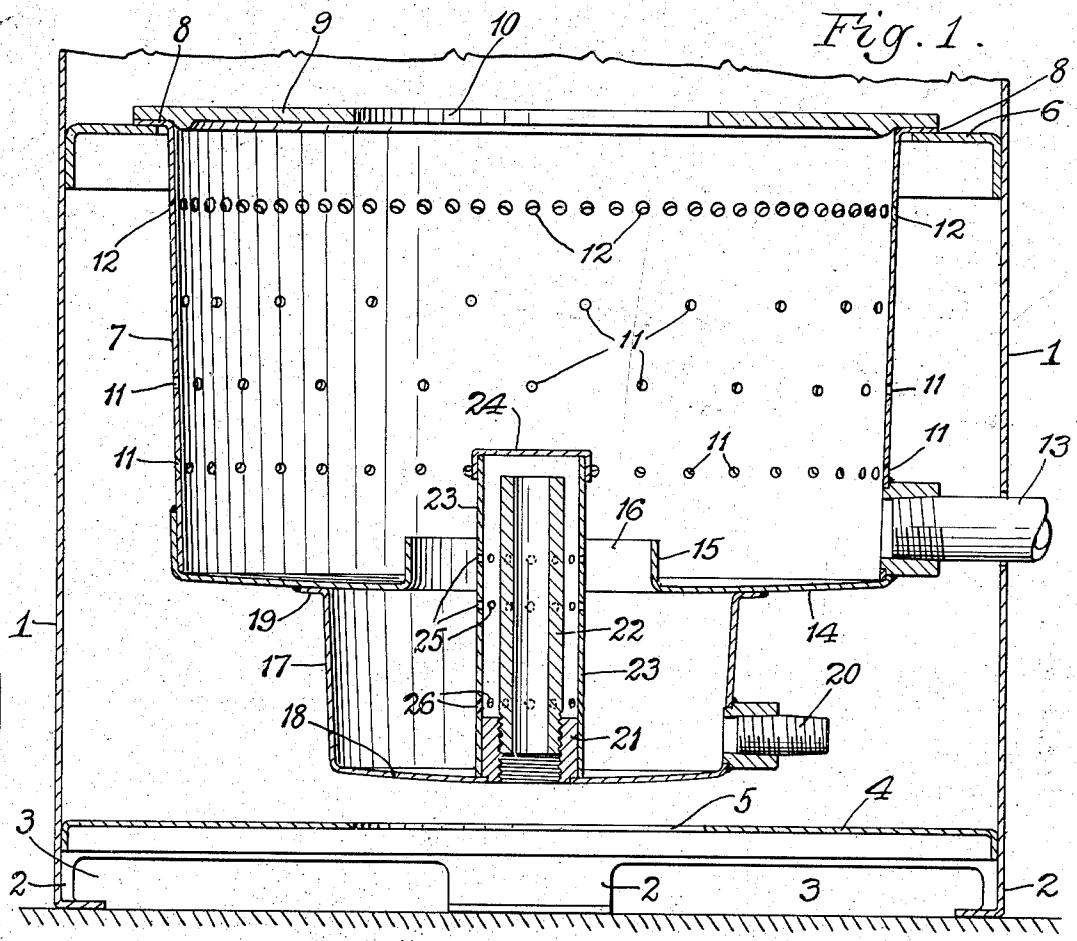
Jan. 9, 1945. J. L. BREESE ET AL 2,366,706

DOUBLE BURNER STRUCTURE

Filed May 16, 1942 3 Sheets-Sheet 1

Fig. 1.



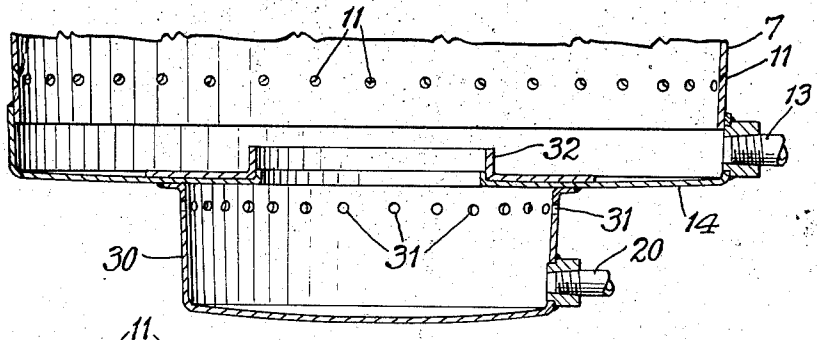


Fig. 2.

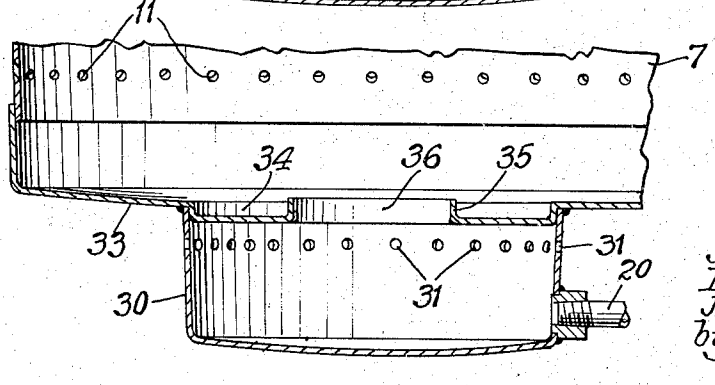


Fig. 3.

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DOUBLE BURNER STRUCTURE

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Fig. 4.

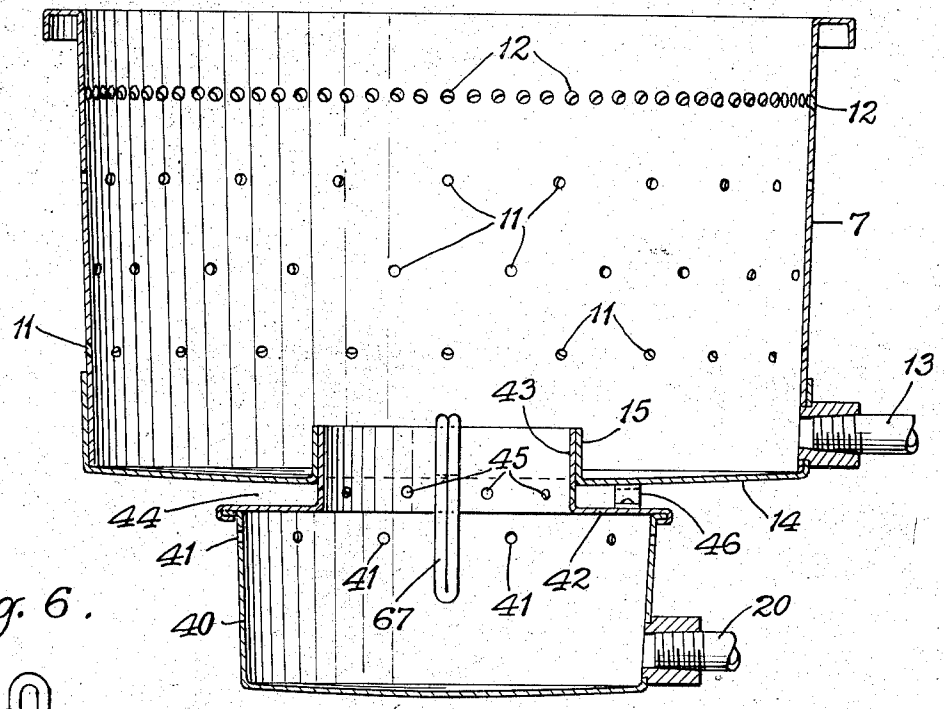


Fig. 6.

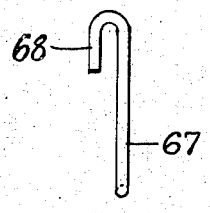
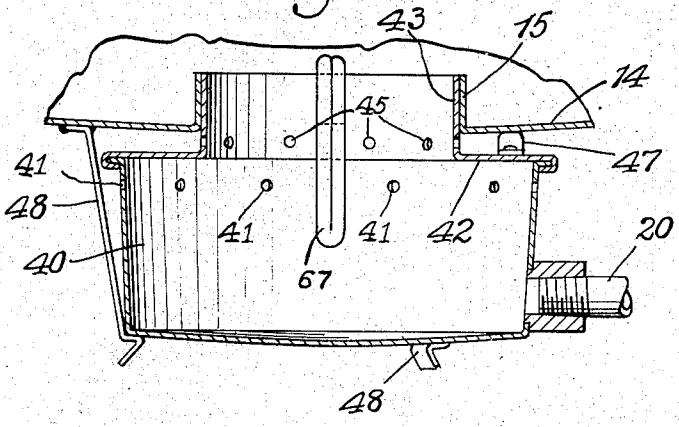


Fig. 5.



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DOUBLE BURNER STRUCTURE

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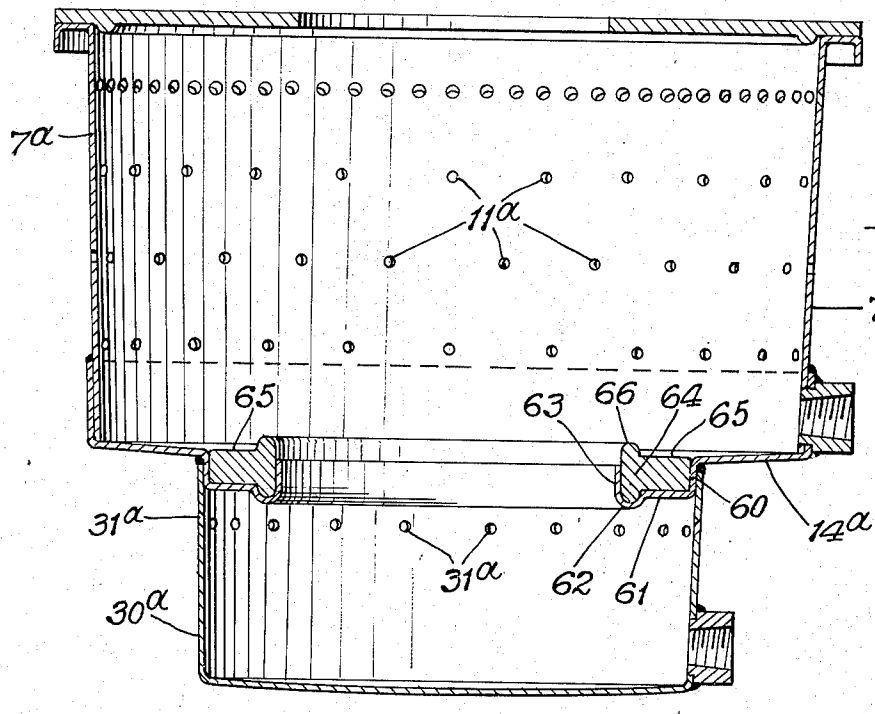


Fig. 7.

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2,366,706

UNITED STATES PATENT OFFICE

2,366,706

DOUBLE BURNER STRUCTURE

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Application May 16, 1942, Serial No. 443,262

13 Claims. (Cl. 158—91)

Our invention relates to an improvement in pot type burners and has for one purpose the provision of separate supplemental pilot burner means for a pot type burner.

Another purpose is to provide two cooperating but independent burners, one of which is employed to maintain a pilot flame, and, incidentally, to maintain the other burner sufficiently heated for quick starting.

Another purpose is to provide two separate but associated burners, each having its own separate air and fuel supply.

Other purposes will appear from time to time in the course of the specification.

We illustrate our invention more or less diagrammatically in the accompanying drawings wherein:

Fig. 1 is a vertical section through an embodiment of the invention;

Fig. 2 is a partial vertical section of another form of the device;

Fig. 3 is a partial vertical section through still another form of the invention;

Fig. 4 is a vertical section through a further variant;

Fig. 5 is a partial vertical section through a still further variant;

Fig. 6 is a detail; and

Fig. 7 is a vertical section through a still further form of the device.

Like parts are indicated by like symbols throughout the specification and drawings.

Referring for example to Fig. 1, 1 indicates an outer housing or drum, having legs or supports 2, which define air inlet spaces 3. The drum 1 is provided with a bottom 4 having a preferably central air inlet aperture 5. 6 is an angle ring mounted at a higher level within the drum 1, adapted to receive the upper flange 8 of a burner pot 7. 9 is any suitable flame ring for the pot having a central flame aperture 10.

The wall of the pot 7 is provided with a plurality of primary air inlet apertures 11 located at various levels. Any suitable means may be provided for supplying secondary air at or near the top of the pot, but we provide a single row of secondary air inlet apertures 12, which may be larger and more closely spaced than the primary air inlet apertures, and which are preferably upwardly and inwardly tilted.

13 is a fuel pipe extending from any suitable source of fuel supply not herein shown, and adapted to deliver a liquid fuel to the bottom 14 of the pot. It will be understood that any suitable means, manual or automatic, may be employed for varying the flow of fuel along the pipe 13, preferably from no flow to high fire. The fuel delivered along the pipe 13 flows over the bottom 14 and about the upstanding flange 15, which defines a central aperture 16. It will be understood that the burner so described is a complete unit and is designed to burn independently of whatever air or fuel may be delivered to the below described lower burner.

In the form of Fig. 1 we illustrate a supplemental burner 17, with its bottom 18, and an upper flange 19, which may be welded or otherwise secured to the lower surface of the bottom 14 of the pot 7.

20 is a fuel pipe extending to the bottom pot 17. Any suitable means may be employed for maintaining at all times, if desired, a pilot flow of fuel, a flow sufficient to maintain a pilot flame. In the form of Fig. 1 we illustrate the lower pot bottom 18 as having a central fitting 21 screw threaded to receive the upwardly extending air inlet passage 22. It will be observed that air flows upwardly through the fitting 21 and the passage 22 to the top of such passage member. It then flows down through an outer sleeve 23, herein shown as having a closed top 24. The sleeve is provided with a plurality of air outlets 25, located adjacent the top of the pot 17, and lower outlets 26 preferably downwardly and outwardly inclined. The apertures 25 and 26 provide all the air necessary for combustion of the fuel delivered along the pipe 20. It will be understood that the fuel as delivered to the bottom 18 is vaporized by the heat of combustion occurring above it. The apertures 26 provide sufficient primary air for mixing with the vaporized hydrocarbon to produce a primary mixture. This primary mixture may be completed by secondary air admitted through the upper apertures 25, and the flame burns at or slightly above the level of the aperture 16 and is effective to keep the pot heated. The wall 17 of the lower pot is imperforate, and even if the two pots were flooded up to the level of the upper fuel inlet 13, no oil can escape from the pot. It will be understood, of course, that any suitable control means are employed for controlling the flow of fuel in such fashion that, when the lower pot is flooded, the further supply of fuel to either pot is cut off. However, the control means do not of themselves form part of the present invention and are not shown.

In Fig. 2 we illustrate a lower pot 30 having a row of primary air inlet apertures 31. The

liquid hydrocarbon vaporizes on the bottom of the pot 30 and mixes with the air delivered through the primary inlets 31 which provides at least sufficient air for the primary air supply, and the final mixture burns at or above the ring 32, about the central aperture in the bottom of the upper pot.

In the form of Fig. 3 the bottom member 33 of the upper pot is provided with a circumferential gutter 34 about the flange 35 surrounding and defining the central aperture 36. The air supply for the lower pot 30 is maintained, as in Fig. 2, through the air inlets 31.

In Fig. 4 we illustrate a lower pot 40, with its separate fuel pipe 20, and provided with a single row of primary air inlet apertures 41 adjacent the top of the pot. 42 is a separate top for the pot 40, which is provided with a generally cylindrical neck 43, which can be slipped into and fits closely within the flange 15 of the upper pot. The neck 43 is of such length as to provide an air space 44 between the members 14 and 42. The neck 43, in line with this air space, is provided with secondary air inlet apertures 45, which are effective to provide as much secondary air as is necessary to maintain the desired pilot combustion. The secondary air inlet apertures 45 are shown as upwardly and inwardly tilted. In the form of Fig. 4 the members 42 and 14 may be connected by any suitable brackets 46, which may be welded or otherwise permanently secured.

In the form of Fig. 5, however, in place of the brackets 46, we illustrate mere spacing means 47, and employ any suitable means, such as spring clips 48, for removably securing the lower pot 40 in position in relation to the upper pot.

In the form of Fig. 7 we illustrate the bottom 14*a* of the upper pot 7*a* as downwardly offset, as at 60, the downward portion being extended inwardly as at 61 and terminating in a downward lip or bead 62 and an upwardly extending generally cylindrical wall 63. The space thus provided receives an insert 64, which may be of cast iron and which conforms to 60, 61, 62 and 63, and has an upper surface 65 conforming to and continuing the bottom 14*a* of the pot and terminating in an upwardly extending lip or bead 66. As in the other forms, the upper pot is provided with a plurality of primary air inlet apertures 11*a* and the lower pot 30*a* is provided with a plurality of air inlet apertures 31*a*, which are herein shown as downwardly tipped. The outer edge of the pot 30*a* may extend about and be secured to the downward offset 60 of the upper pot. It will be observed that the aperture defined by the collar 63 is of relatively large diameter in relation to the diameter of the lower pot. It will be understood, of course, that the proportions may be substantially varied. It will be observed that the lower lip 62 is advantageous as providing a species of drip edge or eaves which prevents any liquid fuel which flows over the upper lip 66 from flowing along the bottom of the upper pot to the wall of the lower pot 30*a*. Thus, any dripping or escape of oil through the air inlets 31*a* is prevented.

It will be realized that, whereas we have described and illustrated a practical and operative device, nevertheless many changes may be made in the size, shape, number and disposition of parts without departing from the spirit of the invention. We therefore wish that the description and drawings be taken as in a broad sense illustrative or diagrammatic, rather than as a limitation to our precise showing.

It will be understood, for example, that whereas we have illustrated a lower drip bead 62 in Fig. 7, we may find it advantageous in all forms of the device to employ some corresponding bead or means for preventing flow of the oil along the top to the side of the lower pot.

We may also employ means for siphoning excess oil from the bottom of the upper pot and for thereby insuring that it will not flow along the bottom of the upper pot to the side of the lower pot. We illustrate for example what may be called a siphon member 67 in the form of a double wire element. If the bottom of the upper pot is flooded, oil will continue to flow down the long arm of the wire siphon until the upper bottom has been emptied. The oil, instead of dribbling back outwardly along the bottom of the upper pot, will flow down the lower arm of the siphon wire to the bottom of the lower pot. This flow may begin about as soon as the level of the oil in the bottom of the upper pot reaches the short arm of the siphon.

The use and operation of our invention are as follows:

Pot type burners as such have of late years been pretty well standardized. The rate of combustion is controlled by varying the rate of flow of a liquid fuel to the bottom of the pot. The lower inlet apertures, such as 11, provide the necessary primary air for a mixture which is completed by the addition of secondary air, for example through the apertures 12. The final mixture passes upwardly through the flame ring 9, and its central aperture 10, and the flame extends well into the upper portion of any suitable housing or drum 1, the portion of which above the flame ring 9 constitutes a combustion chamber. It is often desirable, however, to turn the heater down to a point where little, if any, perceptible heat is called for or delivered. For example, a pot type burner may be run in spring when actual heating is necessary only in the morning and the evening. If the flow through the pipe 13 is cut down to a point sufficiently low to support the desired low combustion, the combustion conditions within the pot 7 are unsatisfactory, and smoking and deposit of carbon take place. We, therefore, provide a separate and supplemental heater, such as the lower parts 17, 30 or 40, which may be operated during times that the upper heater is not in full use. Thus, at a time when no liquid fuel whatever is flowing along the pipe 13, a pilot flow of liquid fuel is maintained along the lower fuel pipe 20 to the lower pot, and this fuel is vaporized by combustion within or at the top of the lower pot. This pilot flame serves to maintain the upper pot bottom properly heated, and to serve as a pilot flame for initiating combustion of fuel when supplied to the upper pot.

The lower pot is in a broad sense a miniature of the upper in its function, in that liquid fuel is vaporized on the bottom of the lower pot, mixes with primary air delivered to the space above the bottom, the ensuing primary mixture being thereafter mixed with secondary air at a higher level, and burned. We have not illustrated any control means, as they do not of themselves form part of the present invention. It will be understood, of course, that, if desired, the flow of fuel along the pipe 13 may be entirely cut off during the operation of the pilot burner. The amount of fuel and air supply to the pilot burner is negligible in relation to the

amount of fuel and air supplied to the upper burner, and the pilot burner can, of course, continue to burn during the operation of the upper burner. What is important is that, when the upper burner is extinguished by the cutting off of fuel along the pipe 13, pilot combustion is still maintained in the independent lower burner.

We claim:

1. In combination, in a pot type burner, an upper burner pot having a side wall provided with primary air inlet apertures located at various levels therein and air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having an aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said aperture, and a supplemental pilot burner aligned with said aperture, said pilot burner including a side wall, a bottom, independent means for delivering a liquid fuel thereto, and said side wall of the pilot burner being provided with air inlets for delivering air to the space within said pilot burner.

2. In combination, in a pot type burner, an upper burner pot having a side wall and primary air inlet apertures located at various levels therein, air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having an aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said aperture, and a supplemental pilot burner aligned with said aperture, said pilot burner including a side wall, a bottom independent means for delivering a liquid fuel thereto, and an air distributor upwardly extending from the bottom of said pilot burner, said distributor being provided with air inlet apertures located within said pilot burner.

3. In combination, in a pot type burner, an upper burner pot having a side wall and primary air inlet apertures located at various levels therein, air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having an aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said aperture, and a supplemental pilot burner aligned with said aperture, said pilot burner including a side wall, a bottom, independent means for delivering a liquid fuel thereto, and an air distributor upwardly extending from the bottom of said pilot burner said distributor being provided with air inlet apertures located within said pilot burner, said distributor including a closed walled inner tube extending to a level above the bottom of the upper burner pot, and an outer tube surrounding said inner tube and provided with a plurality of air delivery apertures located below the top of said inner tube.

4. In combination, in a pot type burner, an upper burner pot having a side wall and primary air inlet apertures located at various levels therein, air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having an aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said aperture, and a supplemental pilot burner aligned with said aperture, said pilot burner including a side wall, a bottom, independent means for delivering a liquid fuel thereto, and an air distributor upwardly extending from the bottom of said pilot burner said distributor being provided with air inlet apertures located within said pilot burner, said distributor including a closed walled inner tube extending to a level above the bottom of the upper burner pot, and an outer tube surrounding said inner tube and provided with a plurality of air delivery apertures located below the top of said inner tube, including apertures adjacent the bottom of the pilot burner, and additional apertures at a higher level.

5. In combination, in a pot type burner, an upper burner pot having a side wall provided with primary air inlet apertures located at various levels therein and air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having an aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said aperture, and a supplemental pilot burner aligned with said aperture, said pilot burner including a side wall, a bottom, independent means for delivering a liquid fuel thereto, and said side wall of the pilot burner being provided with air inlets for delivering air to the space within said pilot burner, and said pilot burner having a top and a neck upstanding from said top and extending upwardly through said aperture in the bottom of the upper burner pot.

6. In combination, in a pot type burner, an upper burner pot having a side wall provided with primary air inlet apertures located at various levels therein and air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having an aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said aperture, and a supplemental pilot burner aligned with said aperture, said pilot burner including a side wall, a bottom, independent means for delivering a liquid fuel thereto, and said side wall of the pilot burner being provided with air inlets for delivering air to the space within said pilot burner, and said pilot burner having a top and a neck upstanding from said top and extending upwardly through said aperture in the bottom of the upper burner pot, the top of said pilot pot being spaced downwardly somewhat from the bottom of the upper pot.

7. In combination, in a pot type burner, an upper burner pot having a side wall provided with primary air inlet apertures located at various levels therein and air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having an aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said aperture, and a supplemental pilot burner aligned with said aperture, said pilot burner including a side wall, a bottom, independent means for delivering a liquid fuel thereto, and said side wall of the pilot burner being provided with air inlets for delivering air to the space within said pilot burner, said pilot burner having a top and a neck upstanding from said top and extending upwardly through said aperture in the bottom of the upper burner pot, the top of said pilot pot being spaced downwardly somewhat from the bottom of the upper pot, and said neck being provided with apertures in communication with the space between the two burners.

8. In combination, in a pot type burner, an

upper burner pot having a side wall provided with primary air inlet apertures located at various levels therein and air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having an aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said aperture, and a supplemental pilot burner aligned with said aperture, said pilot burner including a side wall, a bottom, independent means for delivering a liquid fuel thereto, and said side wall of the pilot burner being provided with air inlets for delivering air to the space within said pilot burner, said pilot burner being removably mounted in relation to said upper burner pot.

9. In combination, in a pot type burner, an upper burner pot having a side wall provided with primary air inlet apertures located at various levels therein and air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having an aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said aperture, and a supplemental pilot burner aligned with said aperture, said pilot burner including a side wall, a bottom, independent means for delivering a liquid fuel thereto, and said side wall of the pilot burner being provided with air inlets for delivering air to the space within said pilot burner, said pilot burner being of substantially less diameter than said upper burner pot.

10. In combination, in a pot type burner, an upper burner pot having a side wall provided with primary air inlet apertures located at various levels therein, and air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having a central aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said central aperture, and a supplemental pilot burner aligned with said central aperture, said pilot burner including a side wall, a bottom, independent means for delivering a liquid fuel thereto, and said side wall of the pilot burner being provided with air inlets for delivering air to the space within said pilot burner.

11. In combination, in a pot type burner, an upper burner pot having a side wall provided with primary air inlet apertures located at various levels therein and air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having a central aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said central aperture, and a supplemental pilot burner aligned with said central aperture, said pilot burner including a side wall, a bottom, independent means for delivering a liquid fuel thereto, and said side wall of the pilot burner being provided with air inlets for delivering air to the space within said pilot burner, said pilot burner being axially aligned with said central aperture and being of a diameter substantially less than the diameter of the upper burner pot.

12. In combination, in a pot type burner, an upper burner pot having a side wall provided with primary air inlet apertures located at various levels therein, and air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having an aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said aperture, and a supplemental pilot burner aligned with said aperture, said pilot burner including a side wall, a bottom, independent means for delivering a liquid fuel thereto, and said side wall of the pilot burner being provided with air inlets for delivering air to the space within said pilot burner, the diameter of the pilot burner exceeding the diameter of the aperture in the bottom of the upper pot.

13. In combination, in a pot type burner, an upper burner pot having a side wall provided with primary air inlet apertures located at various levels therein, and air inlets for supplying secondary air adjacent the top of said pot, means for supplying a liquid fuel to the bottom of the pot, said pot bottom having an aperture and means thereabout adapted to prevent the liquid fuel normally from flowing downwardly through said aperture, and a supplemental pilot burner aligned with said aperture, said pilot burner including a side wall, a bottom, independent means for delivering a liquid fuel thereto, said side wall of the pilot burner being provided with air inlets for delivering air to the space within said pilot burner, and siphon means for directing excess fuel from the bottom of the upper pot into the pilot burner.

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