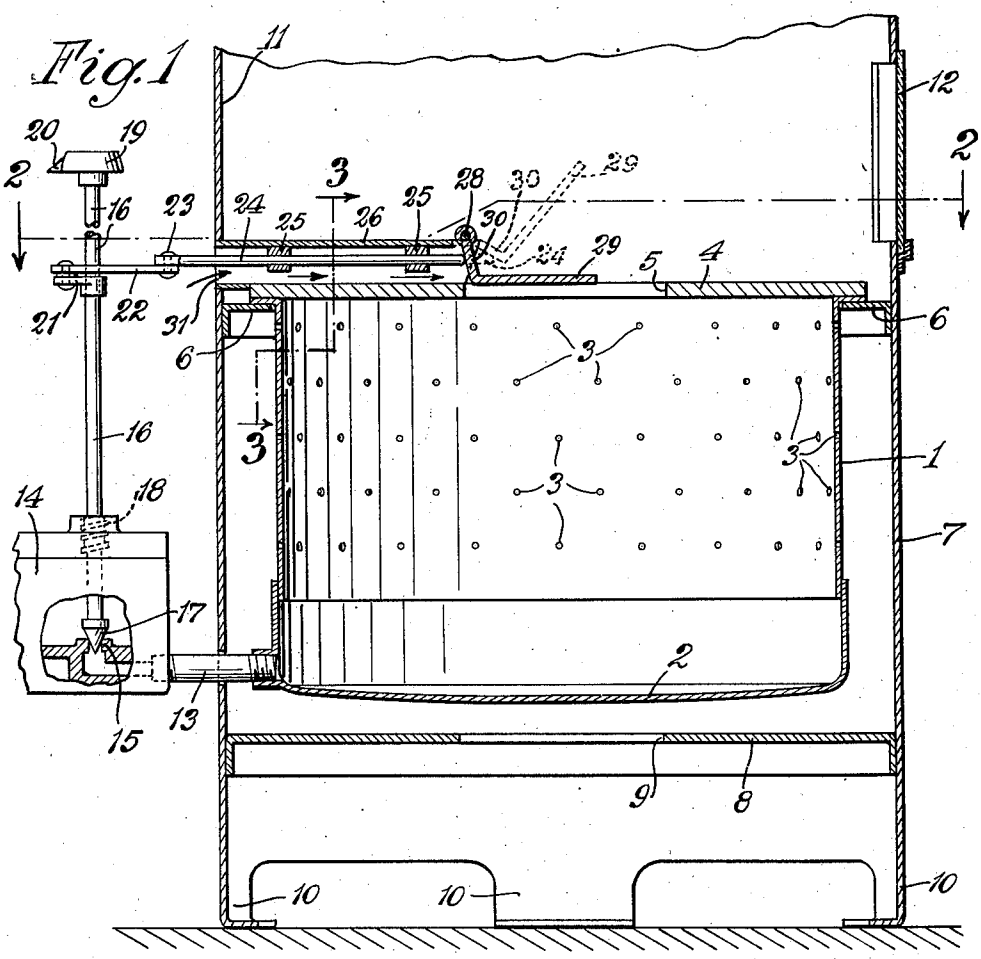
April 18, 1944. J. L. BREESE 2,346,815

SECONDARY AIR SUPPLY MEANS FOR POT TYPE BURNERS

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Fig. 1



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Fig. 2

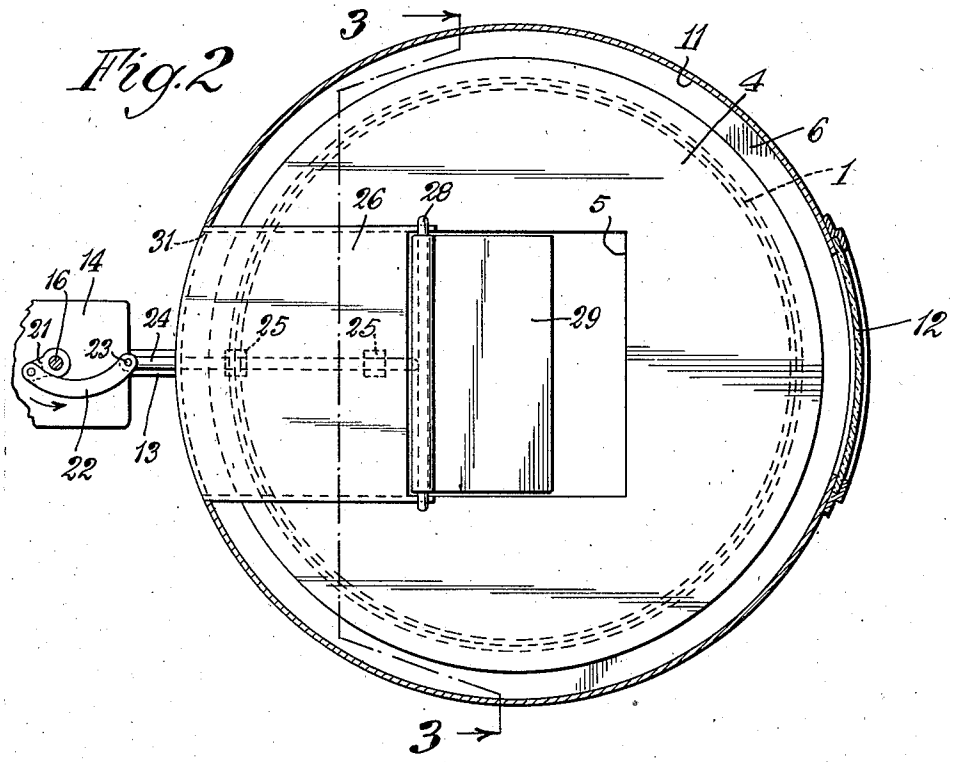
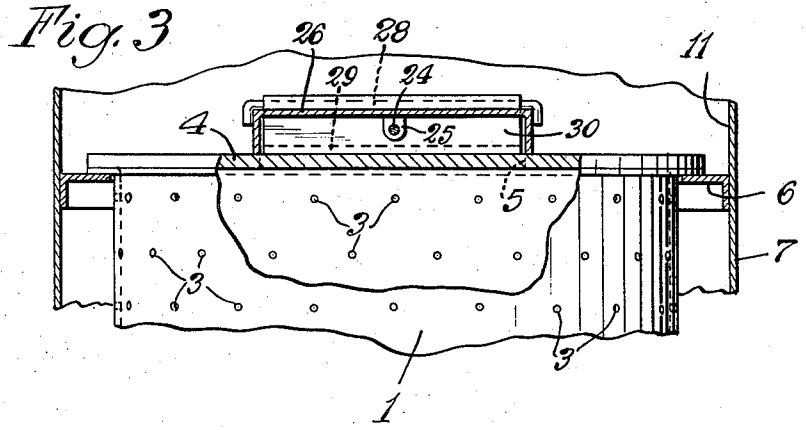


Fig. 3



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SECONDARY AIR SUPPLY MEANS FOR POT TYPE BURNERS

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Application August 8, 1941, Serial No. 405,918

11 Claims. (Cl. 158—91)

My invention relates to an improvement in control means for liquid fuel burners.

One purpose is the provision of improved means for delivering and controlling the supply of secondary air to a pot type burner, and for coordinately varying or controlling the supply of fuel and the supply of secondary air.

Another purpose is the provision of improved means for keeping the window of a pot type burner clear.

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

I illustrate my invention more or less diagrammatically in the accompanying drawings wherein:

Fig. 1 is a vertical axial section;

Fig. 2 is a section on the line 2—2 of Fig. 1; and

Fig. 3 is a section on the line 3—3 of Figs. 1 and 2.

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

Referring to the drawings, I illustrate a pot 1, having a bottom 2. The side wall of the pot is provided with a plurality of primary air inlet apertures 3, which are located at various levels and which are sufficient to provide primary air for all stages of combustion up to the maximum. 4 is a flame ring which closes the top of the pot and which is provided with a generally central aperture 5, which is herein shown as generally rectangular in cross section. The pot is herein shown as supported on a ring or support 6, extending inwardly from a drum or outer housing 7, which has a partition 8 below the pot, having a central aperture 9 adapted to admit air to the space between the pot and the housing. 10 are any suitable supporting means for the structure above described.

11 indicates a combustion chamber, which is herein shown as formed integrally with the housing or drum 7, but which, of course, could be otherwise formed. 12 is an inspection window of any suitable heat resistant material.

13 indicates a liquid fuel inlet to the bottom 2 of the pot 1. I may employ any suitable means for controlling the inflow of fuel, but I illustrate a control member 14, which may be or include the conventional float chamber, the details of which do not of themselves form part of the present invention. It includes, however, a valve seat 15, adapted to control the flow of fuel along the pipe 2.

16 is a valve stem terminating in the valve member 17. The valve stem may be mounted in the float chamber and may have a worm or thread 18 whereby, in response to rotation of the valve stem 16, the valve member 17 is moved toward or away from the valve seat 15. I may employ any suitable control or actuating knob 19, with its pointer 20, opposed to any suitable calibration, not herein shown.

Mounted for movement unitarily with the stem 16 is a lever arm 21, to which is pivoted a curved link 22, which in turn is pivoted as at 23 to an actuating rod 24, mounted in any suitable guides 25 on a member 26, which extends into the combustion chamber 11 above the flame ring 4.

Pivoted to the inner end of the member 26, as at 28, is a baffle or shutter 29, the major portion of the baffle lying in a generally horizontal plane when the rod 24 is withdrawn and partially closing the aperture 5. The portion 29 is connected by an offset 30 with the pivot 28. The space between the member 26 and the top of the flame ring 4 is open to the admission of outside air, as through the aperture 31. The offset portion 30 of the baffle structure serves as a species of shutoff or limiting means for reducing or cutting off the inflow of air through the aperture 31 when the shutter structure is in the full line position of Fig. 1.

It will be understood that any suitable pilot means not herein shown may be employed for controlling combustion at the lower stages. When the device is burning at the pilot stage the knob 19 may be turned to a minimum setting position. It will be understood that any suitable means may be employed for preventing a complete cutoff of the valve 17 when the device is pilot operated. But at the minimum oil flow setting, not only is the valve 17 at its minimum setting in relation to the valve seat 15, but the operating rod 24 is withdrawn to the full line position of Fig. 1 and the shutter portion 30 cuts off the flow of secondary air inwardly through the passage 31 while the shutter portion 29 substantially reduces the area of the aperture 5. Combustion then takes place substantially below the top of the pot, and some or all of the primary apertures 3 then serve as means for admitting secondary air for the pilot stage.

When it is desired to operate at high fire, the valve stem 16 is rotated to high fire position, and this rotation not merely moves the valve 17 away from the seat 15, but also thrusts the operating rod 24 into the dotted line position of Fig. 1, and lifts the shutter structure 29, 30 into the dotted line position. This not merely increases the effective area of the aperture 5, in the flame ring 4,

but also permits the inflow of secondary air through the aperture 31. The primary air inlets 3 then serve as means for supplying the primary air necessary for a hydroxylated mixture, and this mixture rises upwardly through the aperture 5, and receives the secondary air flowing in through the aperture 31, and is burned as a completely hydroxylated mixture at or above the level of the flame ring 4.

The shutter 29 has the further function of directing this flame against the inside of the window 12, thus keeping it clean of carbon for ready inspection of the interior of the burner.

It will be understood that, whereas I have shown this shutter control to be operated unitarily with the operation of the liquid fuel valve, I may if desired use other means for controlling the valve, and separately control the shutter.

It will be realized that, whereas I have described and shown 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 my invention. I therefore wish my description and drawings to be taken as in a broad sense illustrative or diagrammatic, rather than as limiting me to my precise showing.

I claim:

1. In combination, in a pot type burner for liquid hydrocarbons, a combustion chamber, a burner pot located below said combustion chamber and having a plurality of primary air inlet apertures located at various levels in its wall, means for supplying liquid fuel to the bottom of the pot, a restricting partition between the combustion chamber and the pot having a generally central aperture therein, and means for delivering secondary air to the combustion chamber at a level above said restricting partition, including an air duct extending inwardly from a wall of the combustion chamber and in communication with the air outside of said combustion chamber, a shutter element including a portion adapted when the shutter element is in closed position to close said secondary air duct, and another portion adapted when the shutter is in closed position substantially to reduce the effective area of said aperture in the restricting paritition.

2. In combination, in a pot type burner for liquid hydrocarbons, a burner pot having a plurality of primary air inlet apertures located at various levels in its wall, means for supplying liquid fuel to the bottom of the pot, a restricting partition across the top of the pot having a generally central aperture therein, means for delivering secondary air to the burner at a level above said restricting partition, and shutter means for excluding said secondary air and for at the same time reducing the effectual area of said aperture, and means for unitarily moving said shutter means to open position and for increasing the flow of fuel to the pot, including a valve seat in the line of flow of liquid fuel to the pot, a valve member opposed to said valve seat, an actuating element for said shutter means, and means for unitarily moving said valve and said actuating member.

3. In combination, in a pot type burner for liquid hydrocarbons, a burner pot having a plurality of primary air inlet apertures located at various levels in its wall, means for supplying liquid fuel to the bottom of the pot, a restricting partition across the top of the pot having a generally central aperture therein, means for delivering secondary air to the burner at a level above said restricting partition, shutter means for excluding said secondary air and for at the same time reducing the effectual area of said aperture, and means for unitarily moving said shutter means to open position and for increasing the flow of fuel to the pot.

4. In combination, in a pot type burner for liquid hydrocarbons, a burner pot having a plurality of primary air inlet apertures located at various levels in its wall, means for supplying liquid fuel to the bottom of the pot, a restricting partition across the top of the pot having a generally central aperture therein, means for delivering secondary air to the burner at a level above said restricting partition, shutter means for excluding said secondary air and for at the same time reducing the effectual area of said aperture, and means for unitarily moving said shutter means to open position and for increasing the flow of fuel to the pot, including a valve seat in the line of flow of liquid fuel to the pot, a valve member opposed to said valve seat, an actuating element for said shutter means, and means for unitarily moving said valve and said actuating member, including a stem and means for rotating it, a thread, a fixed nut in mesh therewith adapted, in response to rotation of said stem, to raise and lower said stem and valve member, a lever arm on said stem, and a linkage connecting said lever arm and the actuating element for the shutter means.

5. In combination, in a pot type burner for liquid hydrocarbons, a burner pot having a plurality of primary air inlet apertures located at various levels in its wall, means for supplying liquid fuel to the bottom of the pot, a restricting partition across the top of the pot having a generally central aperture therein, means for delivering secondary air to the burner at a level above said restricting partition, shutter means for excluding said secondary air and for at the same time reducing the effectual area of said aperture, and means for unitarily moving said shutter means to open position and for increasing the flow of fuel to the pot, including a valve seat in the line of flow of liquid fuel to the pot, a valve member opposed to said valve seat, an actuating element for said shutter means, and means for unitarily moving said valve and said actuating member, including a stem and means for rotating it, a thread, a fixed nut in mesh therewith adapted, in response to rotation of said stem, to raise and lower said stem and valve member, a lever arm on said stem, and a linkage connecting said lever arm and the actuating element for the shutter means, said actuating element comprising a push rod mounted in the secondary air duct, and means for guiding it.

6. In combination, in a pot type burner for liquid fuels, a burner pot having a circumferential wall with a plurality of primary air inlet apertures located at various levels therein, means for supplying a liquid fuel to the interior of the pot, a restricting partition at the top of the pot, said partition having a generally central aperture therein, air inlet means for delivering air to the burner at a level above the top of the pot and above said restricting partition, and shutter means for simultaneously excluding said secondary air and reducing the effectual area of the central aperture of said restricting partition.

7. In combination, in a pot type burner for liquid fuels, a burner pot having a circumferential wall with a plurality of primary air inlet apertures located at various levels therein, means for

supplying a liquid fuel to the interior of the pot, a restricting partition at the top of the pot, said partition having a generally central aperture therein, air inlet means for delivering air to the burner at a level above the top of the pot and above said restricting partition, and shutter means for simultaneously excluding said secondary air and reducing the effectual area of the central aperture of said restricting partition, including a shutter element having a portion adapted to be opposed to said partition in aperture reducing position.

8. In combination, in a pot type burner for liquid fuels, a burner pot having a circumferential wall with a plurality of primary air inlet apertures located at various levels therein, means for supplying a liquid fuel to the interior of the pot, a restricting partition at the top of the pot, said partition having a generally central aperture therein, secondary air inlet duct means for delivering air to the burner at a level above the top of the pot and above said restricting partition, and shutter means for simultaneously excluding said secondary air and reducing the effectual area of the central aperture of said restricting partition, including a shutter element having one portion adapted to be opposed to said partition in aperture reducing position, and a secondary air inlet duct extending above said partition to a point adjacent said aperture, in line with another portion of said shutter element.

9. In combination, in a pot type burner for liquid fuels, a burner pot having a circumferential wall with a plurality of primary air inlet apertures located at various levels therein, means for supplying a liquid fuel to the interior of the pot, a restricting partition at the top of the pot, said partition having a generally central aperture therein, secondary air inlet means for delivering air to the burner at a level above the top of the pot and above said restricting partition, and shutter means for simultaneously excluding said secondary air and reducing the effectual area of the central aperture of said restricting partition, including a shutter element having one portion adapted to be opposed to said partition in aperture reducing position, and a secondary air inlet duct extending above said partition to a point adjacent said aperture, in line with another portion of said shutter element, said shutter element being rotatable about a horizontal axis located above the level of the inlet end of said secondary air inlet duct.

10. In combination, in a pot type burner for liquid fuels, a burner pot having a circumferential wall with a plurality of primary air inlet apertures located at various levels therein, means for supplying a liquid fuel to the interior of the pot, a restricting partition at the top of the pot, said partition having a generally central aperture therein, secondary air inlet duct means for delivering air to the burner at a level above the top of the pot and above said restricting partition, and shutter means for simultaneously excluding said secondary air and reducing the effectual area of the central aperture of said restricting partition including a shutter element having one portion adapted to be opposed to said partition in aperture reducing position, and a secondary air inlet duct extending above said partition to a point adjacent said aperture, in line with another portion of said shutter element, said shutter element being rotatable about a horizontal axis located above the level of the inlet end of said secondary air inlet duct, and having a portion adjacent its pivot, which portion is generally vertical when the shutter element is in closed position and a portion remote from the pivot which last portion is generally horizontal when the shutter element is in closed position.

11. In combination, in a pot type burner for liquid fuels, a burner pot having a circumferential wall with a plurality of primary air inlet apertures located at various levels therein, means for supplying a liquid fuel to the interior of the pot, a restricting partition at the top of the pot, said partition having a generally central aperture therein, secondary air inlet duct means for delivering air to the burner at a level above the top of the pot and above said restricting partition, and shutter means for simultaneously excluding said secondary air and reducing the effectual area of the central aperture of said restricting partition including a shutter element having one portion adapted to be opposed to said partition in aperture reducing position, and a secondary air inlet duct extending above said partition to a point adjacent said aperture, in line with another portion of said shutter element, said shutter element being rotatable about a horizontal axis located above the level of the inlet end of said secondary air inlet duct, and having a portion adjacent its pivot, which portion is generally vertical when the shutter element is in closed position and a portion remote from the pivot which last portion is generally horizontal when the shutter element is in closed position, said horizontal portion of the shutter element being unitary with and extending angularly from said vertical portion.

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