

July 1, 1941.

F. T. HERRON

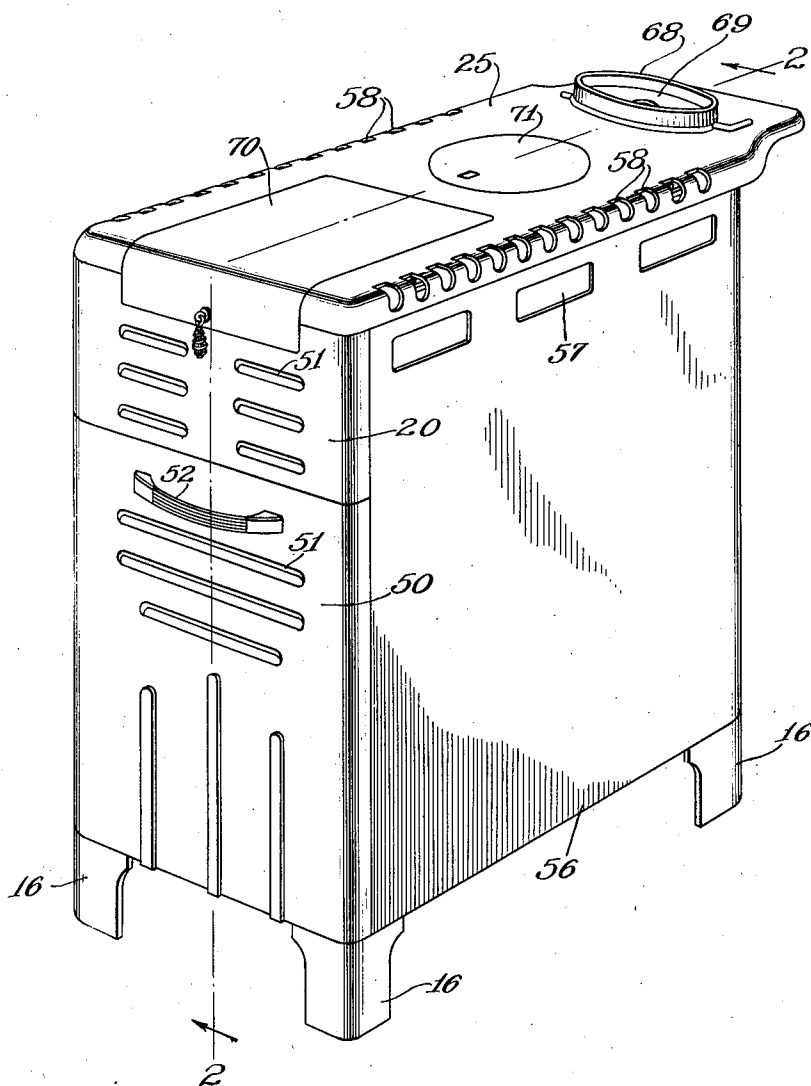
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STOVE

Filed June 16, 1939

5 Sheets-Sheet 1

FIG. 1.



Inventor:
Frank T. Herron
By *Belt, Wallace and Cannon*
Attorneys

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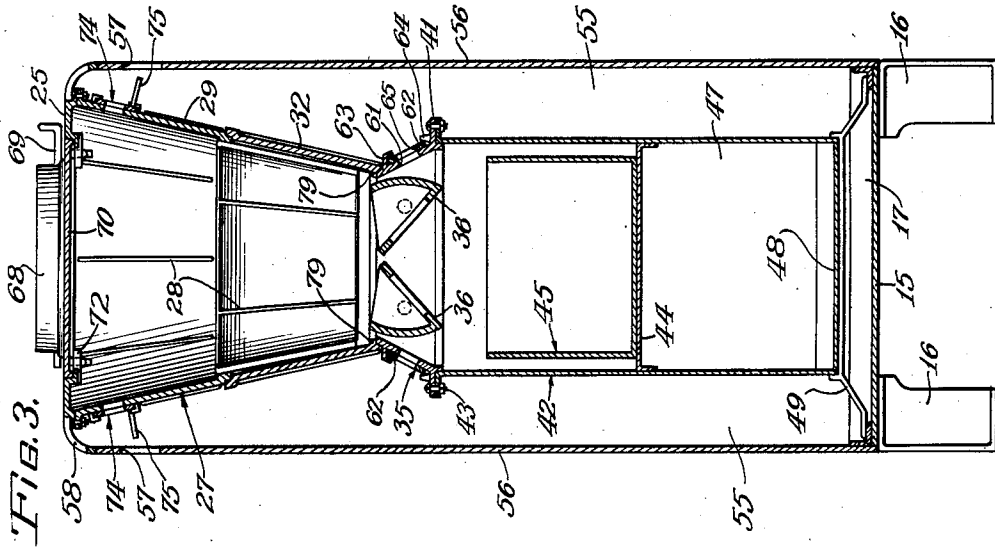
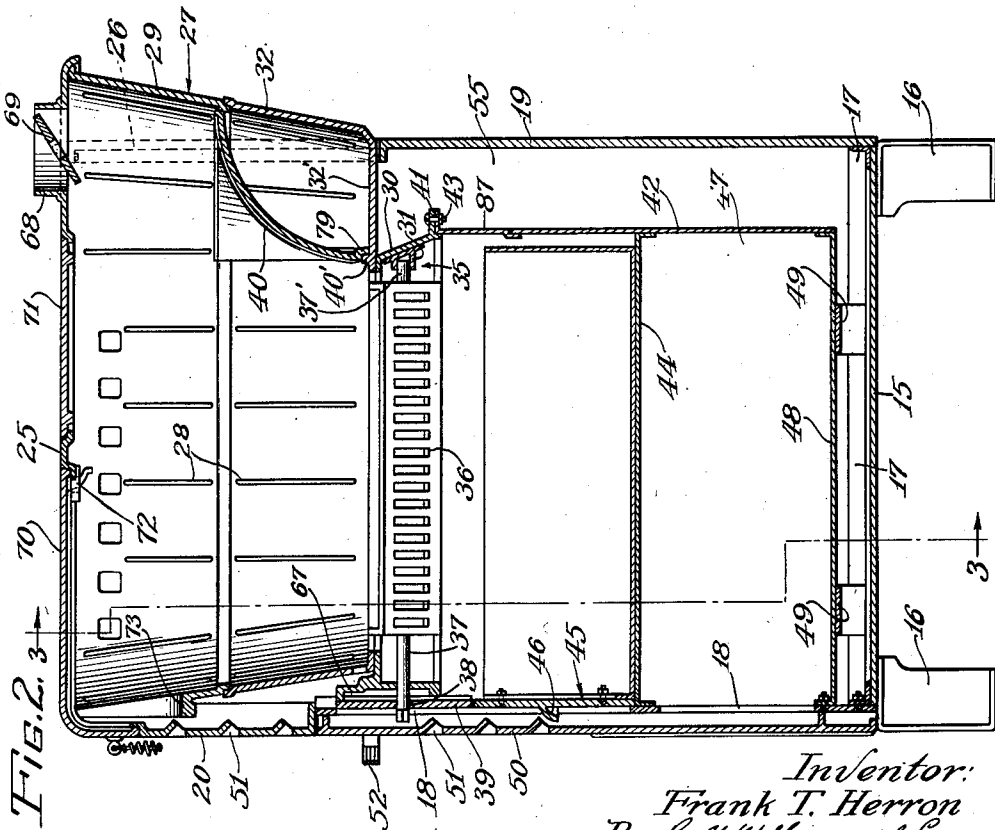
F. T. HERRON

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Inventor:
 Frank T. Herron
 By Bell, Wallace and Cannon
 Attorneys

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F. T. HERRON

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FIG. 4

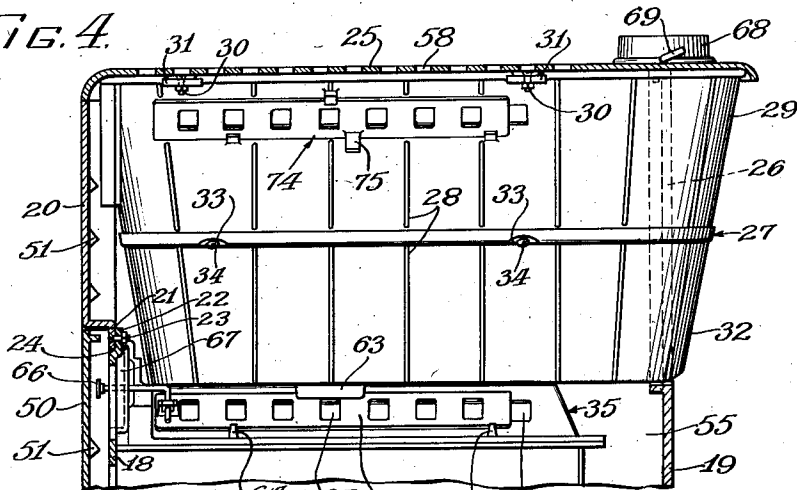


FIG. 5

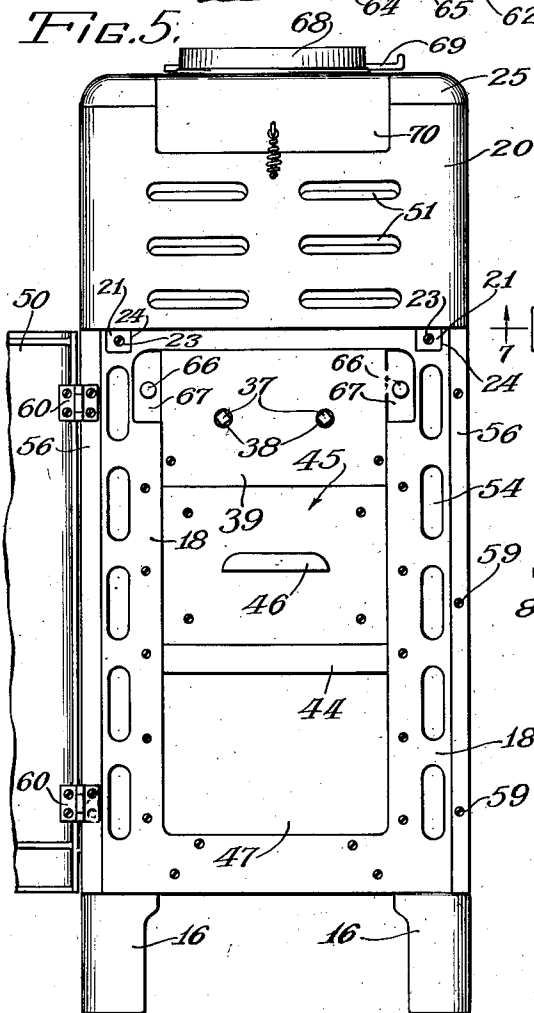


FIG. 6

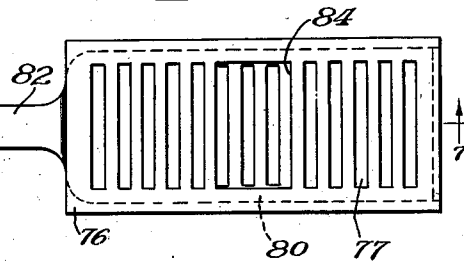


FIG. 7

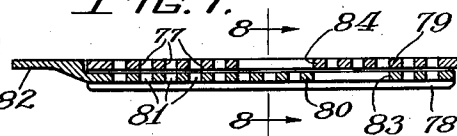
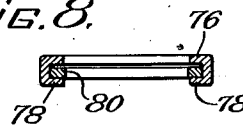


FIG. 8



Inventor:
Frank T. Herron
By *Belt, Wallace and Cannon*
Attorneys

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F. T. HERRON

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FIG. 9.

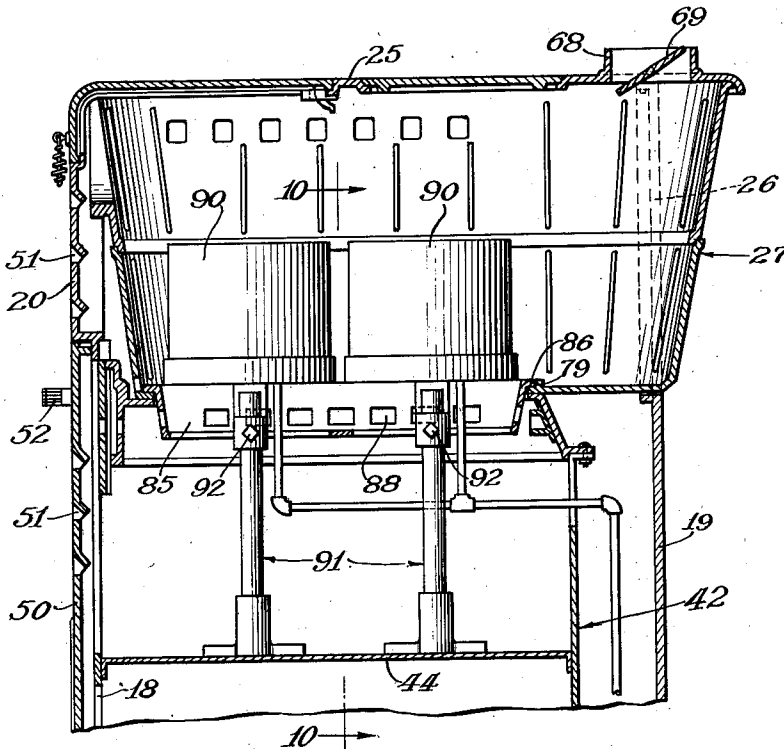


FIG. 10.

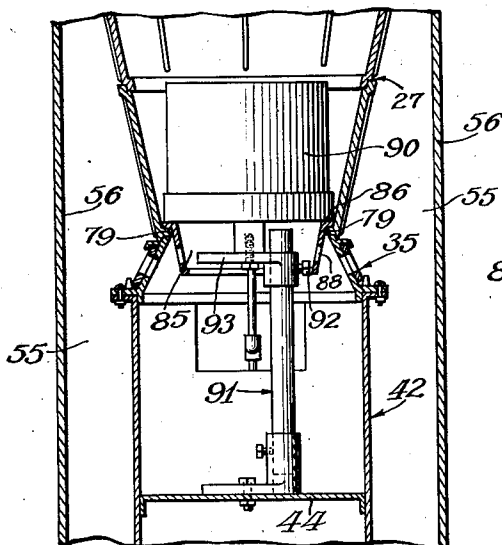
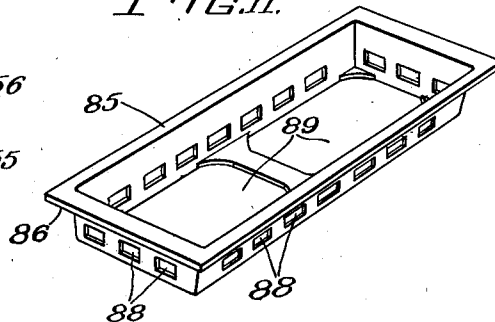


FIG. 11.



Inventor:
 Frank T. Herron
 By *Belt, Wallace and Cannon*
 Attorneys

July 1, 1941.

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FIG. 12.

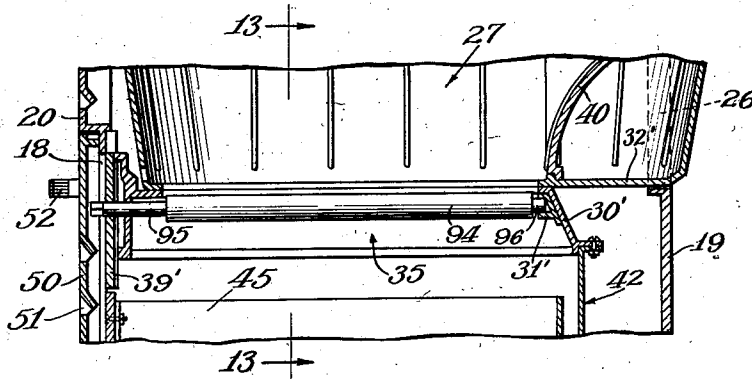


FIG. 13.

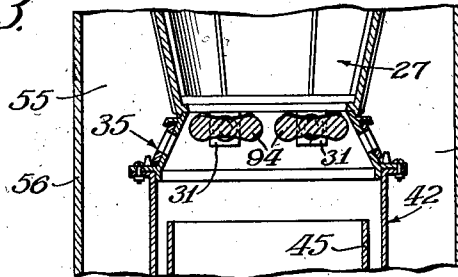


FIG. 14.

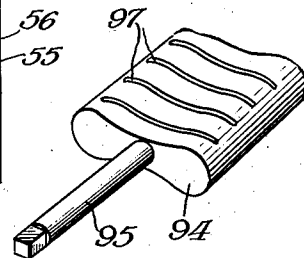


FIG. 15.

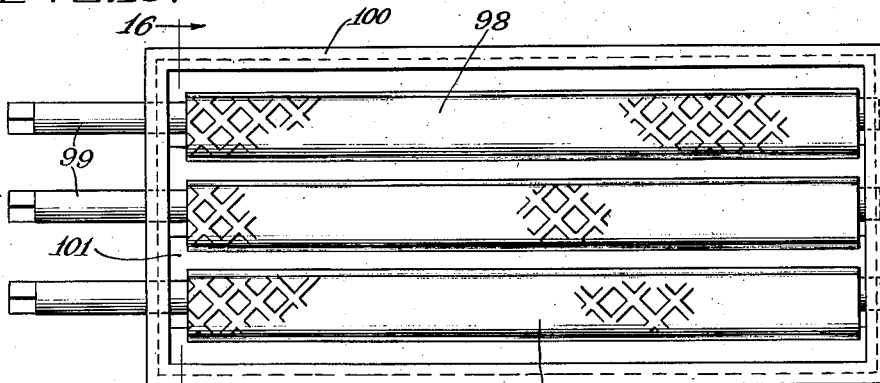
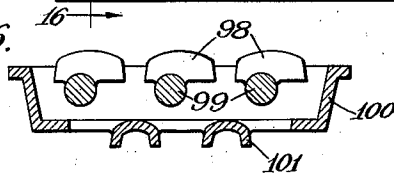


FIG. 16.



Inventor:
Frank T. Herron
By *Celt, Wallace and Cannon*
Attorneys

UNITED STATES PATENT OFFICE

2,247,882

STOVE

Frank T. Herron, Chattanooga, Tenn., assignor to
The American Brake Shoe and Foundry Com-
pany, New York, N. Y., a corporation of Dela-
ware

Application June 16, 1939, Serial No. 279,526

8 Claims. (Cl. 126—67)

This invention relates to stoves and particularly to that type commonly used in kitchens and like places for space requiring heating and also for cooking and like purposes.

It has been common practice to include an inner unit and an outer shell or casing in stoves of the aforesaid type, the inner unit including a fire chamber, grate, and ash compartment, and the outer shell serving to enclose these elements. Heretofore this inner unit has been assembled by securing the component parts thereof to the side and end walls of a frame supported by the legs of the stove and a sufficient clearance has been left between this frame, which usually enclosed the inner unit, and the outer casing to permit air circulation therebetween. Cool air drawn up through this clearance is warmed by contact with the heated parts of the frame and is then discharged through suitable openings in or near the top of the casing and into the room. The air needed for combustion is customarily drawn through the ash compartment which has not been isolated from the aforesaid clearance through which air that is to pass to the room flows to be heated.

It has been observed that in stoves embodying the above described construction, the heat of combustion is not utilized to best advantage primarily because the walls of the supporting frame for the inner unit must be heated before the air that is to pass to the room will be heated. Furthermore, the inner unit frame structure has had little or no support other than that afforded at its base. Another disadvantage is that dust from the ash compartment has sifted into the air that is to flow to the room, especially when the grates are actuated to free the fire box of ash. It has also been observed in stoves of the above described kind that ashes accumulate in the air passageways which is objectionable.

It has been proposed, in view of the foregoing difficulties, to construct stoves of a type known as magazine-stoves, wherein resort is had to a cylindrical outer shell and an inner heating unit which has been either wholly or partially suspended from a supporting structure at the top of the stove. Such stoves, however, have been constructed primarily for use as parlor heaters and have not been very well adapted to be used as kitchen heaters; furthermore, no provision has been made in these stoves for cooking in addition to heating. Moreover, stoves of the magazine type have been unusually troublesome in that they tend to disperse ashes and dust into the room air circulated therethrough.

In view of the above and kindred difficulties the primary object of the present invention is to strengthen the structure of a stove of the so-called kitchen heater type and to render it easier to assemble and repair by resort to a novel construction entailing rigid support for the inner unit of the stove.

Another object is to so arrange a stove of the type referred to above, that air flowing there-through will be efficiently heated without having dust from the ash pit of the stove mingled therewith.

A further object is to enable a kitchen heater to have an inner heating unit which is primarily supported from the top of the stove by a novel suspension construction which avoids the magazine type of construction.

Still another object is to supply the air for combustion through openings in close proximity to the grate and well above the ash pit so that the air need not flow through the ash pit, thereby avoiding the mingling of objectionable dust with air flowing through the stove to be heated.

A further object is to provide for ready adaption of the stove to the burning of a wide variety of fuels.

A still further object is to enable a greater volume of air to be heated than has heretofore been possible in stoves of the kitchen heater type.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show preferred embodiments and the principle thereof and what I now consider to be the best mode in which I have contemplated applying that principle. Other embodiments of the invention embodying the same or equivalent principle may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings,

Fig. 1 is a perspective view of my novel heater;

Fig. 2 is a vertical sectional view taken along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken along the line 3—3 on Fig. 2;

Fig. 4 is a side elevation of the fire chamber showing the draft and damper controls and showing a fragment of the outer casing in section;

Fig. 5 is a front elevation of the heater, with the door open;

Fig. 6 is a plan view of the draw center grate used for burning wood;

Fig. 7 is a section along the line 7-7 on Fig. 6;

Fig. 8 is a section along the line 8-8 on Fig. 7;

Fig. 9 is a sectional view showing the heater as adapted to the burning of liquid fuel;

Fig. 10 is a section along the line 10-10 on Fig. 9;

Fig. 11 is a perspective view of a perforated plate employed in the liquid fuel burner;

Fig. 12 is a sectional view of the heater with a hard coal grate installed therein;

Fig. 13 is a section along the line 13-13 on Fig. 12;

Fig. 14 is a perspective fragmentary view of the hard coal grate;

Fig. 15 is a plan view of a lignite-burning grate; and

Fig. 16 is a section along the line 16-16 on Fig. 15.

In the embodiment of my invention illustrated in Figs. 2 to 5, inclusive, which is especially adapted for burning coal and like fuels, a base plate 15 is supported by legs 16, and an angle iron support frame 17, Figs. 2 and 3, is mounted on the plate 15 to increase the rigidity of the base structure and to afford anchorage for the vertical framework of the stove or heater. A vertical frame member 18, Figs. 2, 4 and 5, is secured at its lower end to the angle iron support 17 and is positioned at the front end of the stove. Another vertical frame member 19, Fig. 2, is provided at the rear and is likewise secured to the frame 17.

An upper front casting 20 is fastened to the frame member 18 and is provided with downwardly extending lugs 21, Figs. 4 and 5, at its lower end that are disposed inwardly a short distance from the face of the casting 20. Portions of the upper end of the frame casting 18 are offset inwardly, as indicated at 22, to form recesses 24, in which the lugs 21 are seated, the lugs 21 being secured in the recesses 24 by bolts 23 which are passed through the offset portions 22 of the frame casting 18.

The forward end of a top plate 25 extends downwardly to provide an edge that seats on the upper end of the casting 20 as shown in Figs. 1 and 5. The upper portion of the vertical frame member 19 is bifurcated at its upper end, for a purpose to be explained presently, whereby limbs 26 are defined, and the rear end portion of the top plate 25 seats on the upper end of the limbs 26. Thus, the plate 25 is firmly supported by the casting 20 and frame 19.

A fire box generally designated by 27 is suspended from the plate 25 in a manner presently to be explained, and the rear portion thereof projects through the bifurcation in the vertical frame member 19. The fire box 27 includes an upper part 29 and a lower part 32. The lower marginal edge of the upper part 29 is offset inwardly and the upper marginal edge of the lower part 32 is offset outwardly whereby these marginal edges may be interfitted. As best shown in Fig. 4, the shoulder defined by the offset portion on the lower part 32 is recessed as indicated at 33 to afford clearance for the heads of bolts 34 that are freely passed through openings in this marginal portion and run into tapped openings in the offset marginal portion on the upper part 29

and thereby the upper and lower parts are firmly united. An outwardly extending flange is provided at the upper end of the upper section 29 and rests against the underside of the top plate 25 and is bolted or otherwise secured to this top plate whereby the fire box 27 is supported from the top plate 25. Ribs as 28 are provided on the upper and lower parts of the fire box 27 for the purpose of reinforcement and especially to prevent warpage thereof when it is heated. A grate frame generally indicated by 35 is suitably secured to an intumed flange at the lower end of the lower part 32 of the fire box 27. Where, as in the form of the invention shown in Figs. 2 to 5, inclusive, coal or like fuel is to be burned, a pair of shaker grate members 36 is provided. Each grate member 36 has a pintle 37 at the front end thereof which protrudes through an opening 38 in a support plate 39 and the free end of each such pintle is of polygonal cross section to enable a handle to be detachably connected thereto to permit the grates to be shaken. Pintles 37' are provided at the rear ends of the grate members 36 and are journaled in sockets formed in lugs 31 fixed to a plate 39 which forms the rear wall of the grate frame 35. The grate members 36 afford a bottom for the fire box and support the fuel during burning thereof. When it is desired to dump the fire, a handle is attached to the polygonal portions of the pintles 37 and the grates are rotated to move their fuel-supporting surfaces out of fuel-supporting position.

As best shown in Fig. 5, the support plate 39 to which reference has been made above extends between spaced uprights of the frame 18 and is suitably secured thereto to be carried thereby, this plate 39 being arranged just below the lower end of the front casting 20.

In those arrangements, such as the present one, where there is a draft connection with the upper end of the fire box at the rear end thereof, it has been found to be advantageous to terminate the grate inwardly of the rear end of the fire box and by referring to Fig. 2 it may be seen that this arrangement is resorted to in the present instance. However, in order to confine the fuel to the grate, an arcuate plate 40 is provided which has the lower marginal edge thereof offset to receive the rib 40' on the horizontally extending portion 32' of the rear wall of the lower portion 32, this horizontally extending portion 32' extending inwardly from the vertical frame member 19 and being terminated above the rear end of the grate frame 35. The upper end of the arcuate plate 40 is rested against the offset marginal portion in the rear wall of the upper section 29 of the fire box 27.

The lower end of the grate frame 35 has a flange 41 thereon, and a sheet metal frame 42 is suspended therefrom by suitable fastening means, such as bolts 43. A shelf 44 within the frame 42 supports an ash drawer 43 which is equipped at its front end with a handle 46 to facilitate removal of the drawer. A utensil or storage compartment 47 is afforded inside the frame 42 between the shelf 44 and the bottom plate 48 of said frame, which compartment 47 may be used for a variety of purposes.

The frame 42 is held against undesirable displacement in the heater by saddles 49 which rest on the angle iron supports 17. It will be seen from the foregoing that the inner unit assembly comprising the fire box 27, grate frame 35, and lower frame 42, is supported by the top plate 25 of the heater, the saddles 49 chiefly preventing

sideward swaying of the inner unit assembly when the stove is being moved.

A door 50 is mounted on hinges 60, secured to one side of the vertical frame member 18, and may be swung into position to cover the front of the storage compartment 47, ash drawer 45, and supporting plate 39, a handle 52 being provided on the front of this door to facilitate swinging thereof.

The outer casing of the heater includes side walls 56 which are fastened at their bottoms to the angle iron supports 17. At the front end of the stove the walls 56 curve around the frame member 18 for a short distance, as indicated in Fig. 5, and are secured thereto by screws 59, or by the fastening means for the hinges 60 of the door 50. Likewise, at their rear edges the walls 56 curve around the frame member 19 and are fastened thereto, thus aiding to prevent relative movement between the frame members 18 and 19. An air-heating space or chamber 55 is afforded between the outer casing of the heater and the inner heating unit.

The frame member 18 has openings 54 therein communicating with the aforesaid space 55 between the inner unit assembly and the outer casing. Air passing through the louvers 51 in the door 50 and casting 20, and also leaking in around the edges of the door 50, is therefore free to enter the air-heating chamber 55, where it is heated by contact with the heated walls of the fire box 27. Thereafter the heated air is discharged through openings 57 in the side walls 56, and openings 58 in the range top 25.

Draft control is afforded by the following arrangement. The grate frame 35 has holes 61, which are disposed in the longitudinal walls of the frame. Sliding plates 62, held against the walls of the frame 35 by guiding lugs 63 and 64, Figs. 3 and 4, have holes 65 therein. By pulling outwardly on the rods 66 attached to the plates 62, the holes 65 may be brought into register with the holes 61 thereby permitting air to be drawn into the interior of the grate frame 35 and upwardly through the burning fuel in the fire box 27. Depressions 67 in the frame 18, Fig. 5, permit the outer ends of the rods 66 to come flush with the body of the frame 18 when the plates 62 are slid inwardly the maximum distance to cut off the air supply to the fire chamber.

The conventional elliptical flue collar 68 is provided in the range top 25, and this collar is equipped with a damper 69 of like configuration, to eliminate the necessity of inserting a damper in the flue. A lid 70, designed to fit flush with the range top 25, and the usual circular lid 71 are provided, the lid 70 being hinged to the top 25 at 72 in the conventional manner. Fuel is admitted to the interior of the fire box through the openings covered by lids 70 and 71, the fire box being cut away at 73 to facilitate the entrance of fuel at the front end thereof.

To assist in the burning of certain fuels, such as bituminous coal, which require a secondary draft over the top of the fuel bed to obtain complete combustion, a set of draft controls generally designated 74, Figs. 3 and 4, are provided near the top of the fire box 27, these draft controls being operated in a manner similar to those on the grate frame 35, with the exception that the handles 75 thereon are reached through the openings 57 in the side walls 56. When anthracite, coke, or other short-flamed fuel is being used, the secondary draft controls 74 can be used to retard combustion of the fuel, if desired.

The draw-center grate shown in Figs. 6, 7 and 8 is particularly adapted to be used in lieu of the shaker grates in Fig. 3 for the burning of wood. A stationary flat piece 76 having rectangular openings 77 and bent-over portions 78 is sized to fit snugly on the flange or ledge 79 that surrounds the open space at the bottom of the fire box 27, Figs. 2 and 3. A sliding plate 80, having openings 81 which generally register with the openings 77, is carried by the bent-over portions 78 of the supporting plate 76, and a tongue 82 is provided at the front end of the sliding plate 80 for actuating the grate, said tongue passing through a suitable opening at the lower front end of the fire box 27. When the contents of the fire box are to be dumped, the plate 80 is slid forwardly until the large opening 83 therein registers with the large opening 84 in the plate 76. The ashes and charcoal may then be scraped out through the aligned openings 83 and 84.

If it is desired to convert the coal burner, shown in Figs. 2 to 5, into a wood-burning heater, it is merely necessary to remove the support plate 39, and withdraw the shaker grates by sliding their rear pintles 37' out of their sockets in the lugs 31. The draw-center grate, Fig. 6, is then placed on the ledge 79, and a cover plate may be fastened to the frame member 18 in lieu of the support plate 39, said cover plate having an opening therein to permit the tongue 82 of the grate to protrude therethrough.

When the stove is to be adapted to the burning of liquid fuel, Figs. 9 to 11, the arcuate plate 40 of Fig. 2 is preferably removed, as are also the shaker grates 36. A small plate 87 on the rear of the frame 42 is likewise removed to permit the passage of a fuel line into the interior of the heater. A perforated plate or pan 85, Fig. 11, having a flange 86 around its upper edge, is then placed in the stove, the flange 86 resting on the ledge 79 at the bottom of the fire box 27. Openings 88 in the sides of the pan 85, and large openings 89 in the bottom thereof, permit a free flow of air to the burner units 90. The units 90 are a conventional type of liquid fuel burner, and are supported by members 93 which are adjustably fastened to stands, generally indicated at 91, that are anchored to the plate 44 in the frame 42. Set screws 92 are provided on the members 93 to facilitate adjusting the height of each member 93 on its stand 91.

The hard coal grate, Figs. 12 to 14, used in heaters particularly adapted to the burning of anthracite, consists of a pair of shaker members 94 which are of rounded configuration, being concave on top and bottom and convex at the sides. This rounded configuration of the grate members 94 tends to prevent the hard coal and clinkers from jamming the grates when they are actuated. Each grate 94 has a pintle 95 on the front end thereof and another pintle at the rear. The front pintles 95 are supported by the plate 39' secured to the frame member 18, while the rear pintles 96 bear in sockets provided in the lugs 31' on the rear wall 39' of the grate frame 35, as has been explained hereinabove in connection with the coal burner of Figs. 2 and 3. Ribs 97 are provided on each grate member 94 to enable incoming air to circulate between the grate and the burning fuel.

In Figs. 15 and 16 there is shown a grate arrangement which has been found to be highly satisfactory in the burning of lignite. The grate members 98 are mounted in side by side relation on pintles 99 which are journaled in a trough 100

that seats on the ledge 79 of the fire box 27. The bottom of the trough 100 is open, except for the inverted channels 101, which are preferably located directly beneath the openings between the grate members 93 and which afford additional rigidity to the grate structure. As shown in Fig. 16, the channels 101 are rounded to prevent the accumulation of ashes thereon. The forward ends of the pintles 99 are of polygonal cross section and are projected a sufficient distance to enable a shaker handle to be fitted thereto when it is desired to actuate the grate.

It is manifest that the shaker grates 36 are shown on the coal burner in Figs. 2 to 5, and the hard coal grates 94, Figs. 12 to 14, of the anthracite burner, require different facilities for mounting in the grate frame 35 of the stove. To this end, I have made the rear wall of the grate frame 35 removable, so that it may comprise either a plate 30, Fig. 2, having the bearings 31 thereon for accommodating the shaker grates 36; or a plate 30' with bearings 31' thereon for the hard coal grates. Likewise the support plate 39 of the coal burner in Figs. 2 to 5 may be replaced by the support plate 39' when the stove is to be adapted to the burning of anthracite, or by a cover plate having suitable openings therein for the pintles 99 when the lignite-burning grate is employed.

Among the advantages afforded by my novel heater is the ease with which heat is transmitted from the interior of the fire box to the circulating air. This is made possible largely by the fact that the fire box 27 is supported mainly from the top of the stove, eliminating the need for side braces and supporting framework next to the inner unit assembly. Since there is no unnecessary framework separating the fire box 27 from the circulating air in the space 55, it follows that absorption of heat by the metal parts of the stove will be greatly reduced. The absence of braces, unnecessary framework, and the like in the space 55 between the inner unit assembly and the outer casing further increases the volume of warm air than can be produced, since there is nothing to impede the passage of air through the space 55. Also, the iron or brick lining usually found in the fire chambers of prior stoves has been dispensed with in the present construction. The fire box is made of fewer parts, and the walls are of minimum thickness, great strength being afforded by the ribbing.

The room air is drawn into the heater through the openings 51 in the front casing 20 and the door 50, this making for greater cleanliness than would be obtained by taking the air directly off the floor of the room. Also, there is no draft up through the ash compartment, air for combustion being admitted through the openings 61 in the grate frame 35, which is well above the ash drawer 45, thus further enhancing the cleanliness of the heater.

Another important advantage is the adaptability of the heater to the burning of a wide variety of fuels. The grates for hard and soft coal, for example, are easily interchanged. The wood-burning grate is readily installed by simply seating it on the ledge 79 of the lower part 32 of the fire box. If the stove is to be utilized as an oil burner, the perforated plate 85 is employed and the plate 87 on the frame 42 is removed to permit the fuel pipe to enter. In those localities where lignite is commonly used as fuel, the lignite-burning grate shown in Figs. 15 and 16 is

very satisfactory and is installed in the heater in the same manner as the coal grates.

While I have illustrated and described preferred embodiments of my invention it is to be understood that these are capable of variation and modification and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall within the ambit of the following claims.

I claim:

1. A heating stove comprising vertical front and rear frame members, a horizontal plate supported by said frame members, a heating unit including a fire box directly secured to and suspended from said plate, and vertical walls arranged exteriorly of and enclosing said heating unit on the sides thereof and spaced therefrom, said front frame member, said plate and said walls having openings therein providing circulation of air therethrough and between said walls and said fire box and about said unit for heating the air surrounding said stove.

2. A heating stove comprising a casing including a horizontal top plate, and a single-wall heating unit secured to and suspended from said plate and located within the casing positioned wholly below the horizontal top plate and comprising a fire box located at the lower face of the horizontal plate, a grate frame secured to and depending from said fire box, and an ash compartment secured to and depending from said grate frame.

3. A heating stove comprising a casing including a horizontal top plate, and a single-wall heating unit secured to and suspended from said plate and located within the casing positioned wholly below the horizontal top plate and comprising a fire box located at the lower face of the horizontal plate, a grate frame secured to and depending from said fire box, and an ash compartment secured to and depending from said grate frame, said heating unit being spaced from the casing and providing between it and the casing an uninterrupted space from the top to the bottom of the heating unit.

4. A heating stove comprising a casing including a horizontal top plate, and a single-wall heating unit secured to and suspended from said plate and located within the casing positioned wholly below the horizontal top plate and comprising a fire box located at the lower face of the horizontal plate, a grate frame secured to and depending from said fire box, an ash compartment secured to and depending from said grate frame, said heating unit being spaced from the casing and providing between it and the casing an uninterrupted space from the top to the bottom of the heating unit, and means preventing lateral movement of the heating unit.

5. A heating stove comprising a casing including a horizontal top plate, and a single-wall heating unit secured to and suspended from said plate and located within the casing positioned wholly below the horizontal top plate and comprising a fire box located at the lower face of the horizontal plate, a grate frame secured to and depending from said fire box, an ash compartment secured to and depending from said grate frame, said heating unit being spaced from the casing and providing between it and the casing an uninterrupted space from the top to the bottom of the heating unit, and spaced saddles receiving the lower end of the heating unit and preventing lateral movement of the same.

6. A heating stove comprising a casing including a supporting base, vertical front and rear frame members, a horizontal top plate supported by said frame members, and side panels detachably secured to the front and rear frame members, a fire box secured to and depending from said top plate and located within said casing and positioned wholly beneath the top plate, a grate frame secured to and depending from said fire box, and means preventing lateral movement of said fire box and said grate frame.

7. A heating stove comprising vertical front and rear frame members, a horizontal plate supported by said frame members, a heating unit including a fire box directly secured to and suspended from said plate, and vertical walls spaced from said fire box and cooperating with said frame members and said plate to form an outer casing substantially enclosing said heating unit, openings being provided in said casing at suitable

points therein to afford circulation of air therethrough and between said walls and said fire box for heating the air surrounding said stove.

8. A heating stove comprising vertical front and rear frame members, a horizontal plate supported by said frame members, a heating unit including a fire box directly secured to and suspended from said plate, said rear frame member being bifurcated at its upper end to enable said fire box to project slightly rearwardly thereof, and vertical walls spaced from said fire box and cooperating with said frame members and said plate to form an outer casing substantially enclosing said heating unit, openings being provided in said casing at suitable points therein to afford circulation of air therethrough and between said walls and said fire box for heating the air surrounding said stove.

FRANK T. HERRON.