

Dec. 31, 1935.

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2,026,340

OIL BURNING HEATER

Filed Nov. 28, 1932

2 Sheets-Sheet 1

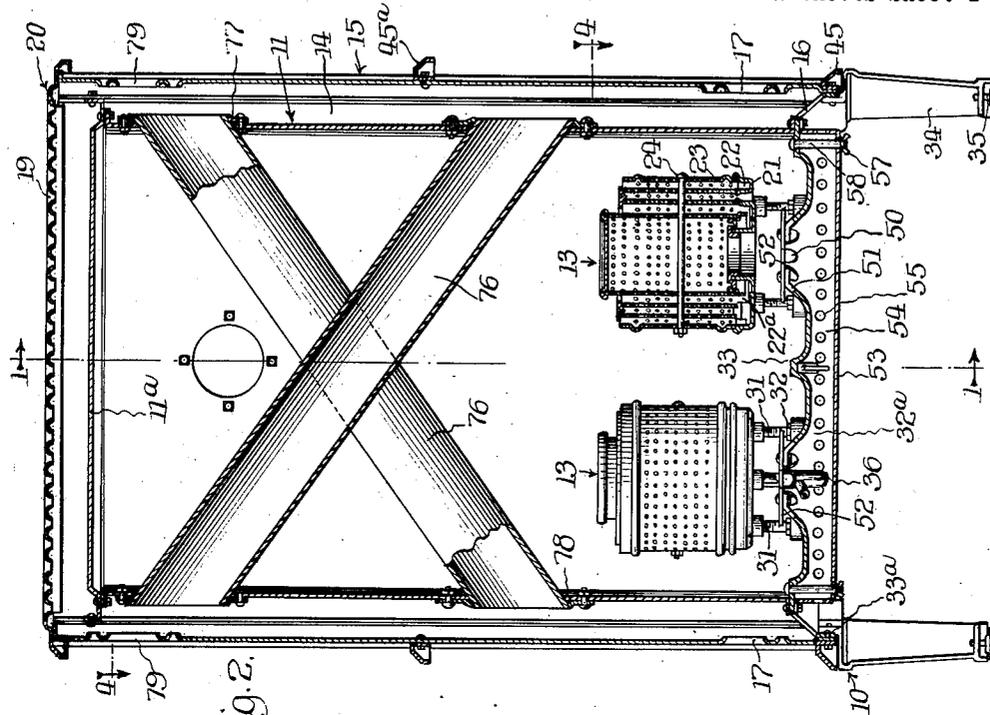


Fig. 2.

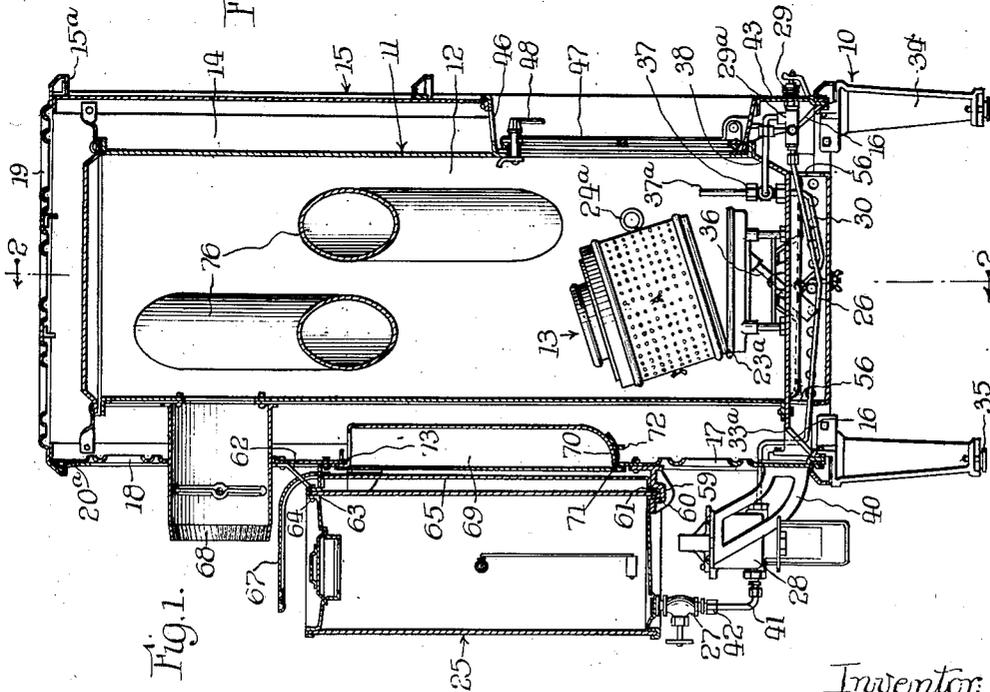


Fig. 1.

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2 Sheets-Sheet 2

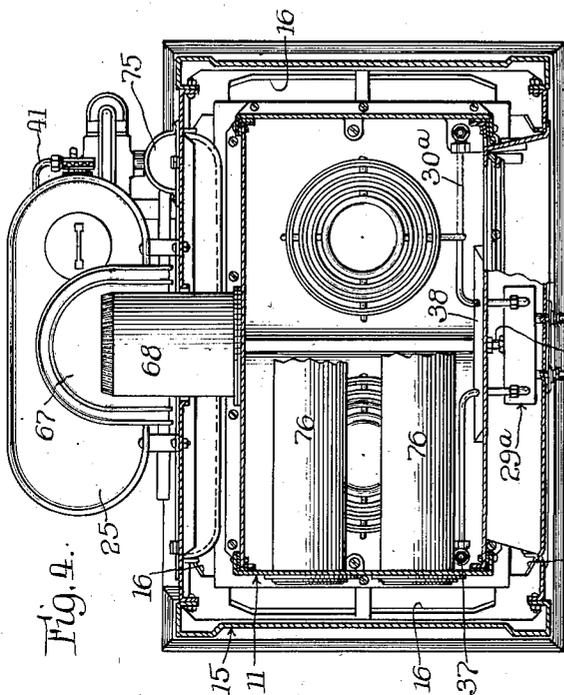


Fig. 4.

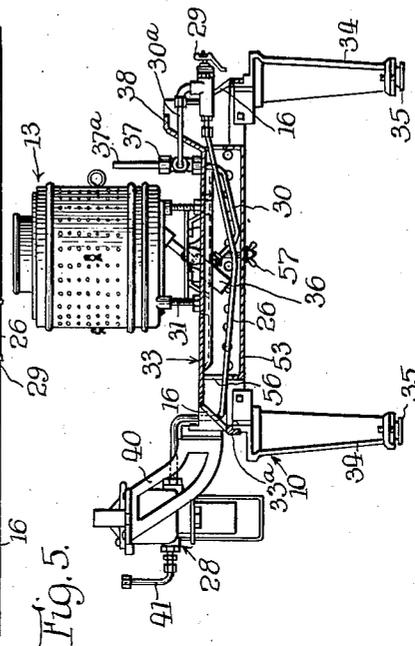


Fig. 5.

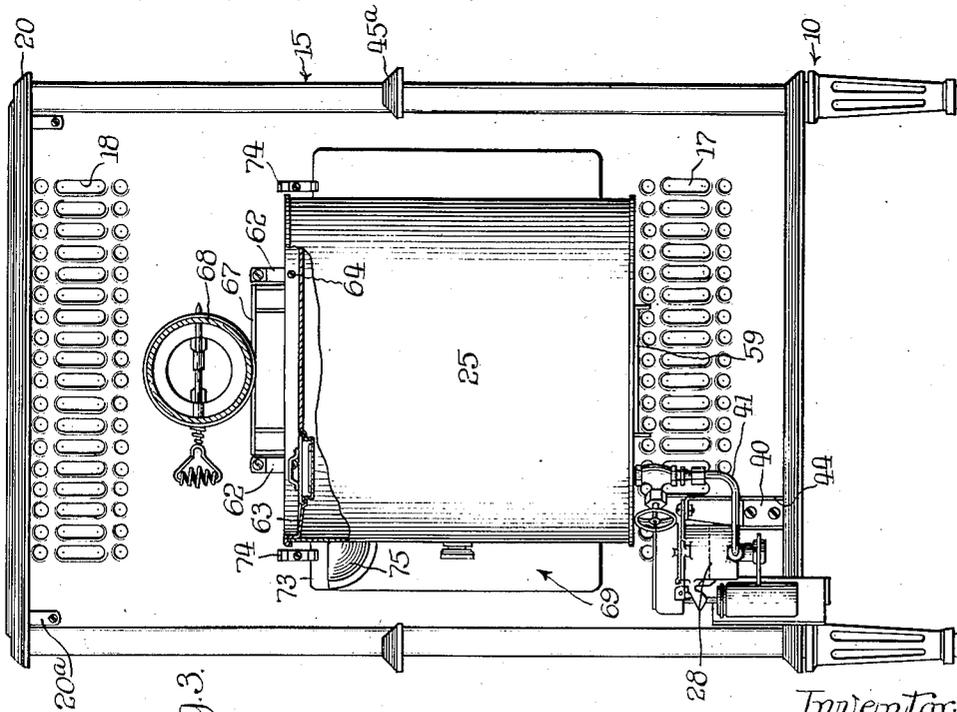


Fig. 3.

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# UNITED STATES PATENT OFFICE

2,026,340

## OIL BURNING HEATER

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poration of Massachusetts

Application November 28, 1932, Serial No. 644,623

5 Claims. (Cl. 126—93)

The invention relates generally to oil burn-  
ing heaters, and more particularly to heaters  
of the cabinet type, wherein air circulating  
through the cabinet is heated by intimate con-  
5 tact with the walls of a combustion chamber  
within the cabinet.

An important object of the invention is to  
provide in a heater of the cabinet type having  
one or more oil burners, means of an advanta-  
10 geous character for mounting the burners and  
their oil supply connections and controls to the  
end that the parts of the heater may be assembled  
expeditiously and with a high degree of ac-  
curacy.

15 Another object is to provide such a heater  
wherein the air for supporting combustion is  
controlled by means of a simple character adapt-  
ed to cause preheating of the air.

20 Another object is to provide a heater which  
responds rapidly to the heat of the burners and  
delivers promptly a substantial volume of heated  
air.

25 Another object is to effect economy of manu-  
facture by providing a heater of this character  
wherein preliminary assembly of the elements  
produces a plurality of major units which are  
subsequently assembled to complete the heater.

A further object of the invention is to pro-  
vide a heater of this type having an easily filled  
30 humidifier tank of large capacity removably  
mounted in the heater to facilitate cleaning of  
the tank and so located as to insure mixture of  
the water vapor with the warmed air discharged  
from the heater cabinet.

35 Other objects and advantages will become ap-  
parent from the following description taken in  
connection with the accompanying drawings  
which illustrate a preferred embodiment of the  
invention, and in which:

40 Figure 1 is a central vertical sectional view of  
a heater embodying the features of the invention,  
the view being taken along the line 1—1 of  
Fig. 2.

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

Fig. 3 is a rear elevational view of the heater.

Fig. 4 is a plan section of the heater taken  
along the line 4—4 of Fig. 2.

50 Fig. 5 is a vertical sectional view of the base  
unit of the heater prior to the mounting of the  
inner and outer casings thereon.

In the form illustrated the invention is em-  
bodied in a cabinet type heater having a base  
10 supporting an upstanding inner casing 11

Within the lower portion of the combustion  
chamber is a pair of oil burners 13 adapted to  
heat air which is circulated about the casing  
11 in a space 14 formed between the casing 11  
and a surrounding ornamental cabinet or outer  
5 casing 15. The air to be heated enters the space  
14 through openings 16 in the base 10 and  
through openings 17 in the outer casing 15 ad-  
jacent its lower edge, and is discharged through  
openings 18 in the upper portion of the outer  
10 casing 15 and through openings 19 in a remov-  
able cover plate 20. The latter forms the top  
of the outer casing 15.

The burners 13 are of a conventional type, each  
15 having a base ring 21 providing a plurality of con-  
centric troughs 22 intercommunicating at 22<sup>a</sup> to  
which fuel is supplied for burning within a plu-  
rality of concentric apertured tubes 23 which ex-  
tend upwardly from the base ring. A pair of  
transverse tie rods 24 extending through the  
20 tubes 23 serve to secure the tubes together so that  
all of the tubes can be tilted, as about a point  
23<sup>a</sup>, see Fig. 1, or removed as a unit. Thus the  
tubes 23 form a unitary structure which may be  
25 raised from the ring as shown in Fig. 1 for the  
purpose of lighting the burner. To facilitate the  
raising of the combustion tubes one of the tie rods  
24 is extended to form a forwardly projecting  
handle 24<sup>a</sup> (Fig. 1).

Fuel oil is supplied to the burners 13 from a sup-  
30 ply tank 25 mounted on the rear side of the  
outer casing 15, by an oil feed line 26 including,  
in series, a manual valve 27 adjacent to the tank,  
a conventional constant-level control device 28  
and a pair of valves 29 (Fig. 4) mounted in a  
35 common valve casing 29<sup>a</sup> and controlling branch con-  
duits 30 leading from the casing 29<sup>a</sup> to the two  
burners 13.

To insure proper operation of the burners it  
is essential that the burners and the various ele-  
40 ments of the fuel feed line bear at all times an  
accurately adjusted relation to each other, and  
the convenient assembly of the parts is also  
desirable. This is accomplished in the present  
instance by constructing and arranging the ele-  
45 ments of the heater and the fuel feed line so that  
the burners and the feed line may be mounted  
and adjusted on the rigid base 10, and subse-  
quently mounting thereon the inner and outer  
casings 11 and 15.

50 With this end in view the base 10, the burners  
13, the fuel feed and control elements are con-  
structed so as to permit assembly thereof apart  
from the other elements of the heater to form a

which the various mounting and adjusting operations may be readily performed.

The base 10 preferably comprises a relatively thin, rigid plate 33 which may be of cast iron as in the present case. The base plate 33 is dished or depressed between the openings 16 so as to catch any overflow of oil from the burners 13. At its outer edges the base plate 33 has downwardly extending flanges 33<sup>a</sup> to which supporting legs 34 are bolted. At the lower end of each leg 33 is a leveling screw 35.

The burners 13 are rigidly supported on the base plate 33 by vertical bolts 31 secured at their upper ends in the burner rings 21. A plurality of bolts 31 are provided for each burner 13, and the lower ends thereof project through the base plate 33 and have nuts 32 and 32<sup>a</sup> thereon above and below the base plate for leveling the burners.

From each burner 13 a pipe 36, communicating with the inner one of the troughs 22, extends downwardly through the base plate 33 for connection with one of the branch conduits 30. The plugged lower ends of the pipes 36 are accessible below the base plate so as to serve as cleanout fittings for removing carbon from the feed line adjacent to the burners. Each branch conduit 30 extends forwardly and laterally from the pipe 36 to the adjacent forward corner of the base casting 33 and then upwardly for connection with a T-fitting 37 located above the base casting. To complete each branch conduit to its valve 29, a pipe 30<sup>a</sup> (Fig. 4) extends from each T-fitting 37 to the valve casing 29<sup>a</sup> which for convenience is centrally positioned at the forward edge of the base casting. The pipes 30<sup>a</sup> extend through an upwardly projecting flange 38 of the base plate so as to be rigidly held in position. From each T-fitting 37 a vent pipe 37<sup>a</sup> extends upwardly to a point above the burner ring 21 to prevent the formation of air pockets in the fuel line.

From the valve casing 29<sup>a</sup>, the common fuel supply line 26 extends beneath the base plate 33 and through one of the openings 16 which are formed in a sloping portion of the rear flange 33<sup>a</sup>, and the end of the line 26 is connected with the constant-level control device 28 which is supported on a bracket 40 bolted rigidly to the rear edge of the base plate. Between the valve 27 and the control device 28 is a suitable pipe connection 41.

In practice the burners and the various elements of the fuel feed line may be assembled and adjusted as shown in Fig. 5 to form a base unit. This unit is relatively small and may be easily handled by the workman, and all of the operations of mounting and adjustment are performed at points which are readily accessible. The inner and outer casings 11 and 15, therefore, do not obstruct or complicate the assembly of the elements of the base unit, and are subsequently put in place on the base unit without disturbing the adjustment of the parts of the base unit.

The inner and outer casings 11 and 15 are preferably constructed of relatively thin plates of sheet metal secured together by flanges and bolts in a conventional manner. The two casings are assembled as separate units and are separately mounted on the base 10. During such mounting operations access to the interior of the casings is afforded through the upper ends thereof, the cover plate 20 of the outer casing 15 being removable, and the inner casing 11 being provided with a top wall 11<sup>a</sup> which may be bolted in place

after the other mounting operations have been completed. The cover plate 20 of the outer casing is preferably held in place at its forward edge by interengaging flanges 15<sup>a</sup> and at its rear edge by spring catches 20<sup>a</sup> (Figs. 1 and 3).

After bolting the lower edge of the inner casing 11 to the base plate 33, the outer casing 15 is lowered into surrounding relation with notches 43 and 44 in its front and rear edges fitting about the valves 29 and the bracket 40. The lower edge 10 of the outer casing is then bolted to the base plate adjacent to the lower edge of the flange 33<sup>a</sup>. A moulding 45 preferably extends about the lower edge of the front and sides of the outer casing 15 so as to conceal the bolted joint between the 15 outer casing and the base, and a corresponding moulding 45<sup>a</sup> may be provided centrally of the cabinet.

Access to the burners 13 is obtained through the forward sides of the casings 11 and 15, a door 20 frame 46 being mounted in suitable openings formed therein directly in front of the burners 13. The door frame 46 is bolted in place after the two casings have been secured on the base unit, and it spans the space between the casings. A door 25 47 pivoted at its lower edge to the frame 46 serves to close the opening and is held in its closed position by a latch device 48.

In the operation of the heater, air to be heated passes upwardly into the space 14 through the 30 relatively large openings 16 which are formed at spaced intervals about the base plate in the angular portion of the flange 33<sup>a</sup> as shown in Fig. 4. The base plate 33 also has openings 50 therein beneath the burners 13 through which air may 35 pass for supporting combustion; and horizontal air distributor plates 52 are mounted above the openings 50 by means of lugs 51. The air passing upwardly through the openings 50 strikes the plates 52 and is deflected and distributed thereby 40 horizontally into the combustion chamber. Hence sudden drafts or blasts which might affect the operation of the burners are effectually broken up. Moreover, the quantity of air entering the combustion chamber is determined by the 45 size of the openings 50 and by the distributor plates 52 so as to produce uniform operation of the burners.

Provision is preferably made for preheating the air supplied to the burners. This is attained in 50 the present embodiment by a plate 53 mounted horizontally beneath the base plate 33 in spaced relation thereto, so as to form a heat-retaining space through which the air must pass to the openings 50. The quantity as well as the path 55 of such air is determined by an upstanding flange 54 on the plate 53 which extends upwardly into contact with the base plate 33 and has a row of apertures 55 formed therein for the admission of air.

The plate 53 and its flange 54 enclose substantially the entire fuel feed line 26, suitable slots 56 being formed in the flange 55 for the forwardly and rearwardly extending ends of the feed line. To provide for access to the feed line, the plate 65 53 is removably secured in position by wing nuts 57 engaging bolts 58 depending from the base plate 33. The plate 53 provides a drip pan beneath the enclosed elements of the fuel feed line, and also serves as an insulator to maintain a 70 low floor temperature beneath the heater.

The fuel tank 25 is removably supported on the rear wall of the casing 15 in spaced relation thereto by a bracket 59, bolted to the casing above the level of the control device 28, and hav- 75

ing a groove 60 therein to receive a downwardly projecting flange 61 formed on the tank 25. At its upper end the tank is removably held in position by a pair of brackets 62 bolted at their inner ends to the casing 15 and secured at their outer ends to an upstanding flange 63 on the tank by means of bolts 64 (Fig. 4). In removing the tank the valve 27, which is carried by the tank, may be closed before unfastening the pipe connection 41 of the fuel feed line.

To prevent overheating of the fuel tank a baffle plate 65 is positioned between the outer casing 15 and the tank. This baffle plate is flanged at its upper and lower edges and fitted snugly between the brackets 59 and 62 so as to be supported thereby. If desired, a shield 67 may be extended upwardly from the baffle plate 65 between the brackets 62 and rearwardly over the fuel tank 25 so as to be positioned beneath a flue pipe 68 which extends rearwardly from the combustion chamber. The flue pipe 68 is bolted at its inner end to the inner casing 11, this operation being performed prior to the mounting of the top plates 11<sup>a</sup> and 20.

The heater is also provided with humidifying means comprising a relatively large reservoir 69 mounted on the rear side of the outer casing 15, so as to project through an opening 70 into the space 14. Preferably the opening 70 is positioned between the brackets 59 and 62 so as to be spanned by the fuel tank 25, and the reservoir 69 is mounted therein so as to be removable for cleaning when the tank 25 and the baffle 65 have been dismantled. At the lower edge of the water reservoir depending flanges 71 and 72 are adapted to fit over and on opposite sides of the flanged lower edge of the opening 70 to hold the bottom of the reservoir in position; while a flange 73 at the upper and outer edge of the reservoir engages the outer surface of the casing 15 above the opening 70 and is held in place by two rotatable latches 74 (Fig. 3) mounted on the casing 15. The reservoir is of a width somewhat greater than the width of the oil tank and at one end has a filling spout 75 (Fig. 4) projecting rearwardly from the rear wall of the outer casing 15. The top of the reservoir 69 within the space 14 is, of course, open to permit water vapor to rise therefrom into the warm air in the space 14. By reason of its position between the heat source and the fuel tank, the water reservoir when filled provides substantial heat insulation for the tank. This feature of the invention is more particularly described and claimed in my copending application, Serial No. 746,175, filed September 29, 1934.

Within the inner casing of the cabinet is a pair of air circulating tubes 76 extending through the combustion chamber 12 above the burners 13 so as to be directly in the path of the hot gases from the burners. The tubes 76 are oppositely positioned at an angle to the vertical so as to promote circulation of air therethrough, and the tubes at their opposite ends open through the casing 11 and into the space 14. The upper end of each tube 76 is fixed to the casing 11 by a flange 77 bolted to the casing so as to prevent leakage of flue gases from the combustion chamber, while the lower end of each tube 76 is associated with the casing so as to permit longitudinal expansion of the tubes. The lower ends of the tube 76 therefore extend through the casing 11 and are slidable through rings 78 which are bolted to the casing 11 to provide gland connection; preventing the escape of flue gases from the combustion chamber.

The tubes 76, being in the path of the flame and the hot gases, act as baffles and are quickly heated so as to start upward movement of warmed air through the tubes immediately after the burners have been lighted. This air is discharged from the heater through relatively large openings 79 (Fig. 2) formed in the outer casing 15 substantially in alinement with the upper ends of the tubes 76. Thus warm air is discharged from the heater in substantial amounts before the entire heater has been fully warmed.

It will be evident that the present heater, being adapted for assembly in separate units prior to final assembly, is adapted for accurate adjustment and economical production. Moreover, the control of the air for combustion is obtained by simple means which contributes to the economy of manufacture of the device. Since the air control means also serves to preheat such air, efficient operation of the burners is promoted.

The humidifying tank in the heater disclosed is of large capacity and it will be apparent that by reason of the novel mounting thereof, is adapted for ready removal for cleaning even though it is mounted in an inconspicuous location. It will also be apparent that the heater responds quickly to the heat of the burner so as to deliver promptly a substantial volume of heated air.

I claim as my invention:

1. A heater of the character described comprising a base unit having a horizontally positioned base plate, supporting legs for said plate, an oil burner adjustably mounted on said plate, an oil supply line for said burner mounted on said plate and including a pipe adapted for connection with a fuel tank, a constant-level control device fed from said pipe and mounted on said base plate, and a manual control valve in said line between said device and said burner, an inner casing unit and an outer casing unit adapted for mounting on said base unit in spaced relation after assembly and adjustment of the parts of said base unit, and a fuel tank carried by said outer casing adapted for connection with said pipe.

2. A cabinet type oil burning heater comprising, in combination, a base unit having a relatively flat base plate with flanges extending angularly downwardly at its edges, said flanges having relatively large openings formed in their angular portions, supporting legs secured to and extending downwardly from said flanges, an oil burner mounted on the upper side of said base plate, a constant level control device mounted in fixed relation to but above the level of said base plate beyond the rear edge thereof, an oil feed line extending from said device through one of said openings in the rear flange and forwardly beneath said base plate, a valve fitting connected to said line at the forward edge of said plate, a conduit extending from said valve and beneath said plate, a pipe connected to said conduit below said plate and extending upwardly through said plate to feed said burner, inner and outer casings secured on said base in spaced relation so that the space between said casings communicates with said openings in the flanges of the base plate, and a fuel tank connected to said constant level device.

3. A heater of the character described comprising spaced inner and outer casings, the inner casing constituting a combustion chamber and the outer casing being apertured to permit circulation of air therethrough in contact with the inner casing, an oil burner within said inner

5 casing, a fuel supply tank removably supported on one side of said outer casing, a fuel supply line detachably connected to said tank and leading to said burner, said outer casing having a  
5 relatively large opening formed therein positioned so as to be spanned by said tank, a relatively large water reservoir positioned in said openings and projecting into the space between  
10 said casings, means removably supporting said reservoir in position on said outer casing, and a filling spout projecting outwardly from said reservoir along one side of said tank.

4. A heater of the character described comprising spaced inner and outer casings, said outer  
15 casing having openings adjacent to the top and bottom thereof through which air may circulate in contact with the inner casing, an oil burner within said inner casing, a fuel supply tank removably supported on one side of said outer  
20 casing, a fuel supply connection between said tank and said burner including a pipe detachably

connected to said tank, said outer casing having a relatively large opening therein across which said tank extends, and a water reservoir removably secured to said outer casing so as to project into the space between the inner and outer casing, said reservoir having a top opening and being removable for cleaning when said fuel tank has been removed.

5. A heater of the character described comprising a base unit, an oil burner, an oil supply  
10 line for said burner including a constant level control device adapted to be fed from a source of fuel supply and a manual control valve in said line between said device and said burner,  
15 all mounted on said base unit and relatively adjustable to insure a proper feed to the burner, and an inner and an outer casing adapted to be mounted on said base unit after assembly and  
20 adjustment of the burner and the parts of the oil supply line on said base unit.

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