

July 12, 1949.

S. P. CAMPBELL

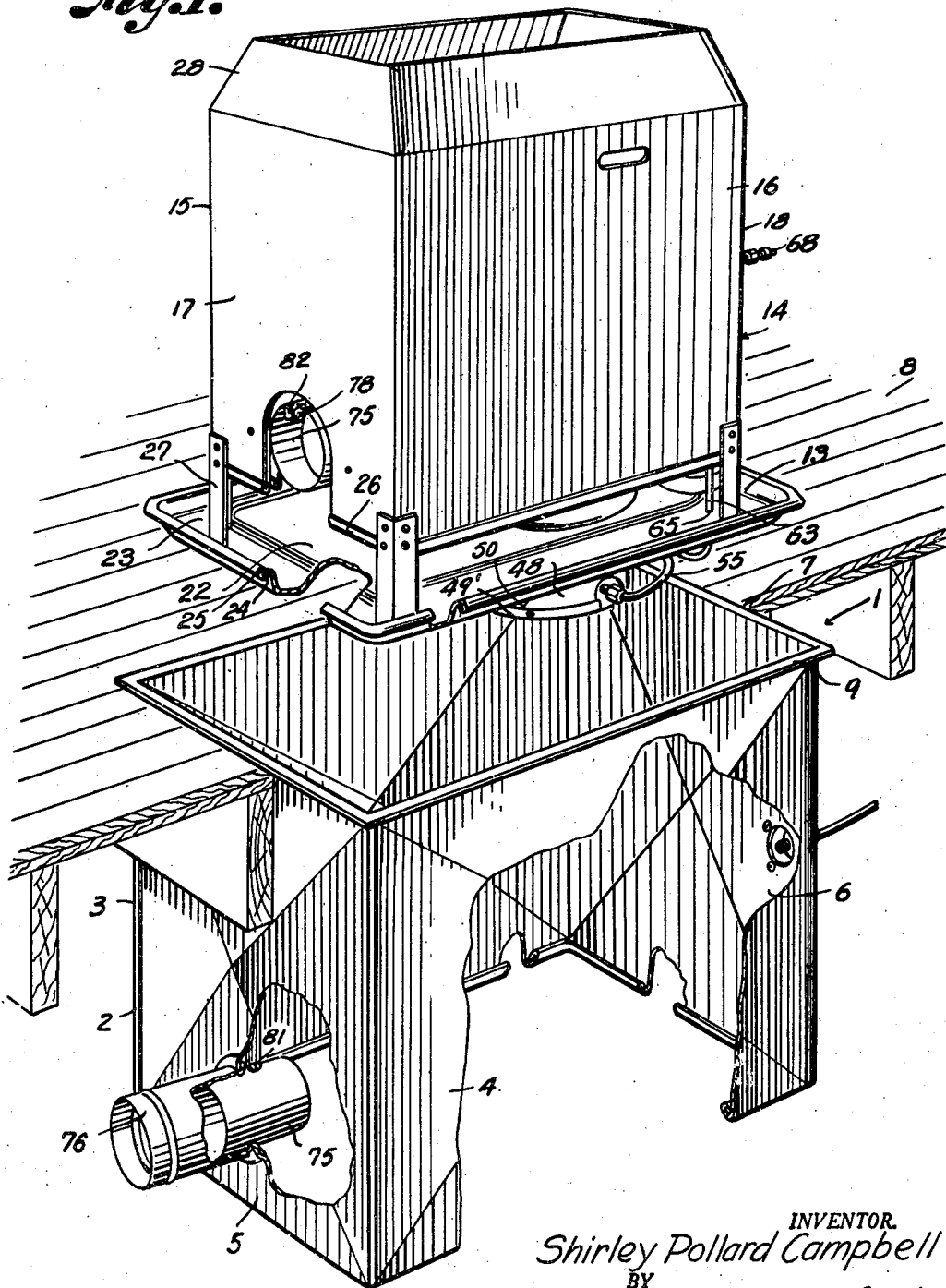
2,475,737

FLOOR FURNACE WITH REMOVABLE PARTS.

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3 Sheets-Sheet 1

Fig. 1.



INVENTOR.
Shirley Pollard Campbell
BY
Fishburn & Mullendore
ATTORNEYS

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Fig. 5.

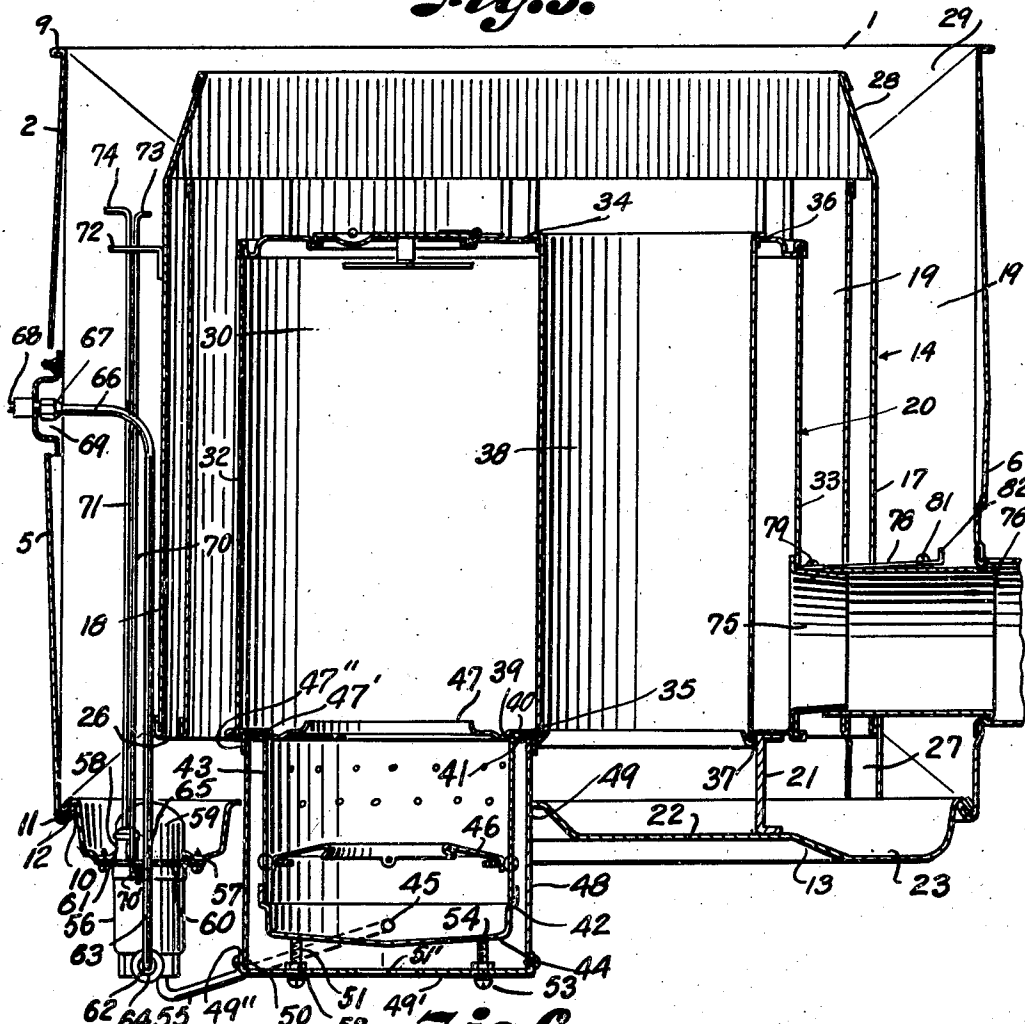
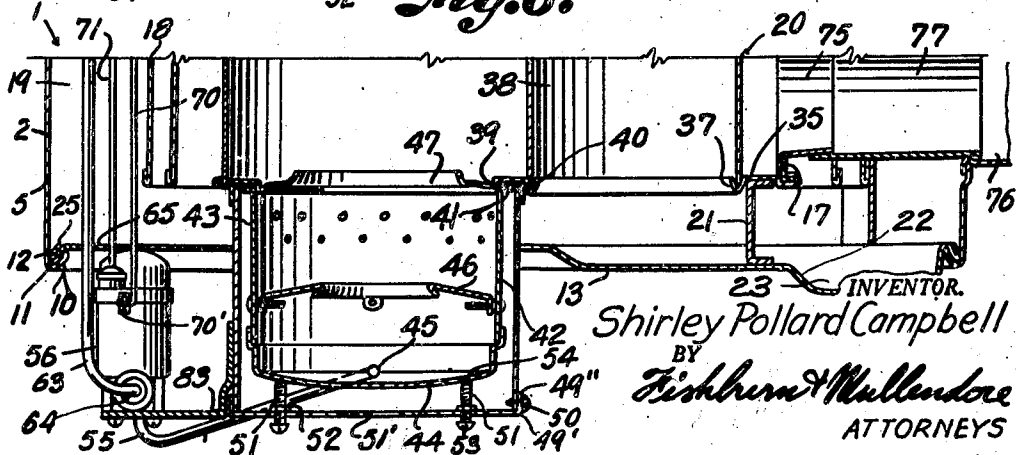


Fig. 6.



INVENTOR.
Shirley Pollard Campbell
BY
Fishburn & Mullendore
ATTORNEYS

UNITED STATES PATENT OFFICE

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FLOOR FURNACE WITH REMOVABLE PARTS

Shirley Pollard Campbell, Wichita, Kans., assignor to The Coleman Company, Inc., Wichita, Kans., a corporation of Kansas

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13 Claims. (Cl. 126—116)

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This invention relates to floor furnaces and particularly to those requiring fuel burners, fuel control, and constant level valves and similar parts which must be serviced from time to time in order to maintain the furnace in efficient operation. Furnaces of this character are installed in many homes without basements and due to the liability of flooding and other reasons, sufficient space cannot be provided below the floor to accommodate furnaces of the usual depth and provide room for servicing.

It is, therefore, the principal purpose of the present invention to provide a furnace assembly which requires less depth of space by partially locating the burner pot and constant level metering valve within the lower portion of the furnace casing.

Another object of the invention is to permit installation of the furnace in homes with basements so that they occupy less of the basement space.

Other objects of the invention are to provide a structure which permits servicing of the burner pot and constant level metering valve from above the floor when the furnace is installed in locations without basements and to provide for removal of the burner pot and metering valve from below the floor when the furnace is installed in locations with basements.

Further objects of the invention are to provide for removal of the burner pot and metering valve without breaking the fuel connections when the servicing is carried on within the basement; to provide a furnace construction having a lower cost of production through saving in material by reason of a furnace of shorter height; and to provide a furnace construction wherein the furnace parts are carried by the casing bottom, thereby eliminating the frame usually required to support such working parts.

In accomplishing these and other objects of the invention I have provided improved structure, the preferred forms of which are illustrated in the accompanying drawings wherein:

Fig. 1 is a perspective view of a floor furnace showing the heater unit assembly removed upwardly through the casing to a position above the floor for inspection and repair, parts of the casing being broken away to better illustrate the construction.

Fig. 2 is a perspective view of a floor furnace installed in a home having a basement and showing the burner and constant level control valve removed from the basement side for inspection and repair.

Fig. 3 is an enlarged section on the line 3—3 of Fig. 2 illustrating removable support of the furnace bottom within the walls of the casing.

Fig. 4 is a fragmentary perspective view of the flue connection.

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Fig. 5 is a vertical section through the furnace showing the heater unit assembly in position within the furnace casing.

Fig. 6 is a section through the lower portion of a modified form of the invention.

Referring more in detail to the drawings:

1 designates a floor furnace including a substantially rectangular enclosure adapted to be suspended through an opening 7 in a floor 8. The upper edges of the casing walls have lateral flanges 9 engaging the floor to support the casing and to seat a removable floor grill (not shown) that normally covers the open top of the casing. The lower edges of the casing walls terminate in downwardly and upwardly extending flanges 10 having the free edges thereof turned retractively as at 11 to stiffen the flange and form a downwardly and outwardly sloping seat 12 to mount a removable bottom 13 carried as a part of a heater unit assembly 14. The heater unit assembly 14 includes an inner casing having side and end walls 15—16 and 17—18 spaced inwardly of the corresponding walls of the outer casing to form downdraft passages 19 for flow of air from the room to be heated downwardly into the casing. The heater assembly also includes a heating unit 20 that is positioned within the inner casing and attached to the bottom 13 by brackets 21. The bottom 13 is preferably of pan shape in that it has a raised central portion 22 surrounded by a trough-like portion 23. The outer edge of the trough-like portion 23 terminates in an outwardly and downwardly extending flange 24 having a reversely turned lip 25 to stiffen the flange for seating on the seat 12 of the outer casing as shown in Figs. 3, 5 and 6. The lower edges 26 of the walls of the inner casing are supported in spaced relation from the bottom 13 by legs 27 that may be secured to the corners of the inner casing and which have their lower ends connected with the bottom 13 as by welding or the like. The upper part of the inner casing terminates in inwardly extending portions 28 to provide enlarged inlets 29 for the downdraft passageways 19 and to direct the air heated by the heating unit for flow toward the center of the grill.

The heating unit includes side walls 30 extending parallel with and spaced from the side walls 15 and 16 of the inner casing and which are connected by end walls 32 and 33 similarly spaced from the end walls of the casing. The side and end walls are closed at the upper and lower ends by a top 34 and a bottom 35. Formed in the top and bottom at one end of the casing 30 are openings 36 and 37 to pass the ends of an updraft tube 38 which provides additional heating surfaces and passageway for air to be heated. The opposite end of the casing has an opening 39 in the bottom thereof encircled by a flange 40 inset

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from the underside of the bottom 35. 42 designates a burner pot which includes an annular perforated wall 43 having a lateral flange forming a rim 41. The burner pot also includes a dished bottom 44 for collecting a pool of oil admitted through an inlet 45 in the side wall thereof. The burner pot has the usual low fire ring 46; however, the high fire ring 47 may be attached as a part of the bottom of the combustion chamber in which case it includes a marginal portion 47' secured to the underside of the inset flange 40 by welding or the like. The fire ring has a depending outer flange 47'' for securing the burner pot chamber. The burner pot chamber is formed by an annular wall 48 that is encircled by the flange 47'' and which projects through an opening 49 in the bottom 13. The upper end of the wall 48 is suitably attached to the flange 47'' as by welding or the like. The bottom of the burner chamber is closed by a cover 49' having an upwardly extending flange 49'' sleeved over the wall of the burner chamber and secured by fastening devices such as screws 50. The cover or closure has an opening 51' and the wall 48 is of a length and diameter to provide for air passage about the burner pot for admitting combustion supporting air. The burner pot is supported with the rim 41 thereof in centered relation with an annular seat 40 of the fire ring by set screws 51 turned in nuts 52 fixed to the inner face of the cover, the heads 53 of the screws being located on the outside of the cover and adapted to be rotated to move the ends of the shanks 54 thereof against the bottom of the burner pot as shown in Fig. 5. The fuel is supplied to the inlet of the burner pot through a pipe 55 connected below the furnace bottom with a constant level and control valve 56 of ordinary construction. The constant level control valve, like the burner, requires inspection, adjustment, and repair and in order to remove the valve from below the casing, the trough-like portion in the bottom of the casing preferably has a flat portion 57 formed therein adjacent the burner chamber and which has an opening 58 in the bottom thereof of a size to pass the upper part 59 of the constant level valve. The casing of the constant level valve has a lateral flange 60 overlapping the bottom at the edge of the opening 58 and is adapted to be removably connected by fastening devices such as screws 61 having their heads exposed on the exterior side of the flange so that upon removal thereof the constant level valve is readily withdrawn. The constant level valve has an inlet 62 for the supply of fuel through a pipe 63.

In order that the fuel supply pipe may be removably connected with the valve, the discharge end thereof is connected with a valve through a union nut 64 located below the bottom of the casing. The pipe 63 extends upwardly through an opening 65 in the bottom of the casing and terminates substantially midway of the height of the casing in a lateral bend 66 and which is connected by a union nut 67 with the terminal of a supply pipe 68 normally located within a recess 69 provided on the end wall of the casing. The constant level valve has a reset rod 70 and a flow regulating rod 71 which extend upwardly from the valve through one of the downdraft passages and which are carried at their upper ends by a bracket 72 attached to the wall of the inner casing. The upper ends of the rods terminate in lateral extensions forming handles 73 and 74 by which the rods are manipulated. The lower ends of the rods are connected with the constant level

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valve by slip apart connections. For example, the rod 70 has a hook 70' on the end thereof that slips into an opening in the reset lever and the rod 71 is also detachably connected with a flow adjusting valve.

The heater unit has a flue outlet connection or collar 75 registering with a flue pipe connection collar 76 carried by the end wall of the casing. Slidable in the flue connection collar is a telescoping pipe section or thimble 77 adapted to engage over the collar 75 to form a continuous duct from the combustion chamber of the heating unit with the flue pipe.

The thimble 77 is latched in position by a latch arm 78 pivoted to the collar 75 by a screw or the like 79. The free end of the latch has a notch 80 adapted to engage a pin 81 carried on the telescoping section. The latch is provided with a finger grip 82 whereby it may be moved into and out of latching position.

In installing a floor furnace constructed as described, an opening 7 is made in the floor and the casing 2 suspended therein with the flanges 9 supported on the floor 8 at the marginal edge of the opening. The fuel supply pipe 68 is connected with the casing and the flue connection collar 76 is connected with a chimney, or other suitable vent. The telescoping section or thimble 77 is slid within the flue connection collar so that the heater unit assembly including the inner casing and the bottom 13 are movable through the open top of the casing with the bottom 13 passing the fuel supply pipe and the retracted thimble 77 to seat upon the flange seat 12 of the casing walls. After placement of the assembly, the union 67 is connected with the bend 66 of the pipe 63 that leads to the constant level and control valve 56. The telescoping flue connection or thimble 77 is then shifted to engage over the collar 75 after which the latch 78 is swung into position so that the notch 80 thereof engages the pin 81. The grill (not shown) is then placed over the top of the furnace completing the assembly.

After the furnace has been in operation for some time, the burner 42 and constant level control valve 56 usually require inspection and servicing. When the furnace has been installed in a home without a basement, the entire assembly including the bottom 13 of the casing which carries the burner 42 and the constant level control valve 56 is readily removed upwardly through the open top of the casing so that any part of the assembly may be worked on at a position above the floor. This is effected by a disconnecting the union nut 67 and by disengaging the latch 78 and pushing the telescoping connection or thimble 77 into the flue connection collar 76 so that the underlying bottom of the casing will clear the end thereof when the unit is lifted through the top of the casing.

When the unit is removed and placed above the floor, the parts thereof are readily removed for inspection and repair. When the heater assembly has been removed from the top, it is readily lowered through the open top of the casing until the flange on the bottom seats upon the inturned flange of the casing wall, after which, the flue and fuel pipe connections are re-established.

When the furnace is installed in a home having a basement, it is more desirable to service the furnace from the basement side. The burner may be readily serviced by disconnecting pipe 55 and removing the screws 50 so that the cover 49'

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and burner pot 42 will drop from position within the burner chamber. The constant level valve 56 is readily removed by disconnecting the union nut 64 and removing the screws 61. The slip apart connections with the rods are readily disengaged and the constant level valve is free to be serviced. After servicing, the burner pot 42 is moved through the lower end of the burner chamber followed by the cover 49'. The flange 49' of the cover is pushed into position so that it telescopes the burner chamber, after which the screws 50 are inserted. The burner may be tightened in its seat by adjusting the set screws 51. The constant level valve 56 is returned to position by moving the upper part 59 thereof through the opening 58 until the flange 60 engages its seat. The connections for the rods 70 and 71 are made and the screws 61 are inserted. The pipe 55 which has been disconnected is then reconnected to establish flow between the constant level valve and the burner pot.

The form of invention shown in Fig. 6 is substantially the same as that above described except that the constant level and control valve 56 is mounted entirely below the bottom 13 on a bracket 83 carried by the side wall 48 of the burner pot chamber.

From the foregoing it is obvious that I have provided a floor furnace construction which may be installed and serviced from above or below the floor. Thus, the furnace is adapted for any installation either in homes with basements or without as the case may be.

What I claim and desire to secure by Letters Patent is:

1. A floor furnace including a casing having walls adapted to be suspended within a floor opening and having an open top normally adapted to be covered by a grill, a bottom for the casing, means for removably supporting said bottom by said walls, a heater unit assembly carried by the bottom, means connecting the heater unit with said bottom for removal of said bottom with the heater unit through the open top of the casing, said heater unit including a constant level control valve, and means for removably mounting said valve on said bottom for removal with the heater unit assembly through the top of the casing and for separate removal downwardly from said bottom exteriorly of the casing when the heater unit is in position within the casing.

2. A floor furnace including a casing having walls adapted to be suspended within a floor opening and having an open top normally adapted to be covered by a grill, a bottom for the casing provided with an opening, means for removably supporting said bottom from said walls, a heater unit carried by the bottom means connecting the heater unit with said bottom for removal of said bottom of the heater unit through the open top of the casing, said heater unit including a burner pot, means supporting the burner pot for downward removal exteriorly of the casing through the opening in said bottom when the heater unit is in position in said casing, and a constant level control valve carried by said bottom when the heater unit is removed for removal downwardly with said bottom through the top of the casing.

3. A floor furnace including a casing having walls forming an open top and open bottom adapted to be suspended within a floor opening, a removable bottom for the casing having an opening, means carried by the casing walls providing a support for said bottom, an annular wall extending through said opening for forming the

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sides of a burner pot chamber, a bottom closure for the burner pot chamber, means removably connecting the bottom closure with the annular wall of said chamber, a heating unit carried by the removable bottom of the casing and having a combustion chamber provided with a circumferential seat substantially coaxially registering with the wall of the burner pot chamber, and a burner pot in the burner pot chamber having a rim engageable with said seat.

4. A floor furnace including a casing having walls forming an open top and open bottom adapted to be suspended within a floor opening, a removable bottom for the casing having an opening means carried by the casing walls providing a support for said bottom, an annular wall extending through said opening for forming the sides of a burner pot chamber, a bottom closure for the burner pot chamber, means removably connecting the bottom closure with the wall of said chamber, a heating unit carried by the removable bottom of the casing and having a combustion chamber provided with a circumferential seat substantially coaxially registering with the wall of the burner pot chamber, a burner pot in the burner pot chamber having a rim engageable with said seat, and means carried by the bottom closure for supporting the burner pot in engagement with said seat.

5. A floor furnace including a casing having walls forming an open top and adapted to be suspended within a floor opening, a removable bottom for the casing, means carried by the said walls providing a support for said bottom, a burner pot housing having its side walls projecting downwardly from said bottom and a bottom closure, means removably connecting the bottom closure with the downwardly projecting walls, a combustion chamber casing carried by and connected to the removable bottom of the first named casing and having a circumferential seat substantially registering with the wall of the burner pot housing, a burner pot having a rim engageable with said seat, means carried by the removable closure for supporting the burner pot in engagement with said seat, a constant level control valve, means supporting the control valve for removal on said bottom, and a detachable fuel conduit between the constant level control valve and the burner pot and located below said bottom.

6. A floor furnace including a casing having walls forming an open top and adapted to be suspended within a floor opening, a removable bottom for the casing, means carried by the said walls providing a support for said bottom, said bottom having an opening, a burner pot housing having an annular wall in contact with the periphery of said opening and a bottom closure means removably connecting the bottom closure with said wall of the housing, a heating unit having a combustion chamber carried by the removable bottom of the casing and having a circumferential seat substantially registering with the wall of the burner pot housing, a burner pot having a rim engageable with said seat, means carried by the removable closure for supporting the burner pot in engagement with said seat, a constant level control valve, means removably attaching the constant level control valve to the bottom of the casing, a fuel conduit between the constant level control valve and the burner pot, a fuel supply pipe extending into the casing and through said bottom, removable connections for said conduit, a removable connection in the fuel supply pipe outset from the path of movement of

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said bottom when the bottom is removed from the casing and said connection being accessible within the casing, and a second removable connection in the fuel supply pipe below said bottom of the casing.

7. A floor furnace including a casing having side walls forming an open top and adapted to be suspended within a floor opening, a bottom for the casing, means supporting the bottom for removal through the open top of the casing, a heating unit including a burner pot carried by the removable bottom of the casing, and means for removably supporting the burner pot from said bottom exteriorly of the casing when the bottom is in said casing.

8. A furnace of the character described including, an outer casing having a bottom, means providing removable support for said bottom, a unit assembly removable from the outer casing and including an inner casing, a heating unit within the inner casing and supported by said bottom, a constant level fuel control valve for supplying fuel to the heating unit, means for mounting said constant level valve for removal from below said bottom, operating rods for said constant level valve supported by the inner casing, and slip-apart connections between the constant level valve and said rods for effecting disconnection of said rods when the constant level valve is removed from below said bottom.

9. In a floor furnace including a casing having side walls forming an open top and adapted to be suspended within a floor opening, a removable assembly in said casing including a casing bottom and a heating unit carried on and fixed to said bottom, means on the side walls providing removable support for said bottom, a flue connection collar having one end fixed to one wall of the casing in substantially flush relation with the inner face of said wall, a collar on the heating unit, a thimble connecting said collars and slidable into one of the collars for clearance in passing said bottom by the wall-supported collar when the assembly is removed through the open top of the casing, a fuel supply duct extending through a wall of the casing and having connection with the heating unit, and a coupling in the supply duct on the inside of the casing and offset outwardly from the path of removal for said bottom.

10. In a floor furnace including a casing having side walls forming an open top and adapted to be suspended within a floor opening, a removable assembly in said casing including a casing bottom and a heating unit carried on and fixed to said bottom, means providing removable support for said bottom, a flue connection collar having one end fixed to one wall of the casing in substantially flush relation with the inner face of said wall, a collar on the heating unit, a thimble connecting said collars and slidable into one of the collars for clearance in passing said bottom by the wall-supported collar when the assembly is removed through the open top of the casing, a constant level valve for said heating unit and removably carried by said bottom of the casing below said bottom, a fuel supply duct extending through a wall of the casing and having connection with the constant level valve below said bottom, and a coupling in the fuel supply duct on the inside of the casing and offset outwardly from the path of removal of said bottom to pass the

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bottom when the heating unit is removed from the casing.

11. A floor furnace including a casing having walls forming an open top and adapted to be suspended within a floor opening, a removable bottom for the casing, means carried by said walls providing support for said bottom, said bottom having an opening, an annular wall extending through said opening to form sides of a burner pot chamber, a bottom closure for the burner pot chamber, means removably connecting the bottom closure with the annular wall, a heating unit carried by and connected with the removable bottom of the casing and having a combustion chamber provided with a circumferential seat substantially registering with the annular wall of the burner pot chamber, a burner pot in said chamber and having a rim engageable with said seat, and set screws carried by the removable closure and engaging the bottom of the burner pot for supporting the burner pot in engagement with said seat.

12. A floor furnace including a casing having side walls forming an open top and adapted to be suspended within the floor opening, a removable bottom for the casing, means on the side walls supporting said bottom, an annular wall extending through said bottom and depending below said bottom to provide the sides of a burner pot chamber, a bottom closure for the burner pot chamber, means removably connecting the bottom closure with the annular wall of said burner pot chamber, a heating unit having a combustion chamber provided with a circumferential burner pot seat substantially registering with the wall of the burner pot chamber, a burner pot in said burner pot chamber having a rim engageable with said seat and removable from said chamber when the bottom closure is removed, and adjustable means carried by the bottom closure for urging the burner pot into engagement with said seat.

13. A floor furnace including a casing adapted to be suspended within a floor opening and having an open top normally adapted to be covered by a grill, a removable bottom for the casing adapted to pass through said open top of the casing, means supporting the bottom for removal through said open top of the casing, a heater unit connected to and carried by the bottom for removal with said bottom through the open top of the casing, a fuel supply duct extending through a wall of the casing and having connection with the heater unit, and a coupling in the supply duct on the inside of said casing and offset outwardly from the path of removal of said bottom to pass said bottom when the heater unit and bottom are removed from the casing.

SHIRLEY POLLARD CAMPBELL.

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