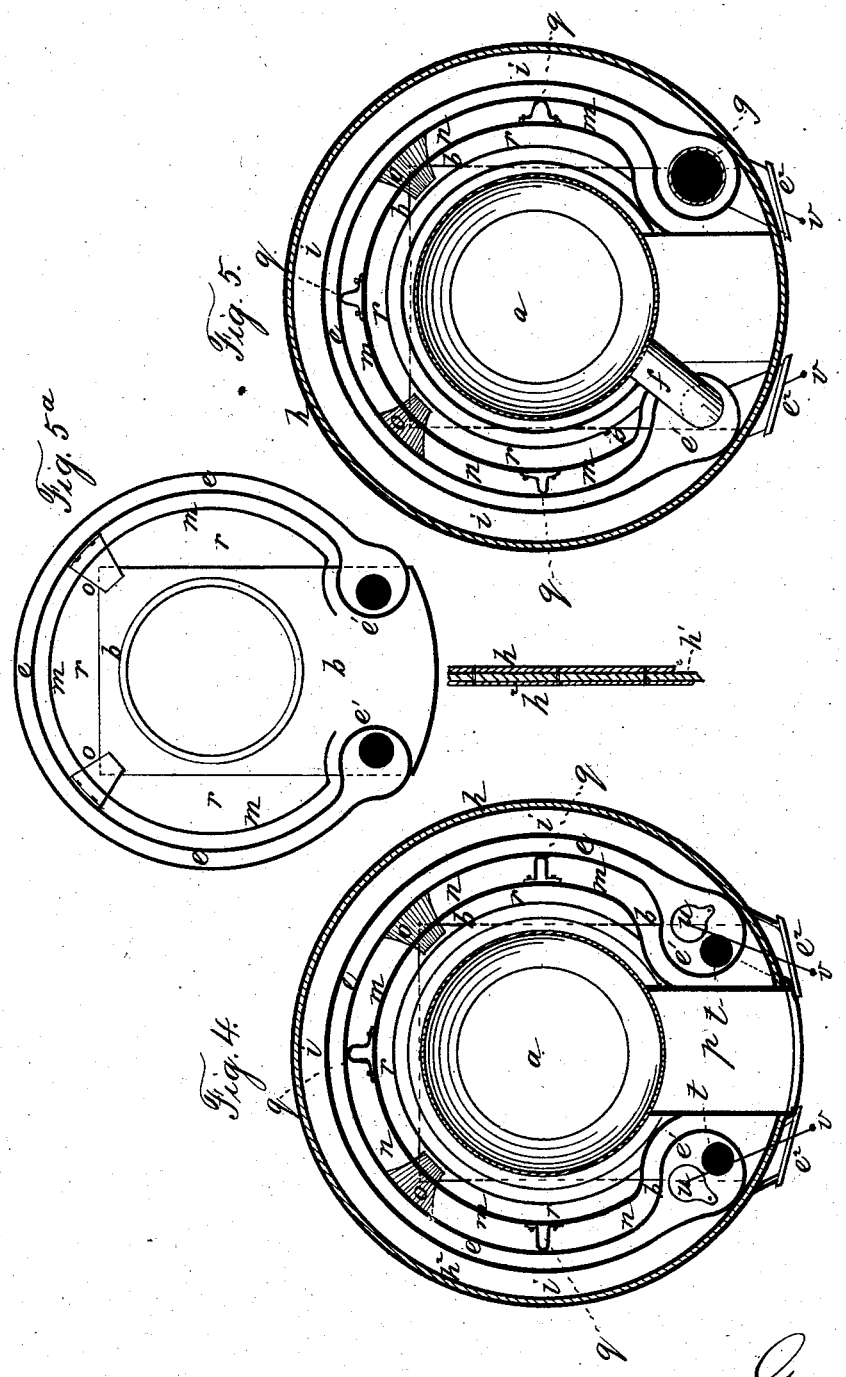

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UNITED STATES PATENT OFFICE.

GEORGE R. BROWN, OF CORNING, NEW YORK.

HEATING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 259,806, dated June 20, 1882.

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

To all whom it may concern:

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

My improvements are directed to the production of a furnace for heating air for dwellings, in which the cold air will be admitted in direct lines at the bottom of the furnace in contact with both sides of an auxiliary radiator surrounding the fire-pot and pass 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 direct from the bottom of the furnace in direct lines into the hot-air chamber at the top of the furnace.

The auxiliary radiator is in cross-section, much narrower at the top 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.

The auxiliary radiator is provided with valved openings at its front ends, communicating with the ash-pit, and by opening these valves when shaking the grate the fine ashes and dust will escape from the ash-pit into the radiator, and from thence to the chimney, and 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 direct into the auxiliary radiator.

An air-heating furnace having such construction is represented in the accompanying drawings, in which—

Figure 1 represents a vertical section; Fig. 2, a similar view taken through the smoke-pipe of the combustion-chamber; Fig. 3, a similar view taken through the feed-entrance; Fig. 4, a horizontal section taken through the feed-entrance; Fig. 5, 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 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.

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 top of the ash-pit casting at four points, partially surrounds the fire-pot, and communicates with the combustion-chamber at one end by an elbow-pipe, *f*, (shown in Fig. 2,) and at the other with the smoke-pipe *g*, (shown in Fig. 3,) so that the products of combustion pass through this narrow chamber and give out their heat to the ascending cold air.

A drum or casing, *h*, surrounds the auxiliary radiator, leaving an intervening space, *i*, and forming a cold-air chamber, *j*, around three 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*, partially surrounds the fire-pot, is supported at its rear side by projections from the auxiliary radiator, and at the front upon the ash-pit casting, leaving an intervening space, *n*, between it and the auxiliary radiator.

The auxiliary radiator *e* rests by foot-brackets *o o*, projecting from its inner wall, upon the rear corners of the ash-pit casting *b*, and its front ends, *e' e'*, are enlarged and rest upon the front part of the ash-pit casting on each side of the feed-entrance *p*, as shown in Fig. 4. The ends *e' e'* of the auxiliary radiator are enlarged to allow of the free entrance of the products of combustion therein and of their free escape therefrom, and it is held in its proper relation with the ash-pit casting by its connection with the outer casing, as will be hereinafter described.

The fender *m* separates the radiators, is sup-

ported upon the foot-brackets *o o* of the auxiliary radiator, and at its front ends upon the ash-pit casting *b*, and it is kept in its proper relation to the auxiliary radiator by sheet-iron brackets *q*, riveted in four or five places at its bottom and at its top, and by the contact of its ends against the sides of the feed-entrance or against the sides of the enlarged ends of the auxiliary radiator, as shown in Fig. 4. The radiator and the 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 air heated directly into the top chamber, *k*, while openings *r r r* on three sides of the ash-pit casting allow the cold air to ascend in the space *r'*, between the fender *m* 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 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 fender *m* may be provided with an inward horizontally-projecting cap, *m'*, for the purpose of causing the ascending air to be crowded or directed against the walls of the radiator proper to take up all the heat it can by such contact.

I prefer to extend the fender a short distance above the top of the auxiliary radiator, and I may use an outward horizontally-projecting ring-plate, *s*, supported upon the top of the fire-pot, the better to hold or retard the ascent of the air around the fire-pot, and to cooperate in such function with the fender-cap in preventing too rapid ascent of the air within the space surrounding the fire-pot.

I also prefer to make the radiator taper in its cross-section to its top, so that the products of combustion will give the greatest heat in the narrowest top part of said radiator, where it is most needed.

The enlarged entrance and exit connections *e' e'* of the auxiliary radiator are provided at their lower ends with tubes e^2 e^2, 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.

The bottoms of the enlarged entrance and exit ends of the auxiliary radiator are each provided with an opening, *t*, and the top of the ash-pit casting is provided with a corresponding opening, both of which are closed by a valve, *u*, pivoted or sliding within each radiator end, and operated by a rod, *v*, passing out through the covered end of the clean-out tube e^2, as shown in Fig. 4. The object of this valved communication of the ash-pit with the auxiliary radiator is to provide for allowing the dust from the ash-pit, when shaking the grate, to be drawn by the draft up into said radiator by opening the dust-flue valves *u* by pushing in or pulling out the valve-rods, 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 these openings.

I provide for controlling the fire without going into the furnace-room by hanging the damper *w* in the ash-pit door *x* and the damper *y* on the outer side of the smoke-pipe *g*, so that they will close automatically by their weight, and I connect with each a cord or chain, *z*, leading to the room above the furnace-room in some suitable place, and secured by hooks or otherwise, so that they can be drawn up to open the dampers or let down to close them. The closing of the ash-pit damper and the opening of the smoke-pipe damper in this way has the effect to check the fire. This latter damper for this purpose is hinged to the outer side of the smoke-pipe *g* and arranged to cover an opening in its side and to open outward to prevent the draft of the furnace by admitting cold air into the pipe.

The damper in the ash-pit door closes on an incline base, and the chain is fastened at the end of the damper nearest the hinges of the door, so that the damper will not be affected by the opening and closing of the door.

The radiator-drum *d* has a wrought-iron top riveted to it, and the outer casing is preferably made with a concave or hollow top for sand.

For the purpose of aiding in holding the heat within the drum or casing *h*, a lining of asbestus is secured to the inner side of the casing and held thereon by a covering of tin riveted to the outer casing, making the latter of three thicknesses, of which *h* is the outer casing, *h'* the asbestus lining, and h^2 the tin covering to hold the asbestus lining in place as a wall upon a wall. The pot or vessel *p'* for water is placed upon the top of the ash-pit beneath the feed-entrance within the hot-air chamber, and has a spout projecting through an opening in the casing, with a cover to close the spout, so that it lifts off to fill the vessel.

The auxiliary radiator has its greatest width at its bottom, and this gives an important advantage in causing the heaviest products of combustion to pass to the bottom, and thus give out their heat to the coldest part.

I claim—

1. The combination, in an air-heating furnace, of the auxiliary radiator *e* with the fender *m*, both supported upon the ash-pit casting *b*, and forming the spaces *n* and *r'*, opening directly into the bottom cold-air chamber, *j*, and directly into the top hot-air chamber, *k*, substantially as described.

2. The separate auxiliary radiator *e*, provided with the inner wall foot-brackets, *o o*, in combination with the oblong ash-pit casting *b* and the outer casing, *h*, whereby the said separate auxiliary radiator is both supported and held in place over the bottom cold-air-inlet spaces, *r*, substantially as herein set forth.

3. The separate fender *m*, provided with the

brackets *q*, in combination with the separate auxiliary radiator *e* and the oblong ash-pit casting *b*, the said fender being supported upon foot-brackets *o o* and upon the front part of the said ash-pit casting, and held in place, substantially as herein set forth.

4. The auxiliary radiator *e*, surrounding the fire-pot, tapering from its base to its top, closed at top and bottom, and communicating at one end with the combustion-chamber and at the other end with the smoke-pipe *g*, both said connections being made at the narrow top of said radiator, substantially as described, for the purpose specified.

5. The fender *m*, having the inward-projecting top plate, *m'*, in combination with the brackets *o o* and *q* and the ash-pit casting *b*, whereby said fender is loosely supported to form the air-heating spaces *n r'*, open at top and bottom, as described.

6. The combination of the fender *m*, having the cap-plate *m'*, and supported as described, with the ring-plate *s*, the fire-pot *a*, and the radiator-drum *d*, substantially as herein set forth, and for the purpose specified.

7. The combination, in an air-heating furnace, of the auxiliary radiator *e*, having separate entrance and exit connections with the fire-pot radiator *d*, and the smoke-pipe *g*, with the ash-pit casting *b*, and the valved communications of the said auxiliary radiator with the said ash-pit, substantially as described, for the purpose specified.

8. The auxiliary radiator ends and the top of the ash-pit casting, provided with corresponding openings, in combination with the valves *u*, arranged within said radiator ends, substantially as described, for the purpose specified.

9. In combination, the auxiliary radiator *e* and the fender *m*, the oblong ash-pit casting *b*, the fire-pot radiator *d*, the outer casing, *h*, the valved communications between the auxiliary radiator and the ash-pit, and dampers arranged one in the ash-pit door and one in the smoke-pipe, and adapted to be controlled from the room above the furnace, substantially as described.

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

GEORGE R. BROWN.

Witnesses:
H. PRITCHARD,
J. W. LYNAHAN.