Nov. 28, 1939. J. L. BREESE 2,181,261

BURNER FOR LIQUID FUEL

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Fig. 1

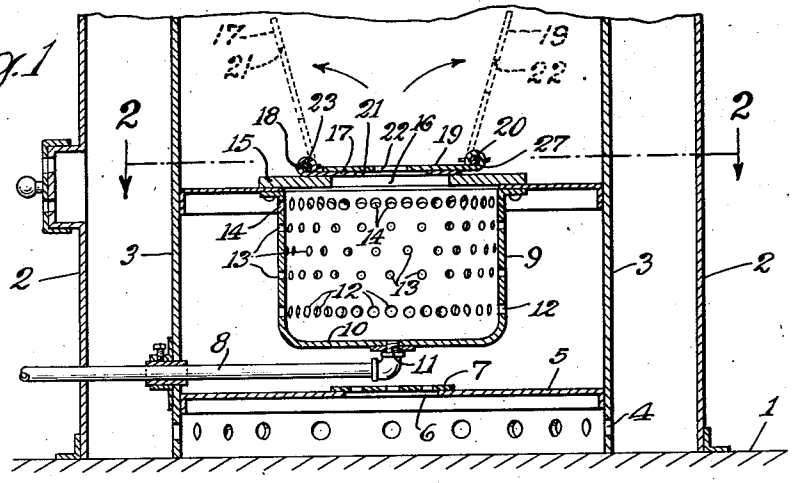


Fig. 4

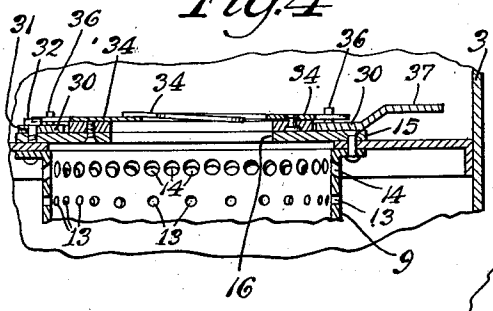


Fig. 2

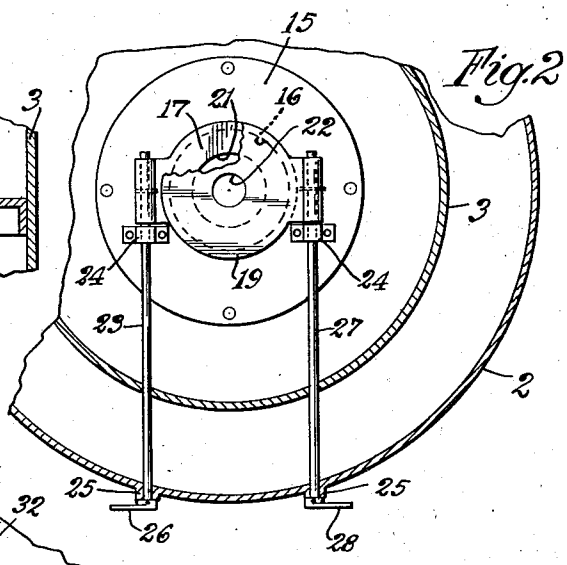
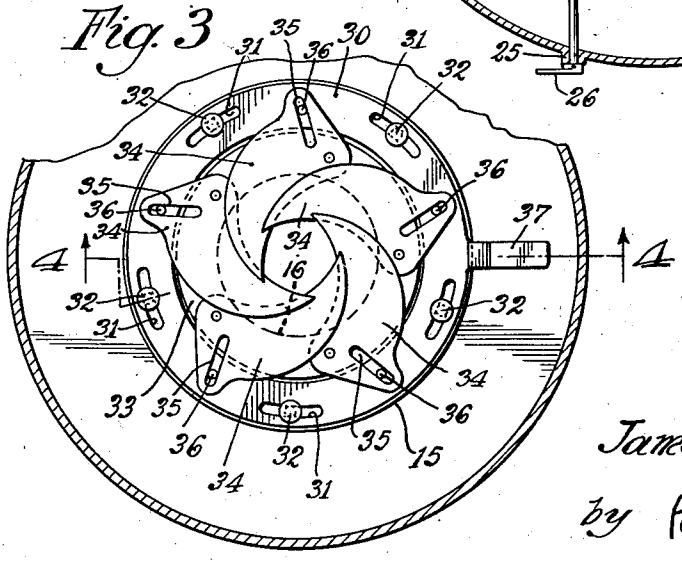


Fig. 3



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Fig. 5

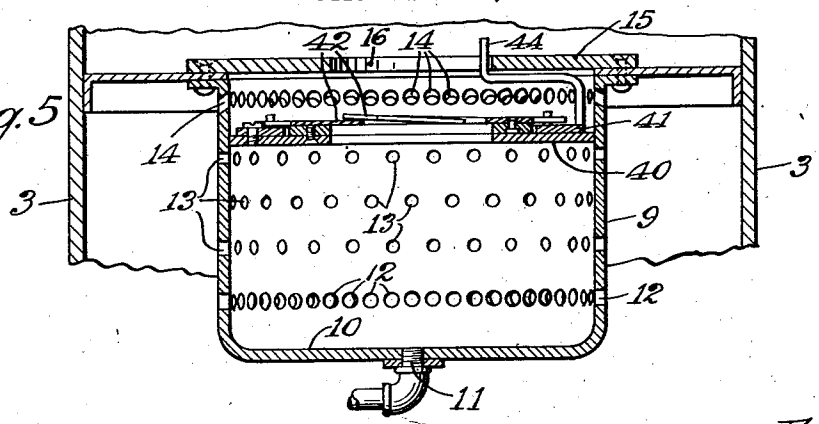


Fig. 6

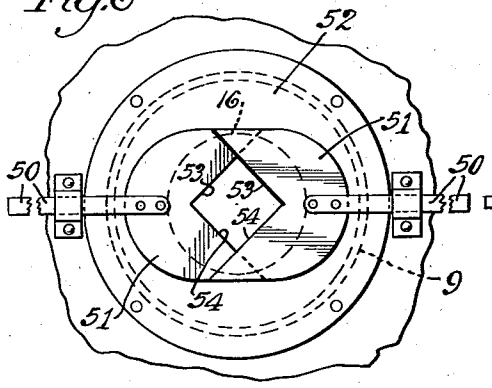


Fig. 7

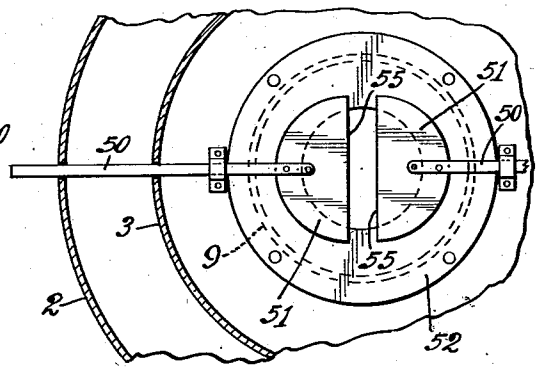


Fig. 9

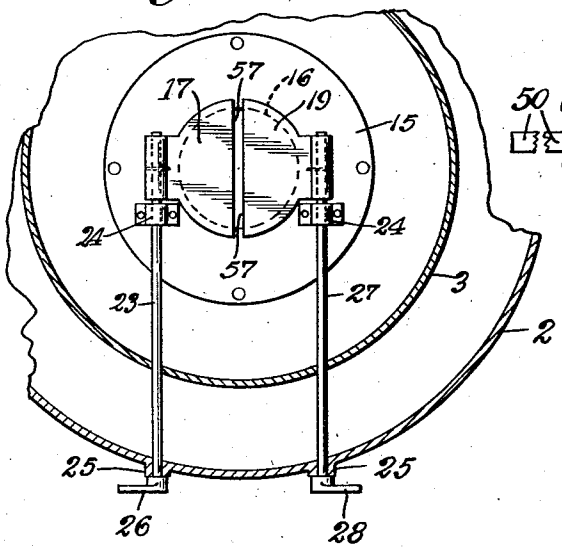
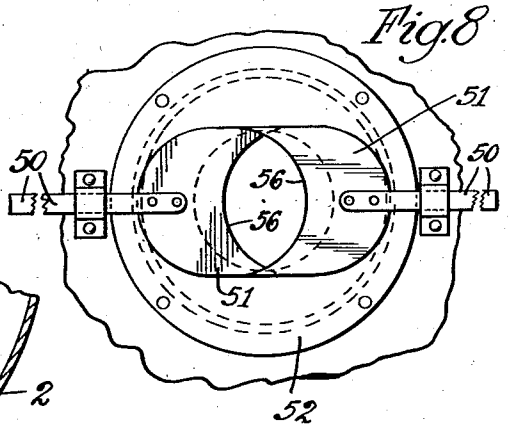


Fig. 8



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UNITED STATES PATENT OFFICE

2,181,261

BURNER FOR LIQUID FUEL

James L. Breese, Santa Fe, N. Mex., assignor to Oil Devices, Santa Fe, N. Mex., a limited partnership of Illinois

Application March 18, 1937, Serial No. 131,573

3 Claims. (Cl. 158—91)

My invention relates to an improvement in burners and is particularly adaptable to burners or stoves or furnaces burning liquid hydrocarbons and the like.

One purpose is the provision of improved baffle means whereby the baffle or apertured partition which closes the upper end of a mixing or combustion chamber, or is located intermediate the top and bottom of such a chamber, may be provided with an aperture of readily variable or adjustable diameter or cross sectional area.

Another purpose is the provision of means for regulating combustion in such a burner.

Another purpose is the provision of means for controlling or varying the minimum effective combustion rate of such a burner.

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:

Figure 1 is a vertical axial section;

Figure 2 is a section on the line 2—2 of Figure 1;

Figure 3 is a plan view of a variant form of the device;

Figure 4 is a section on the line 4—4 of Figure 3;

Figure 5 is a vertical axial section through a variant form;

Figure 6 is a plan view of a variant form;

Figure 7 is a plan view of a further variation;

Figure 8 is a plan view of a further variation; and

Figure 9 is a plan view of a further variation.

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

Referring to the drawings, 1 indicates any suitable base or surface upon which I indicate as supported an outer shell or housing 2. 3 indicates an inner housing or shell having about its base a plurality of air apertures 4. It will be understood that any suitable means may be employed for admitting air to the space between the members 2 and 3. 5 is any suitable horizontal or transverse partition adjacent the bottom of the member 3 and herein shown as above the level of the inlet air apertures 4. It may be provided with a central aperture 6 herein shown as closed by the apertured or foraminous plate 7. 8 is an inlet pipe for a liquid fuel and 9 generally indicates a fire pot, combustion chamber or mixing chamber through the bottom 10 of which extends the outlet end 11 of the fuel pipe 8.

12 indicates a bottom row of apertures whereby air may penetrate to the interior of the member 9. 13 indicates other apertures, the apertures 12 or 12 and 13 together being effective to admit a primary air supply for mixture with the vaporized liquid hydrocarbon which spreads out on the bottom 10 and is fed from the fuel pipe 8. 14 indicates an upper group or row of air apertures herein shown as upwardly and inwardly inclined. These apertures are adapted to admit a secondary air supply which, when it mingles with the vaporized hydrocarbon already mixed with the air from the primary air inlets 12 and 13, forms the combustible mixture the full combustion of which takes place above the upper edge of the pot or chamber 9.

In Figure 1 I illustrate this chamber as partially closed by an upper baffle 15 with a central aperture 16. In order to control or vary the effective diameter of the aperture in the baffle 15 I provide an additional baffle 17 pivoted as at 18 and a further baffle 19 pivoted as at 20. It will be noted that the aperture 21 of the baffle 17 is smaller than the aperture 16 and the aperture 22 of the baffle 19 is smaller than the aperture 21. Thus I have effective a choice of three different sizes of aperture in the main or fixed baffle 15.

23 indicates a shaft mounted in any suitable bearings 24, 25 and provided with an exterior handle 26 whereby the baffle 17 may be rotated from the effective full line position in which it is shown in Figure 1 to the ineffective or inoperative dotted line position in which it is shown in the same figure. Similarly, the rod 27 with its exterior handle 28 serves as means for controlling the position of the upper hinged baffle 19. It will be understood, of course, that the limit of movement of the hinged baffles 17 and 19 may be greater than is indicated by the dotted line position of Figure 1. Preferably the parts are so proportioned that they may be dropped into flat or horizontal position in the inoperative as well as in the operative location.

Figures 3 and 4 indicate another means for controlling the effective diameter of the aperture 16. In this form I illustrate an adjusting ring 30 provided with concentric slots 31 through which pass any suitable centering and positioning bolts 32. 33 indicates an inner fixed ring to which are pivoted a plurality of shutter members 34 each of which is slotted as at 35 slidably to engage an upstanding pin 36 on the rotatable adjustment ring 30. 37 is any suitable handle means which may, if desired, be extended to the exterior of the shell 3 and which may be employed to rotate the ring 30. When the ring 30 is at one position, the members 34 are in the posi-

tion in which they are shown in Figure 3 and define a substantially circular aperture of small diameter. Rotation of the ring in one direction will cause a further restriction in the diameter of the opening and rotation in the opposite direction will cause an increase in the diameter of the opening which may be arranged to be equivalent to the diameter of the aperture 16 itself.

Referring to Figure 5, I illustrate a device in which the structure substantially as shown in Figure 3 is applied to an intermediate baffle. The top of the chamber 9 may, if desired, be closed by a fixed baffle 15 like the one shown in Figure 1. Beneath the primary inlet apertures 14 I illustrate a fixed ring 40 on which is mounted a rotating ring 41 which may be substantially identical with the ring 30 shown in Figure 3 and is, therefore, not described again in detail. It controls pivoted shutter members 42 which may be identical with the shutter members 34 of Figure 3. Any suitable means may be employed, including for example an outwardly extending lever 44, for rotating the ring 42 and for thereby varying the effective cross sectional area of the aperture formed by the inner edges of the said shutter members.

Referring to Figure 6, I illustrate a form of shutter or baffle structure which may be applied either to the top of the mixing chamber or at any intermediate point or level. I illustrate for example slidably mounted shutter handles 50 each controlling a slidable shutter member 51 adjacent a fixed baffle plate 52. Each one of the members 51 is provided with a concave forward edge including portions 53, 54 inclined to each other. It will be evident from the structure of Figure 6 that the cross sectional area of the aperture defined by the opposed members 51 can be varied by simply sliding the shutter handles 50 in and out.

Figure 7 shows a form identical with that of Figure 6 except that the members 51 are provided with opposed parallel rectilinear edges 55.

The form of Figure 8 is identical with the forms of Figures 6 and 7 save that each of the members 51 has an arcuate edge 56. In the case of all three forms, sliding the handles 50 in and out varies the shape of the aperture and the cross sectional area of the aperture.

Figure 9 illustrates a variation of the form shown in Figures 1 and 2. In this case, the members 17 and 19 are each provided with parallel rectilinear edges 57 and the size of the members 17 and 19 is so proportioned that when they are swung into the closed position in which they are shown in Figure 9 they make a small slot whereas, when they are moved to the open position, they leave the baffle aperture 16 fully open.

It will be realized that whereas I 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 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 the precise showing.

Thus, in the form of Figures 1 and 2, I provide a selection of three differently sized apertures for the baffle 15. In Figures 3 and 4, I provide means for varying the size of such apertures progressively from a predetermined minimum to a maximum equivalent to the size of the aperture 16 itself. In Figures 5 and 7, the aperture is bounded by parallel rectilinear walls. The forms employing sliding or iris type members, such as shown in Figures 3 to 8, may be employed with either the upper or the intermediate partition or baffle.

The use and operation of my invention are as follows:

My invention may be broadly applied to any situation where the combustion chamber is provided with an upper or intermediate baffle with an aperture the diameter of which should be varied or controlled either at the time of starting combustion in the device or in order to control the rate of combustion or the quality of combustion in the area defined by the baffle. One application of my invention is to a mixing and combustion chamber in which a primary air supply is first mixed with a vaporized hydrocarbon to form a preliminary mixture which, in turn, has supplied to it a secondary air supply to create a final and fully combustible mixture. In this type of burner, as shown for example in Figure 1, I find it desirable to place an upper baffle 15 above the secondary air supply inlets 14. The optimum size of the aperture 16 varies widely. Furthermore, the rate of combustion can be controlled by varying the size of the aperture 16. I therefore provide ready means for controlling the aperture.

In the form of Figure 1, when an aperture of minimum size is desired, the hinged baffles or shutters 17 and 19 are both dropped into the full line position in which they are shown in Figure 1. If the member 19 is rotated by the exterior handle 28 into inoperative position, a baffle aperture of intermediate size becomes operative. If the operator then wishes to rotate the baffle or shutter 17 into inoperative position, the maximum size aperture 16 then becomes effective.

With reference to Figures 3 and 4, instead of providing a selection of specifically sized apertures, I provide means for varying the size or area of the aperture at will from a minimum to a maximum and any suitable means may be employed for rotating the adjusting ring 30 into any desired position and for changing its position from time to time as may be necessitated by varying conditions of combustion or to obtain varying rates of combustion.

Referring to the forms of Figures 5 to 9, I illustrate various means for controlling the cross sectional area of the baffle aperture, either by the application of the iris shutter to the intermediate or lower baffle, as shown in Figure 5, or by the employment of sliding shutters, as shown in Figures 6 to 8, or by the employment of shutters rotating about horizontal axes, as shown in Figure 9. It will be understood that shutters of the forms shown in Figures 3 to 8 inclusive can all be applied either to an upper baffle or to an intermediate baffle. Figures 1, 2 and 9 relate to a form applicable primarily to an upper baffle.

It will be realized that my invention includes the employment of means for varying the cross sectional area of the upper opening for the combustion or mixing chamber 9 or for varying the opening of an intermediate or lower baffle.

I claim:

1. A mechanism for burning liquid fuel, which includes a chamber and means for admitting liquid fuel to the bottom thereof, a wall for said chamber provided with a plurality of primary air apertures positioned at various levels above the level of the liquid fuel, means, located above

said primary air apertures, for admitting secondary air to the upwardly rising mixture of vaporized fuel and primary air, and means for varying the flow of air through said air apertures, including a baffle located at an upper portion of said chamber, an aperture in said baffle, and means for varying the effective cross sectional area of said aperture.

2. A mechanism for burning liquid fuel, which includes a chamber and means for admitting liquid fuel to the bottom thereof, a wall for said chamber provided with a plurality of primary air apertures positioned at various levels above the level of the liquid fuel, means, located above said primary air apertures, for admitting secondary air to the upwardly rising mixture of vaporized fuel and primary air, and means for varying the flow of air through said air apertures, including a baffle located at an upper portion of said chamber, an aperture in said baffle, and means for varying the effective cross sectional area of said aperture, said baffle being located above said secondary air admission means.

3. A mechanism for burning liquid fuel, which includes a chamber and means for admitting liquid fuel to the bottom thereof, a wall for said chamber provided with a plurality of primary air apertures positioned at various levels above the level of the liquid fuel, means, located above said primary air apertures, for admitting secondary air to the upwardly rising mixture of vaporized fuel and primary air, and means for varying the flow of air through said air apertures, including a baffle located at an upper portion of said chamber, an aperture in said baffle, and means for varying the effective cross sectional area of said aperture, said baffle being located below said secondary air admission means.

J. L. BREESE.