June 27, 1933. O. C. SCHROEDER ET AL 1,915,903

HEATER

Filed Feb. 25, 1932 3 Sheets-Sheet 1

Fig. 1.

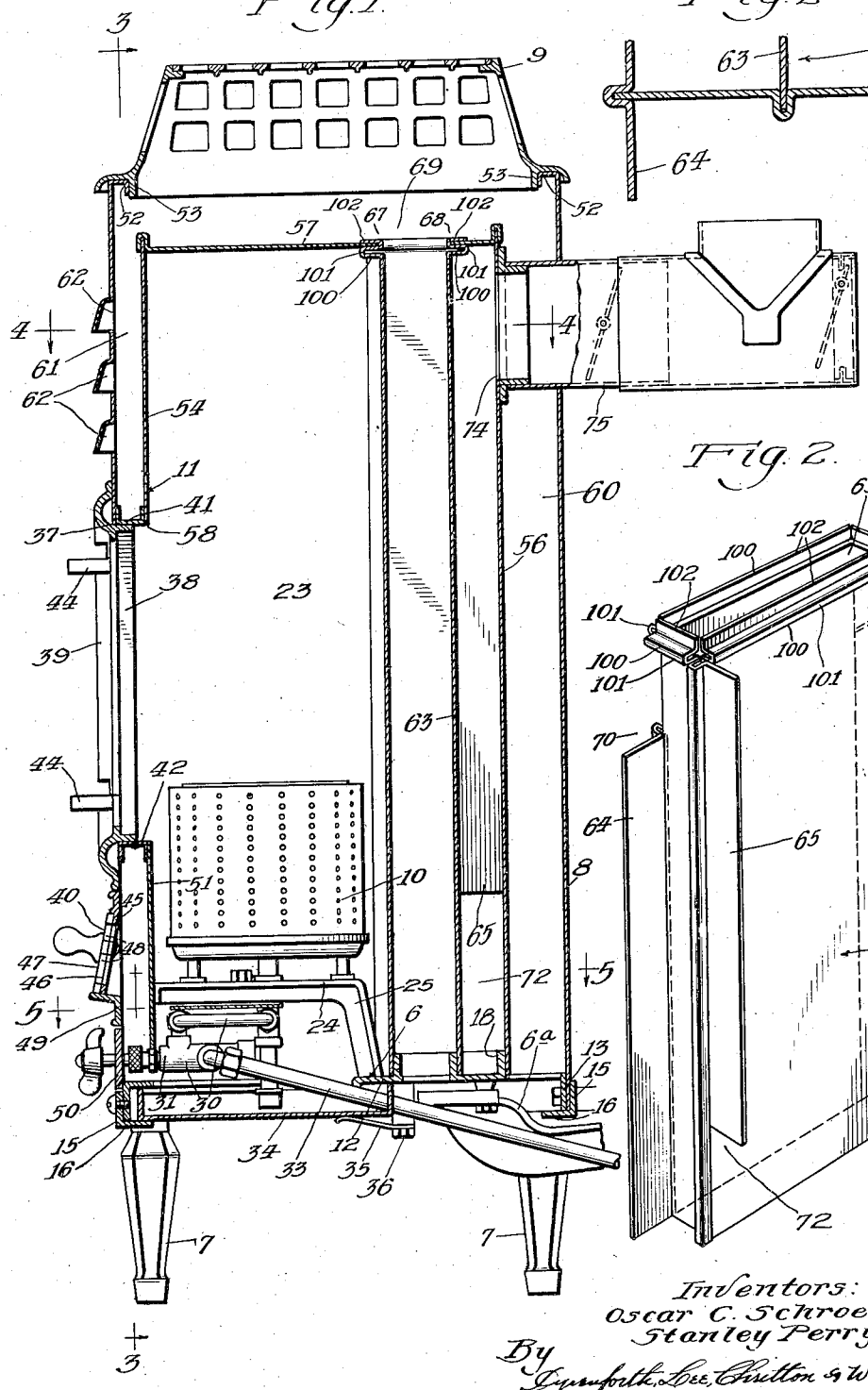


Fig. 2a.

Fig. 2.

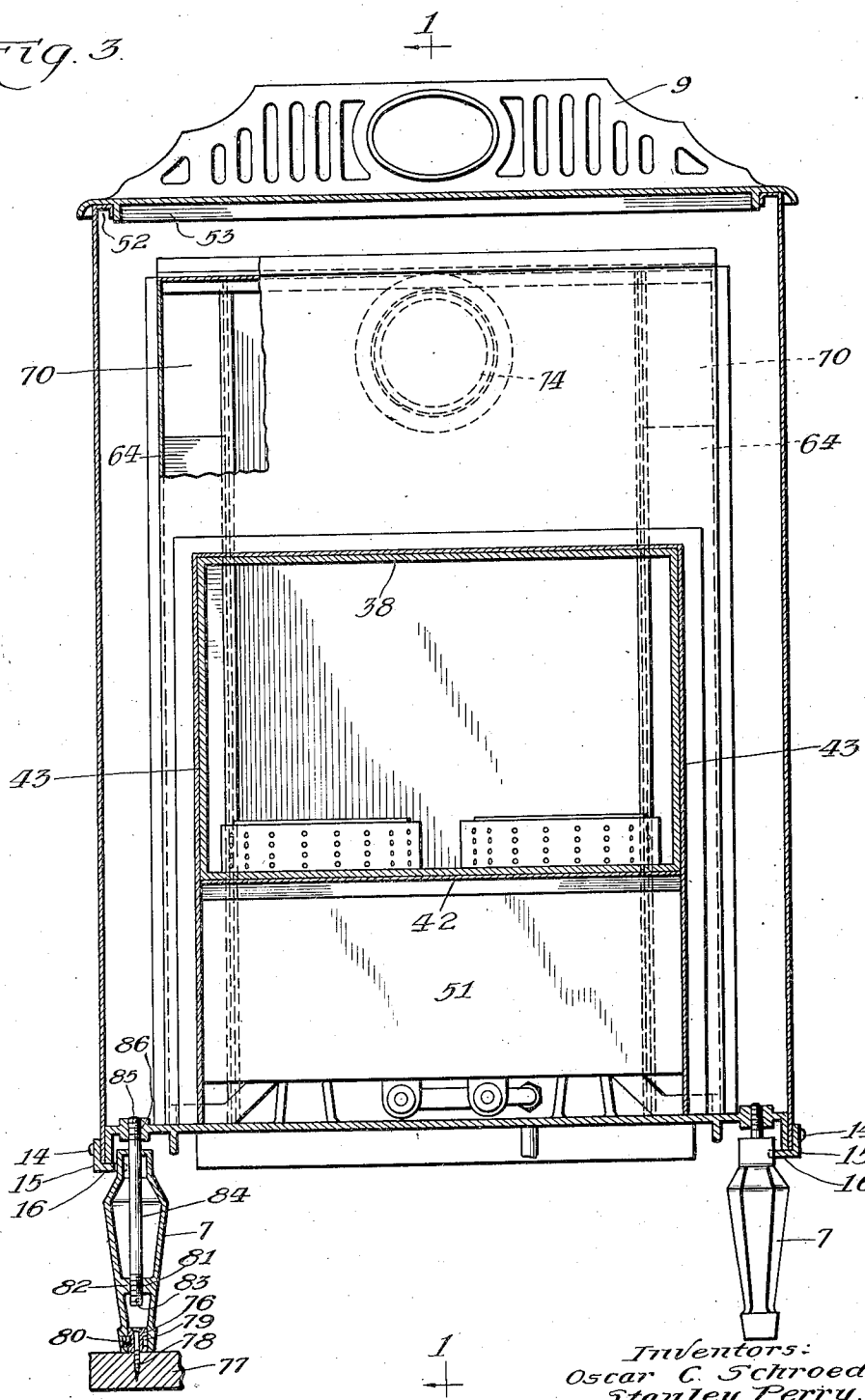
Inventors:
Oscar C. Schroeder,
Stanley Perry
By Dyrenforth, Lee, Chritton & Wilcox,
Attorneys:

June 27, 1933. O. C. SCHROEDER ET AL 1,915,903

HEATER

Filed Feb. 25, 1932 3 Sheets-Sheet 2

Fig. 3.



1

Inventors:
Oscar C. Schroeder
Stanley Perry.

By Dyer, Tompkins, Lee, Christton & Wilks,
Attorneys.

June 27, 1933. O. C. SCHROEDER ET AL 1,915,903

HEATER

Filed Feb. 25, 1932 3 Sheets-Sheet 3

Fig. 4.

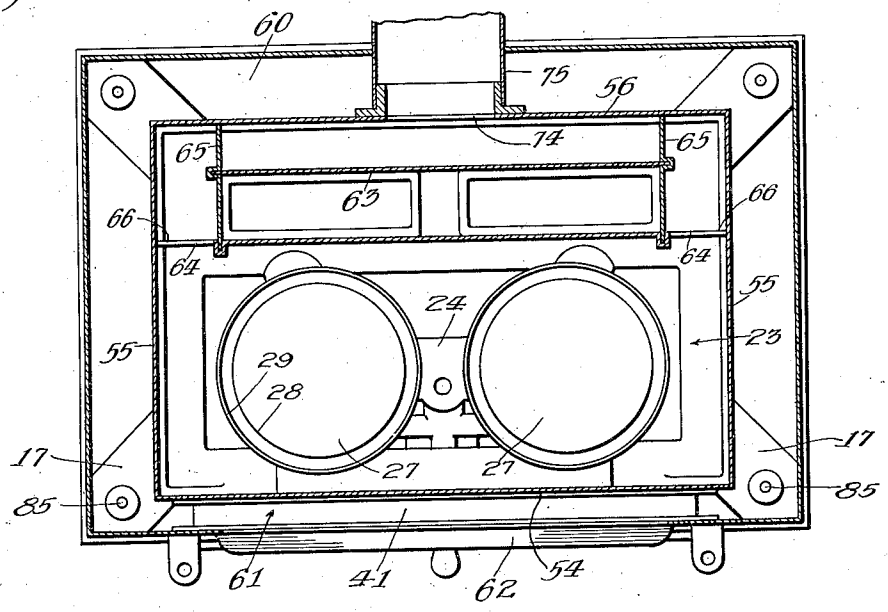
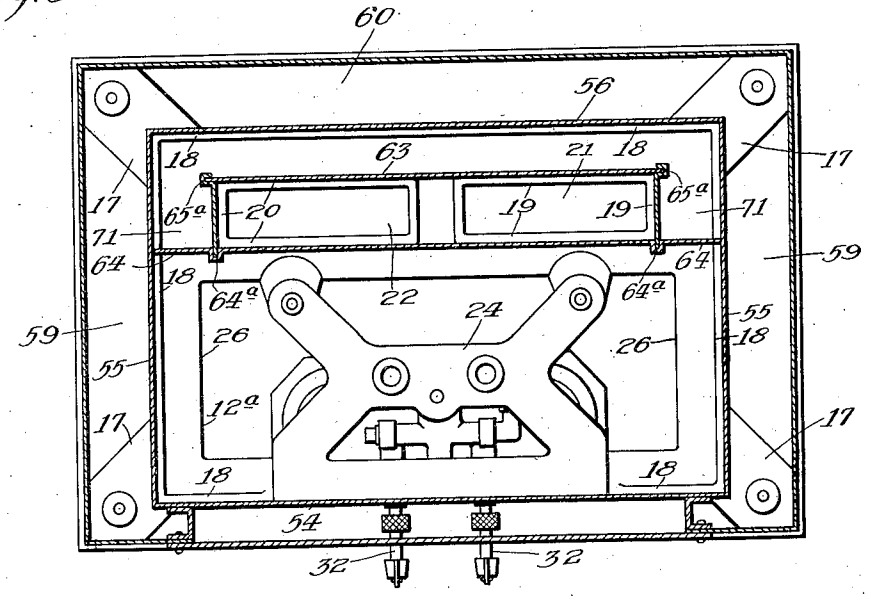


Fig. 5.



Inventors:
Oscar C. Schroeder,
Stanley Perry.
By Dyrenforth, Lee, Chritton & Wiles,
Attorneys

Patented June 27, 1933 1,915,903

UNITED STATES PATENT OFFICE

OSCAR C. SCHROEDER AND STANLEY PERRY, OF CHICAGO, ILLINOIS; SAID PERRY ASSIGNOR TO AUTOMATIC BURNER CORPORATION, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS

HEATER

Application filed February 25, 1932. Serial No. 595,178.

Our invention relates more particularly, though as to certain features thereof not exclusively, to oil heaters of the type employing an air duct, rising through the casing of the heater for heating air entering the lower portion of the heater and discharging it at the upper portion thereof.

Certain of my objects are to provide a heater of the type above referred to which will be of simple construction and by which the heat generated in the combustion chamber of the heater may be used to the best advantage in the heating of the air circulating in the air duct; to provide for the minimum resistance to the flow of air through the heater; to provide for a long gas passage through the heater with the minimum resistance to the flow of the gas therethrough to the end of providing, in connection with the air duct, for the absorption by the air, in the flue, of the heat in the gases to a high degree thus assuring low stack temperatures; to provide for the supporting of the burner unit, valve mechanism therefor, fire box structure and exterior shell, when used, on a base and in their proper relation, and for the adjustment on the base to cause these parts to occupy the desired position in use; to provide means for air-cooling the valve mechanism referred to and pre-heating the air supplied for supporting combustion; to provide a structure which will serve the double purpose of catching any drippings from a burner, where an oil burner is used and forming the bottom of the combustion chamber; to provide a construction of heater having an air duct, the casing and duct portions of which will present the minimum number of joints; to render such structures more economical of manufacture and better adapted to perform the service for which they are provided; and other objects as will be manifest from the following description.

Referring to the accompanying drawings:

Figure 1 is a view in vertical sectional elevation of an oil-burner heater constructed in accordance with my invention, the section being taken at the line 1—1 on Fig. 3 and viewed in the direction of the arrows.

Figure 2 is a perspective view of a sheet metal air duct unit for insertion into the inner shell of the heater to form therewith passages for the hot gases in flowing to the outlet of the heater.

Figure 2ª is an enlarged fragmentary plan section of a portion of the air duct unit of Fig. 2 showing details of certain of the joints thereof.

Figure 3 is a section taken at the line 3—3 on Fig. 1 and viewed in the direction of the arrows.

Figure 4 is a plan section taken at the line 4—4 on Fig. 1 and viewed in the direction of the arrow; and

Figure 5, a plan section taken at the line 5—5 on Fig. 1 and viewed in the direction of the arrows.

The heater shown comprises a base portion 6 having legs 7 at which the heater is supported, an outer shell 8 forming a casing shown as of rectangular shape in plan, a perforated hood, or cover portion, 9 surmounting the shell 8, a burner apparatus 10, shown as an oil burner, for generating the heat, and an inner shell structure 11 disposed in the shell 8 and spaced therefrom at all sides and at its top and forming air and gas ducts or flues.

The base 6 which may be in the form of a casting comprises a plate portion 12 having depending flanges 13 along each edge thereof which is lapped by the lower edges of the shell 8 with which the base is telescoped and to which it is attached by screws 14, the lower edge of the shell 8 having applied thereto angle irons 15 secured in place by the screws 14, the horizontal flanges 16 of the angle irons 15 extending inwardly.

The base 6 is provided at its four corners with outwardly extending arms 17 to which the legs 7 are secured as hereinafter described, and is provided at its back and side edges and at portions of its front edges with an upstanding rib 18 and within the rib 18 as provided, with upstanding continuous ribs 19 and 20 located forward of the rear edge of the base 6 and surrounding openings 21 and 22, respectively, in the base, the rib structures 19 and 20 extending short of the ribs 18 at the side edges of the base.

The forward portion of the base at which it extends beneath the combustion chamber hereinafter described and represented at 23, is provided with an upper platelike portion 24 supported by legs 25 at its rear edge and rising from the plate portion 12, the forward portion of the latter being in the form of a rectangular frame 12ª and presenting an aperture 26.

The burner apparatus 10 is supported on the plate 24 of the base 6, the plate 24 being of skeleton form as shown. The burner apparatus 24 in the particular construction shown comprises two burner units 27 of the well known range burner type and comprising inner and outer perforated shells 28 and 29, the piping represented at 30 and through which the oil is supplied to the units 27, being provided with oil-flow-controlling valve devices 31, the stems 32 of which extend through the front side of the heater to be accessible for manipulation, the pipe to which the oil is supplied to the valve-controlled piping 30, being represented at 33 and extending to any suitable source of oil supply, as for example oil-supplying apparatus including an oil-receptacle (not shown), the oil-supplying apparatus being preferably supported exteriorly of the heater-casing on the rear end of a bracket 6ª secured to the base 6.

The base 6, together with an oil drip pan 34 located directly below the burner apparatus, forms the bottom of the heater, the pan 34 being shown as supported at its front edge on the flange 16 at the front of the heater and at its rear edge on an arm 35 pivotally supported at 36 on the base 6, the pan 34 thus being adapted for removal as desired.

The front wall of the shell 8 contains an opening 37 for a door casing 38 and door 39 co-operating therewith, and a damper-equipped air-inlet structure 40, the opening 37 being framed by an upper channel cross member 41, a lower channel cross member 42 and side channel members 43, the latter extending to the base 6.

The door casing 38 fits into the opening between the cross channels 41 and 42 and is secured in place in any desirable manner, the door 39 being hinged to the door frame at the hinges represented at 44.

The structure 40 comprises a stationary plate section 45 secured in place and containing air-inlet openings 46 and a damper in the form of a sliding plate 47 containing apertures 48 for controlling the passage of air at this point into the heater.

The opening 41 below the structure 40 is closed by the member 49 and a plate 50 which are secured at their ends to the side channels 43.

Positioned back of the air-inlet structure 40 and spaced therefrom is a vertical baffle plate 51 secured at its upper edge to the cross channel 42 and extending to within a short distance of the portion 12ª of the base 6, this plate being secured to the forward edge of the upper plate portion 24 of the base and extending the full width of the opening 37.

The upper edges of the shell 8 are stiffened by turning these edges inwardly and then downwardly as represented at 52 thereby causing the shell to present a framing about its upper edge into which the depending flanged portion 53 of the cover 9 extends.

The inner shell 11 is formed of a front plate portion 54, side plate portions 55, a back portion 56, and a top portion 57, the front portion 54 being closed except for an opening 58 coincident, and coextensive, with the opening 37 in the outer shell.

The shell 11 thus provided affords, with the outer shell 8, air passages 59 at opposite sides of the heater, an air passage or flue 60 at the back of the heater and an air passage or flue 61 at the front of the heater the front wall of which contains louvered inlets 62. The passages 59 and 60 open at their bottoms to the atmosphere through the openings in the base 6 and, together with the flue 61, open at their upper ends into the space above the top 57 of the inner shell and thus in communication with the apertured top portion 9 of the heater.

The shell 11 also comprises a sheet metal structure (Fig. 2), preferably provided as a unit, and comprising a duct 63 of rectangular shape in plan section and open at its top and bottom, the duct 63 being provided along its forward vertical edges with laterally extending plates 64 extending from its bottom to within a short distance of its top, and at its rear vertical edges with rearwardly-extending plates 65 which extend substantially from the top of the duct 63 to within a short distance of the bottom of this duct.

According to the preferred illustrated construction the front wall of the duct 63 and the plates are formed of a single sheet, and each end wall of the duct 63 and the adjacent plate 65 of a single sheet, the sheet forming the front wall of the duct 63 and the plates 64 being folded to form grooves 64ª into which the forward edges of the end walls of the duct 63 extend, grooves 65ª being similarly formed in the sheets forming the end walls of the duct 63 and the plates 65 to receive the vertical edges of the sheet forming the rear wall of the duct 63, the folded material at these joints thus provided being crimped upon the parts embraced thereby and forming closed joints.

The sheet metal forming the front, rear and end walls of the duct 63 extends upwardly above the upper edges of the plates 65 and are folded as shown at 100 to form about these four walls of the duct 63 outwardly projecting flanges 101 and upwardly extending lips 102.

The unit just referred to fits within the shell 11 as shown, the ribs 19 and 20 extending upwardly into the duct 63 and the outer edges of the plates 64 extending into slots 66 in the ribs 18. The unit structure referred to rests at the lower edges of the walls of the duct 63 and of the plates 64 upon the upper surface of the base 6 and the outer edges of the plates 64 and 65 fit closely against the adjacent surrounding wall portions of the shell 11 as shown.

The lips 102 extend upwardly through an opening 69 in the plate portion 57 and are bent outwardly and downwardly against the upper surface of the plate portion 57 to clamp the portions of the plate 57 defining the opening 69 tightly between the flanges 101 and lips 102 and make tight joints.

The forward wall of the duct 63 and the plates 64 form the rear wall of the combustion chamber 23, the side walls, front wall and top of which are formed of portions of the inner shell 11 as shown, the hot-air duct 63 opening into the space above the top portion 57 of the shell through the opening 69.

The openings represented at 70 and provided at the upper ends of the plates 64 afford communication between the combustion chamber 23 and gas flues 71 formed of portions of the side walls 55, the rear wall 56, the end walls of duct 63 and the plates 64 and 65, these flues opening at their lower ends through the openings 72 at the lower ends of the plate 65, into a gas flue 73 bounded by the plates 65, the rear wall of the duct 63 and the rear wall 56 of the shell 11, the wall 56 having an outlet 74 for the gas shown as communicating with a stack 75 which extends through the rear wall of the outer shell 8.

It will be understood from the foregoing that in the operation of the heater the hot gases generated by the burner apparatus 10 rise in the combustion chamber 23, thence discharge through the openings 70 into the flues 71 through which they pass downwardly to the openings 72 for discharge into the flue 73 through which they rise and escape to the stack, thereby presenting a relatively long passage for the gases which in flowing over the large area surfaces of the air duct 63 heat the air rising through the duct 63 for discharge at the top of the heater, the construction being such, as described, that a high rate of heat interchange between the air rising in the duct 63 and the heated gases contacting with the walls thereof is effected, with relative freedom of gas flow through the heater and resultant low stack temperatures.

The air duct 63, as shown, is relatively long and narrow in plan affording relatively great freedom of passage of air upwardly therethrough, while of a particularly desirable shape for a heater of the general shape in plan as shown in the drawings.

It will also be understood that in the operation of the heater, the surrounding walls of the shell 11 become heated and thus induce upward flow of air through the flues 59, 60 and 61 and discharge of this heated air through the top of the heater.

The operation of the burner apparatus induces a flow of air into the heater through the air inlet structure 40, the baffle plate 51 serving to deflect this air downwardly against the valve devices 31 with the result of cooling the valves and in so doing preheating the air before it reaches the burners, with the manifest advantage.

The use of the single air duct 63 not only improves the circulation of the air through the heater and gives improved heat-absorption results, but in combination with the wall forming plate portions 64 and 65 provided thereon as stated, reduces the number of joints required in forming the air and gas ducts in the heater and makes possible the obtaining of great efficiency of the heater by a comparatively simple mechanical construction.

Furthermore, it is to be noted that the base 6 serves as a support not only for the burner apparatus but also for the various parts of the heater shown superposed thereon, whereby the adjustment of the burner apparatus, as for example to insure the level condition thereof may be effected, while maintaining the several parts of the heater associated therewith in their proper relative positions, by merely adjusting the base. In his connection it is preferred that the several legs 7 be connected with the base for relative adjustment of these parts, it being preferred that the construction shown be provided and involving for each leg a cylindrical anchor element 76 secured to the floor 77 as by a screw 78 and extending upwardly into the hollow leg 7, the anchor element 76 containing an endless peripheral groove 79 into which a set screw 80 carried by the leg 7 extends, thereby forming an anchorage for the leg 7 holding it to the floor. The leg 7 is rotatable on the anchor element 76 and engages at a threaded opening 81 in a web 82 within the leg, the lower threaded end 83 of a rod 84 extending upwardly through the top of the leg and rigidly secured at its upper threaded end 85 in a threaded opening 86 in the adjacent arm 17. Thus by rotating the leg 7, the rod 84 being stationary, the leg is adjusted relative to the base 6 and thereby the latter may be caused to be supported for positioning the burner apparatus in the desired level condition, it being noted that the set screw 80 not only holds the leg to the anchoring element 76 and thus in anchored condition to the floor, but prevents, by the tightening of this set screw, accidental disturbance of the adjustment of the leg relative to the base 6.

The feature of mounting the burner ap-

paratus, the controlling mechanism therefor and the oil supplying means on the base is of advantage as thereby these parts may be assembled preliminary to the assembling therewith of the wall superstructure thereby greatly reducing the cost of assembling the various parts of the heater.

While we have illustrated and described a particular construction embodying our invention, we do not wish to be understood as intending to limit it thereto as the same may be variously modified and altered without departing from the spirit of our invention.

What we claim as new, and desire to secure by Letters Patent, is:

1. A heater comprising a casing structure having a base member forming a closure for said casing structure and side walls, and oil-burner apparatus in said casing, said base member comprising separate sections one of which is formed with an upwardly offset portion on which the burner apparatus is supported and contains an opening below said offset portion and the other of which is in the form of a removable oil-drip pan positioned below said upwardly offset portion and closing said opening and serving to receive oil dripping from the apparatus.

2. A heater comprising a casing structure having a base member forming a closure for said casing structure and side walls, an oil-burner apparatus in said casing and comprising valve means controlling the flow of oil to the apparatus, said base member comprising separate sections one of which is formed with an upwardly offset portion on which the burner apparatus is supported and contains an opening below said offset portion and the other of which is in the form of a removable oil-drip pan positioned below said upwardly offset portion and closing said opening and serving to receive oil dripping from the apparatus, said casing containing an air-inlet in a side wall thereof through which air is supplied to said apparatus, and baffle means arranged to deflect the air entering said inlet downwardly against said valve means to a point below said upwardly offset portion.

3. A unit for assembling with a casing to provide a series of passages comprising a hollow body open at its top and bottom and having a set of plate portions extending therefrom in opposite directions at one face of said body and a second set of plate portions extending in the same direction from said body at its opposite face and angularly relative to said first-referred-to set of plate portions, said first-named set of plate portions and said first-referred-to face of said body being formed of a single sheet folded to form grooves into which edges of the side walls of said hollow body extend and each of said side walls and the adjacent one of said second-named set of plate portions being formed of a single sheet folded to form a groove, the rear face of said body extending at opposite edges into said last-referred-to grooves.

OSCAR C. SCHROEDER.
STANLEY PERRY.