

F. A. NIEBERDING.

STOVE.

APPLICATION FILED AUG. 20, 1909.

982,847.

Patented Jan. 31, 1911.

4 SHEETS—SHEET 1.

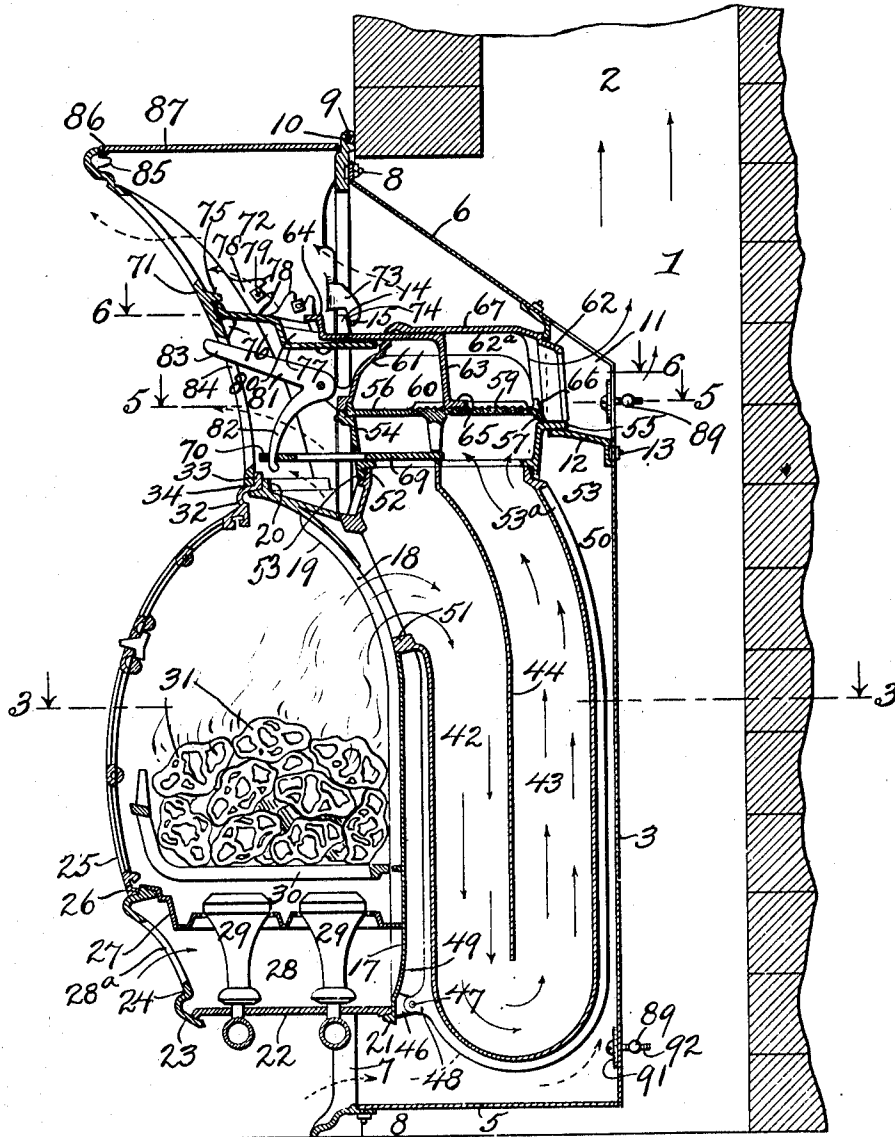


FIG. 1

WITNESSES:

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Chas. C. Watt

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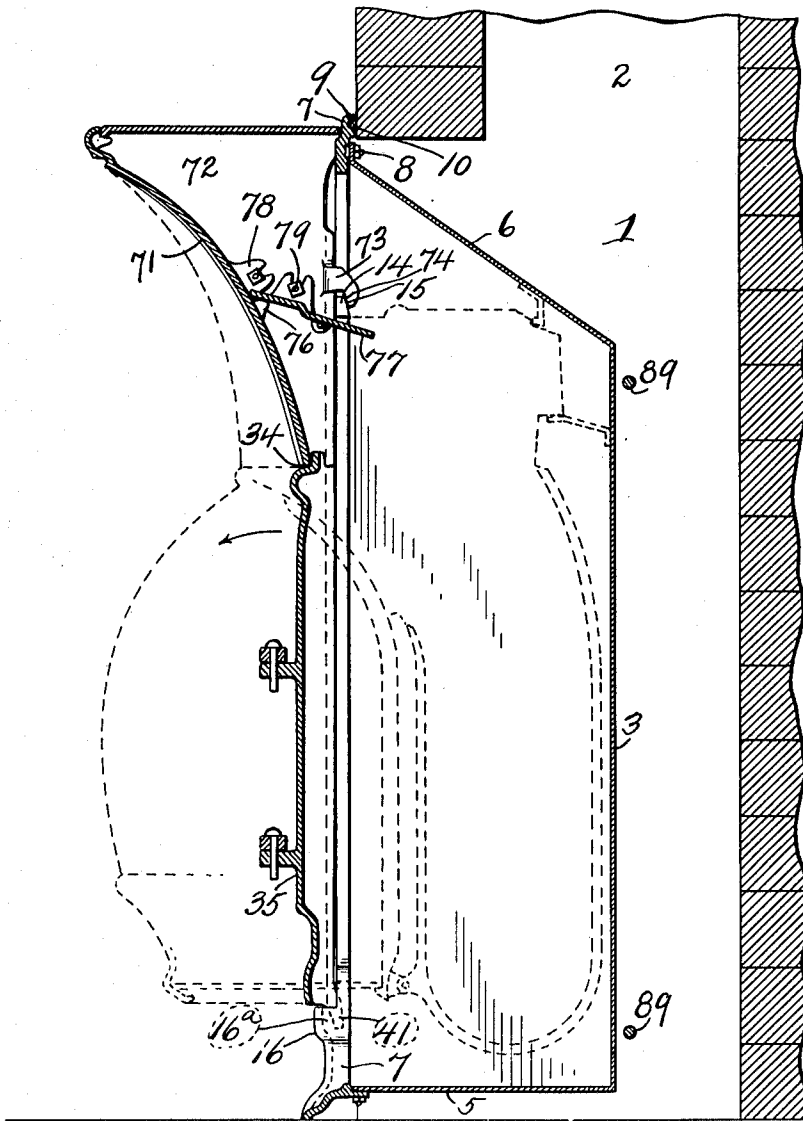


FIG. 2.

Witnesses:

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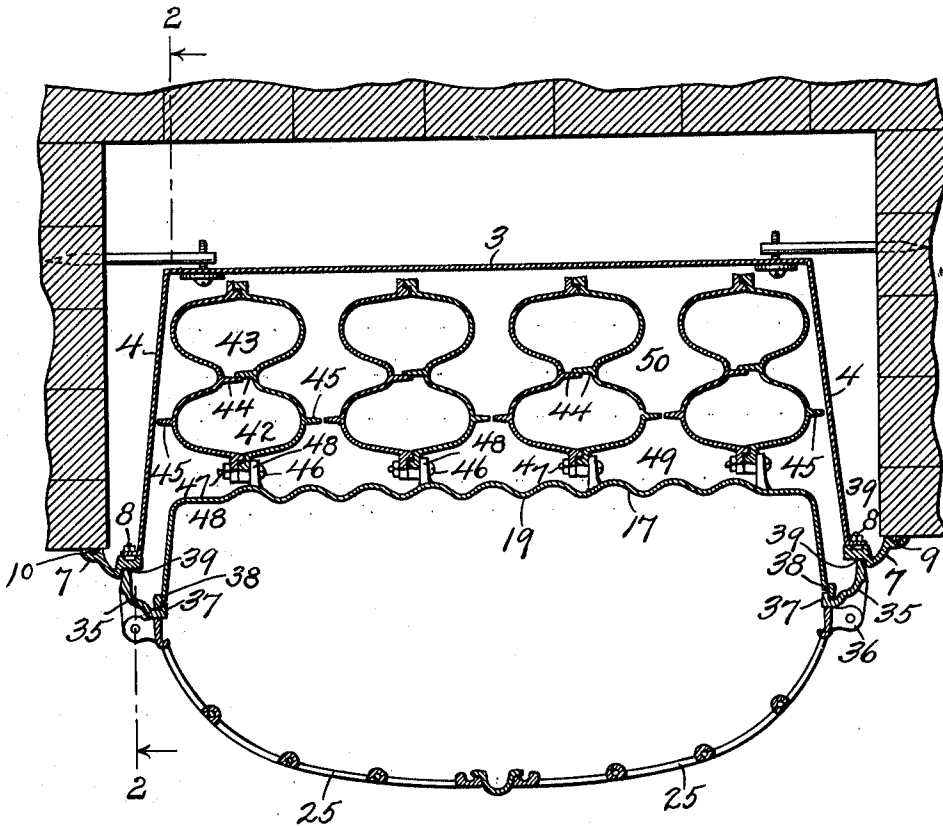


FIG. 3.

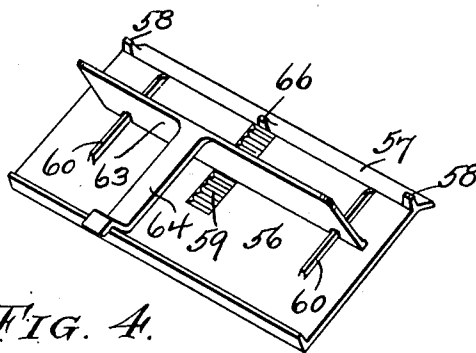


FIG. 4.

Witnesses:

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4 SHEETS-SHEET 4.

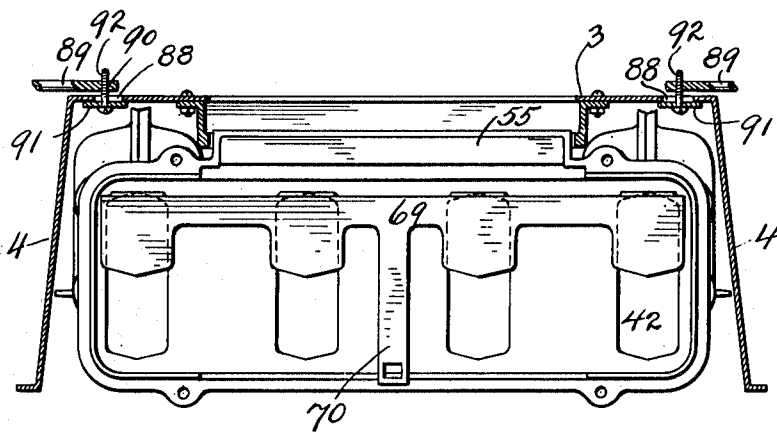


FIG. 5.

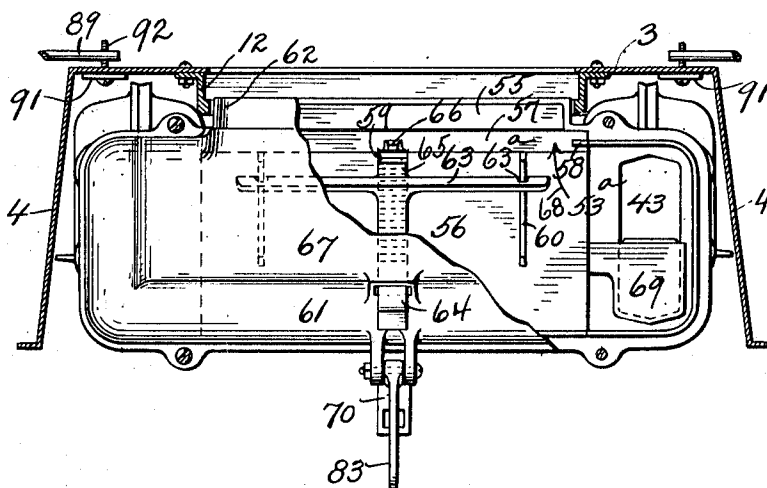


FIG. 6.

Witnesses:

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UNITED STATES PATENT OFFICE.

FRANK A. NIEBERDING, OF CLEVELAND, OHIO, ASSIGNOR TO ECONOMY STOVE COMPANY, OF CLEVELAND, OHIO, A COPARTNERSHIP.

STOVE.

982,847.

Specification of Letters Patent.

Patented Jan. 31, 1911.

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To all whom it may concern:

Be it known that I, FRANK A. NIEBERDING, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Stoves, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates to stoves or heaters of the type that are employed with fire places and which are adapted to heat both by radiation and by circulation of heated air.

Among the objects of the invention are the provision of a heater of this character with means whereby it may be conveniently adjusted to draft conditions existing in any chimney to which it may be applied; the provision of a construction whereby the heated air may be distributed in such manner as to secure high efficiency in heating the apartment in which the heater or stove may be located; the provision of a cooperating construction of heater and housing by means of which the former may be conveniently applied to and removed from the latter; the provision of an efficient construction for equalizing the circulation of the products of combustion through the air heating flues; also the provision of a convenient construction whereby the heater may be converted from a direct to an indirect-draft stove and vice versa.

Generally speaking, the invention may be defined as consisting of the combinations of elements and parts embodied in the claims hereto annexed and illustrated in the drawings forming part hereof, wherein—

Figure 1 represents a substantially central vertical sectional view through a heater constructed in accordance with my invention; Fig. 2 a vertical sectional view corresponding substantially to the line 2—2 of Fig. 3; Fig. 3 a transverse sectional view on the line 3—3 of Fig. 1; Fig. 4 a perspective view of the draft-equalizing plate for the flues and the draft-adjusting plate cooperating therewith; Fig. 5 a sectional view corresponding to the line 5—5 of Fig. 1; and Fig. 6 a similar view corresponding substantially to the line 6—6 of Fig. 1, the cover plate for the draft-equalizing and adjusting chamber being broken away.

Describing the parts by reference characters, 1 denotes the fire place opening of a chimney and 2 the vertical flue of said chimney. The chimney and fire-place opening will be of the ordinary or standard type. With this fire-place opening I employ an air-circulating housing having a frame, the frame being adapted to fit around the edge of the chimney opening and being preferably separable from but secured to the housing, with a heater and ornamental front construction removably carried by said frame. The housing is preferably of sheet metal and comprises a rear wall 3, side walls 4, a bottom wall 5, top wall 6, and a frame to which the outer edges of these walls are secured, said frame being adapted to fit the chimney opening and bear against the face of the chimney breast.

7 denotes the frame, and the outer edges of the sheet metal housing are conveniently secured to said frame, as by means of bolts 8. The frame is preferably an integral casting and is provided in the top and in both sides thereof with a groove 9 for the reception of packing material 10, such as asbestos, said packing material enabling the frame to form a tight joint with the chimney breast. The frame is of such size that the bottom of the same may rest upon the floor or tiling of the fire place with the top engaging the front of the chimney breast above the opening 21, as shown in Fig. 1.

The side walls 4 of the housing are shown as flaring outwardly from the rear wall 3, while the upper wall 6 is inclined upwardly from said rear wall to the upper portion of the frame 7. The housing is provided with a suitable discharge opening 11 at the central portion thereof and at the junction of the top and rear walls. This opening 11 is the outlet opening from a flue collar which is carried by the housing. This flue collar is preferably an integral casting 12 which is secured to the top and rear walls of the housing, as shown by bolts 13.

Each side member of the frame 7 is provided at a short distance below the top thereof with an inwardly extending projection 14 having a downwardly and rearwardly beveled face 15 and at a short distance above the bottom thereof with an inwardly extending projection 16 having therein a socket

16^a. The purpose of these projections and sockets will be explained hereinafter in connection with the heater proper.

The heater which I employ in connection with the aforesaid housing comprises a fire box, which may be adapted for any kind of fuel, the form illustrated herein being shown as employing gaseous fuel. Suitably connected to the fire box is a lateral series of flues each having downwardly and upwardly extending ducts arranged to permit either a direct or an indirect circulation of gases. At the top of these flues there is located a chamber containing a plate which is arranged to equalize the draft through the flues and having means whereby the outlet from the chamber into the flue collar may be adjusted to accommodate the heater to the draft conditions in the chimney. The fire box shown herein comprises a fire back 17, which is preferably an integral casting extending from the bottom of the heater to the top thereof and provided in the upper rear portion thereof with a plurality of discharge openings 18. The rear surface of the fire back is preferably corrugated, as shown at 19, and the upper edge of said fire back is provided with an upstanding flange 20 for the upper end of a front frame to which reference will be made hereinafter. The lower end of the fire back is provided with a forwardly projecting flange 21 which is adapted to receive the inner or rear edge of a bottom plate 22, the front or outer edge of which is supported by the lower intumed end 23 of the frame 24. The frame 24 is bent inwardly above the bottom and forms a seat for the lower ends of the doors 25, being provided with an upstanding flange 26 against which the inner edges of the bottoms of said doors abut. The frame 24 may have its opposite ends secured to the sides of the fire back.

27 denotes a plate which extends substantially parallel to the bottom plate 22 and is spaced therefrom to provide an air-receiving chamber 28 with the former plate, the fire back and the frame 24, the frame being provided with openings 28^a for supplying air to said chamber. The outer edge of the plate 27 may be conveniently supported from the intumed edge of the frame 24, and the said plate is provided with openings for the upper ends of burners 29, the mixers whereof are located within and receive their air from chamber 28. The upper ends of the burners project into the fire box beneath a grate 30, which is shown as provided with artificial fuel 31.

The frame 32 extends across the top of the fire box and is provided with a flange 33 adapted to bear against the flange 20 and with a forwardly projecting seat 34 below the former flange, for a purpose to be hereinafter described. The lower end of the

frame 32 forms an abutment for the upper ends of the doors 25, which doors are hinged each to a vertically extending frame plate 35, as shown at 36. Each of these frame plates, as will appear more particularly from Fig. 3, is provided at its inner edge with an inwardly projecting flange 37 adapted to fit within a corresponding outwardly projecting flange 38 carried by the front edge of the fire back. The outer edge of each plate 35 rests in a seat 39 formed on each side member of the frame 7. The lower end of each plate 35 is provided with a downwardly and outwardly projecting pin- tle 41 which is adapted to enter the socket 16^a formed in each projection 16 carried by the side members of the frame 7, as indicated more particularly in Fig. 2. The frames 24, 32 and 35 are preferably an integral casting for the front of the stove or heater.

Reference has been made to the flues with which the fire box communicates. A lateral series of four such flues is shown, each flue consisting of a pair of vertically extending ducts 42 and 43 separated from the top to a point near the bottom thereof by a partition and each flue communicating near its upper end with one of the fire box outlets 18. Each complete flue is preferably made of two complementary sinuous castings, adapted, when placed together, as shown in Fig. 3, to form a complete flue having a downwardly extending duct 42 and an upwardly extending duct 43, said ducts being separated by means of a partition conveniently formed by ribs 44 projecting from one casting toward the other and adapted, when said castings are fastened together, to form a complete partition. Each casting is provided at the enlarged front portion thereof with an outwardly projecting rib or wing 45. Each double flue is supported near its lower end from the fire back 19, as by means of lugs 46 carried by said fire back and a bolt 47 extending through each of said lugs and through corresponding lugs 48 on the flue sections. (See Fig. 3). The wing 45 on the outer surface of each outermost flue of the series is in substantial contact with a side wall 4 of the housing, and the other ribs of said flues are in virtual engagement with each other, whereby an air space 49 is provided between said ribs 45 and the fronts of the flues and the fire back 19, while an air space 50 is formed between said ribs and the back wall 3 of the housing. Near their upper ends the flues are provided each with a collar 51 adapted to register with an outlet opening 18 in the fire back. The upper ends of the flues are flush with each other and are provided each with a neck 52 adapted to receive a short collar 53 projecting downwardly from the vertical walls 54 of the lower section of the draft-

regulating chamber and said section is provided with a bottom plate 53^a having openings registering with the upper ends of the flues. This section is provided at the rear central portion thereof with a rearwardly extending flange or lip 55 which is adapted to engage the inner end of the flue collar 12. The lip 55, as will appear more particularly from Figs. 5 and 6, is of the same lateral extent as the flue collar 12.

56 denotes a plate which rests on the top of the front and back walls of the section 54 and is of substantially the same length as the lip 55, being provided at its rear end with a downwardly projecting flange 57 adapted to fit against the lip 55 and having at each end thereof a short projection 58 adapted to form a corresponding short extension of the upper edge of the section 54. The plate 56 covers the upper ends of the two innermost or central flues of the series, leaving the ends of the outermost flues uncovered, as indicated in Fig. 6. The purpose of this construction is to equalize the draft through the flues. With the arrangement of flues shown and described herein, there is a tendency for the draft to be strongest through the centrally arranged flues. The provision of the plate 56 checks the draft through these flues while leaving the draft comparatively free through the outermost flues, thereby equalizing the draft through all of the flues. The plate 56 is provided at its central portion with serrations 59 and with a rib 60 on each side of said serrations.

61 denotes a cover section for the section 54. This cover section is provided with an integral flue collar 62 closed at the top and sides and open at the bottom to cooperate with the lip 55 to form an outlet connection from the position of the chamber included between said cover section and the plate 56 and the flue collar 12. The cover 61 comprises a top and downwardly projecting ends and front, said ends and front cooperating with the upper end of the section 54 to form a chamber therewith.

Within the upper chamber 62^a, formed between the cover 61 and the plate 56, there is located a chimney-draft regulator 63. This regulator is shown as a plate which extends across the space between the cover and the plate 56 and is provided with an operating handle 64 extending through an opening in the cover. The lower end of the plate 63 is provided with a lip 65 adapted to engage the serrations 59, and at the end of said serrations a stop 66 is provided. As will be seen from Figs. 1 and 6, the central portion of the cover is projected upwardly as compared with the ends thereof, and this upwardly projected portion 67 extends laterally beyond the flue collar 62. The plate 63 is provided in its lower edge with notches

63^a adapted to receive the ribs 60, and said plate is of slightly less length than the width of the collar 62. There is thus formed between the ends of the plate 63 and the sides of the collar 62 passageways, indicated by the arrows 68, for the passage of the gases into the flue collar 12 and thence into the chimney. By moving the plate 63 toward the neck 62, the passageway at each side thereof will be restricted, while by moving it in the opposite direction, the passageways will be enlarged. In installing the heater in a fire place, it is only necessary to adjust the plate 63 by the handle to secure proper draft conditions, after which the heater will operate with the best efficiency with reference to the chimney to which it may be applied.

Below the plate 56 is located a slide 69. This slide rests on the bottom plate 53^a of the section 54 and is adapted to cover the upper ends of the ducts 42 or 43, according to the position in which it is placed by its handle 70. When in the position shown in Fig. 5, a direct draft is established between the fire box and the upper ends of the ducts 42; when in the position shown in Figs. 1 and 6, this direct draft is cut off and it is necessary for the gases to pass down the ducts 42 and up the ducts 43, as indicated by arrows in Fig. 1.

It will be understood that the fire box, the flues, the chamber carried at the upper ends of the flues, neck 62, plate 63 and plate 69 will be all connected together. Under these conditions it will be only necessary to insert the pintles 41 into the recesses in the projections 16 and tilt the heater upwardly and rearwardly on these pintles, to bring the neck 62 into the flue collar 12. The center of gravity of the heater being at the rear of the pintle 41, the heater will be firmly supported in place by its bearings on said pintles and on the collar 12.

Above the front of the heater there extends an upper open-work front 71, which may be secured to side members 72. The front 71 projects outwardly from the seat 34 which is formed therefor on the top of the frame 32. The side members 72 are each provided with a hook 73 having a beveled face 74 adapted to cooperate with the beveled face 15 of a lug 14. The front member 71 is provided with vertically spaced lugs 75, 76 for the reception of the front end of a plate 77 which extends transversely of the front and is inclined downwardly from front to rear. At its ends, the plate 77 is provided with forked projections 78 by means of which it may be bolted to the side frames, as shown at 79. The central portion of the plate 77 is provided with a depression 80 which is adapted to receive the outwardly projecting portion of the handle 64 by which the plate 63 is adjusted. This

prevents the plate 63 from tilting and enables it to close the vertical space between 67 and 56.

Below the plate 77 there is located an angle lever 81, said lever being conveniently pivoted to a projection carried by the cover 61. The downwardly projecting arm 82 of said lever extends through an opening in the front of the operating handle 70 of slide 69, while the other arm 83 projects upwardly through a slot 84 in the front 71. The upper end of the front 71 is provided with a suitable number of projections 85, which are adapted to receive a downwardly projecting flange 86 on a cover or sub-mantel 87, the rear edge of which rests upon a suitable seat provided on the frame 7.

The arrangement of the inclined plate 77 causes the air which passes upwardly through the passageway 49 formed between the fire back and fronts of the flues and ribs 45 to be discharged into the room below the top 87 of the frame, while the air which passes upwardly through the housing between the rear wall thereof and the rear of said flues and the aforesaid ribs passes mainly above said inclined plate. By this means, an efficient distribution of heated air is secured and the overheating of the cover or sub-mantel 87 is prevented.

For the purpose of securing the housing within the fire place or chimney opening, the following construction is provided: The rear wall of the housing is provided with a suitable number of apertures 88, said apertures being preferably located one near each corner of said wall. Spikes 89, each having near the outer end thereof a threaded aperture 90, are driven into the chimney in such position that the threaded aperture in each spike will aline with an aperture 88 in the rear wall. The apertures 88 in the rear wall are of materially greater diameter than the apertures in the spikes, and each aperture 88 is provided with a washer 91, which is of considerably greater diameter than said aperture. A screw 92 is carried by each washer and projects through the same and through the corresponding aperture in the housing wall and is threaded into the corresponding aperture in the adjacent spike. The construction described provides means whereby the screws may be adjusted so as to be threaded into the spike apertures without interfering with the circulation of the air through the housing.

Having thus described my invention, what I claim is:—

1. The combination, with a stove having a fire box and a series of flues communicating with said fire box, said flues having a common outlet connection, of a housing having a flue connection, the stove being pivoted to the front of said housing with the pivotal connection so located that the upper por-

tion of the stove will automatically swing backwardly within the housing to bring said connections into operative relation.

2. The combination, with a stove having a combustion chamber and a plurality of flues leading therefrom, of a chamber common to the discharge ends of all of said flues and provided with a lateral discharge outlet, a plate in said chamber interposed between the flues and the outlet and providing passageways around the ends leading to said outlet, said plate being spaced from the top of the chamber, a plate mounted on the former plate and extending between the same and the top of the chamber, and means whereby the latter plate may be adjusted toward and from the chamber outlet.

3. The combination, with a stove having a combustion chamber and a series of flues leading therefrom, of a chamber common to the discharge ends of all of said flues and provided with a centrally arranged lateral outlet, a plate in said chamber located above the ends of the central flues and interposed between said flues and said outlet and spaced from the top of the chamber, passageways being formed around the ends of the plate leading to the outlet, a plate mounted upon the former plate and extending between the same and the top of the chamber, and means whereby the latter plate may be adjusted along the former plate toward and from the chamber outlet.

4. The combination, with a stove having a combustion chamber and a lateral series of vertically extending flues leading therefrom, of a chamber above and common to the discharge ends of all of said flues and provided at its rear end with a centrally arranged outlet, and a baffle plate in said chamber beneath said outlet and located above the upper ends of the centrally arranged flues only, of the series, and providing passageways around its sides to the outlet.

5. The combination of a fire box, a plurality of flues communicating therewith, a housing into which said flues project, said housing having a chimney connection for said flues and said flues dividing the housing into front and back passageways for air, said housing having an air inlet at the lower end thereof and an air outlet at the upper end thereof, and a downwardly inclined plate in said outlet the inner end whereof projects into the upper end of the housing in position to deflect outwardly air flowing through the front passageway.

6. The combination with a fire place, of a pair of side frame members applied to opposite sides of the fire place opening and each having a seating member provided with a downwardly and rearwardly inclined surface, said members projecting inwardly from the frame members, a stove or heater for said fire place, and an open-work front

above said stove or heater, said front being provided at each side thereof with a seating member adapted to engage a seating member on the corresponding side frame and
 5 having a downwardly and rearwardly inclined surface corresponding to the inclined surface on the seating member carried by said frame, and said stove or heater being provided with an air chamber communicating
 10 ing with the open-work front.

7. The combination, with a chimney having a fire-place opening, of a housing in said opening, said housing having in the rear wall thereof a plurality of apertures, a
 15 stove in operative relation to said housing, spikes driven into the opposite sides of the chimney, within the opening, and each projecting across an aperture in the rear housing wall, each of said spikes having a
 20 threaded aperture, a washer covering each aperture in the rear housing wall, and a screw carried by each washer and projecting through an aperture in the housing wall and threaded into the corresponding aperture
 25 in a spike, said screws being of materially less diameter than the apertures in the housing and the washers being of materially greater diameter than said apertures, to permit adjustment of the screws in the apertures
 30 without uncovering the apertures.

8. The combination, with a chimney having a fire place opening therein, of a stove, a housing therefor projecting into the fire place opening, and means for anchoring
 35 said housing in place within the fire place opening, said means comprising members projecting from the chimney, apertures in said housing corresponding to said members, washers covering said apertures, and means
 40 carried by said washers and projecting through said apertures and secured to said members, the last mentioned means being of materially less diameter than the corresponding apertures and the washers being
 45 of materially greater diameter than said apertures to permit adjustment of said means in said apertures and without narrowing the apertures.

9. The combination, with a fire place, of
 50 a housing within said fire place and provided with an outlet communicating with the chimney flue, a heater in said housing having a combustion chamber, a lateral series of vertically extending flues communicating with the combustion chamber and
 55 leading therefrom, a chamber with which the upper ends of said flues communicate, said chamber having a centrally arranged discharge outlet adapted to communicate
 60 with the housing outlet, and a plate in said chamber spaced vertically from the upper ends of the centrally arranged flues of the

series and interposed between the upper ends of said flues and the chamber outlet.

10. The combination, with a fire place, of 65 a housing within said fire place and provided with an outlet communicating with the chimney flue, a heater in said housing having a combustion chamber, a lateral series of flues in said housing,
 70 each flue comprising a pair of vertically extending ducts communicating at their lower ends, one of said ducts communicating near its upper end with the combustion chamber of the heater, the upper ends of all of the
 75 flues being in substantially the same plane, a chamber for the upper ends of all of said flues, said chamber having a centrally arranged discharge outlet, a plate in said chamber spaced vertically from the upper
 80 ends of the centrally arranged flues of the series and interposed between such upper ends and the chamber outlet, and a damper plate arranged to slide across the upper ends of said flues and to cover one or the
 85 other set of vertical ducts of said flues.

11. The combination, with a fire place, of a housing within said fire place and provided with an outlet communicating with the chimney flue, a heater in said housing
 90 having a combustion chamber, a lateral series of flues in said housing, each flue comprising a pair of vertical ducts communicating at their lower ends, one of said ducts being connected below its top with the
 95 combustion chamber, a chamber common to the upper ends of all of said flues and having a central outlet above said flues adapted to discharge into the housing outlet, and a plate within said chamber spaced from and
 100 covering the upper ends of the central flues only of the series and interposed between said flues and the chamber outlet and providing with the chamber walled passageways leading to the outlet, the side flues of
 105 the series communicating directly with these passageways.

12. The combination, with a housing having a flue outlet, of a stove having a fire box and a plurality of flues communicating
 110 with the fire box and projecting rearwardly into the housing and provided with a rearwardly projecting common outlet adapted to register with the flue outlet, and a pivotal connection between the stove and the housing
 115 located in front of the center of gravity of said stove.

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

FRANK A. NIEBERDING.

Witnesses:

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 BRENNAN B. WEST.