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GAS HEATER

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2 Sheets-Sheet 1

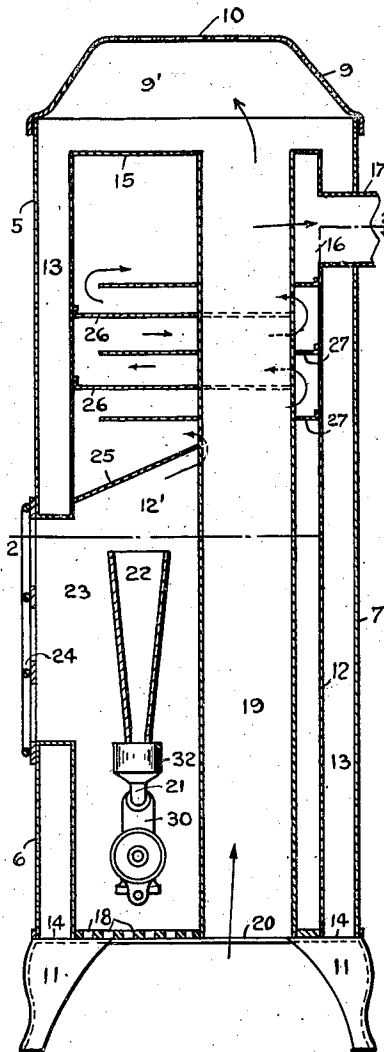


Fig. 1

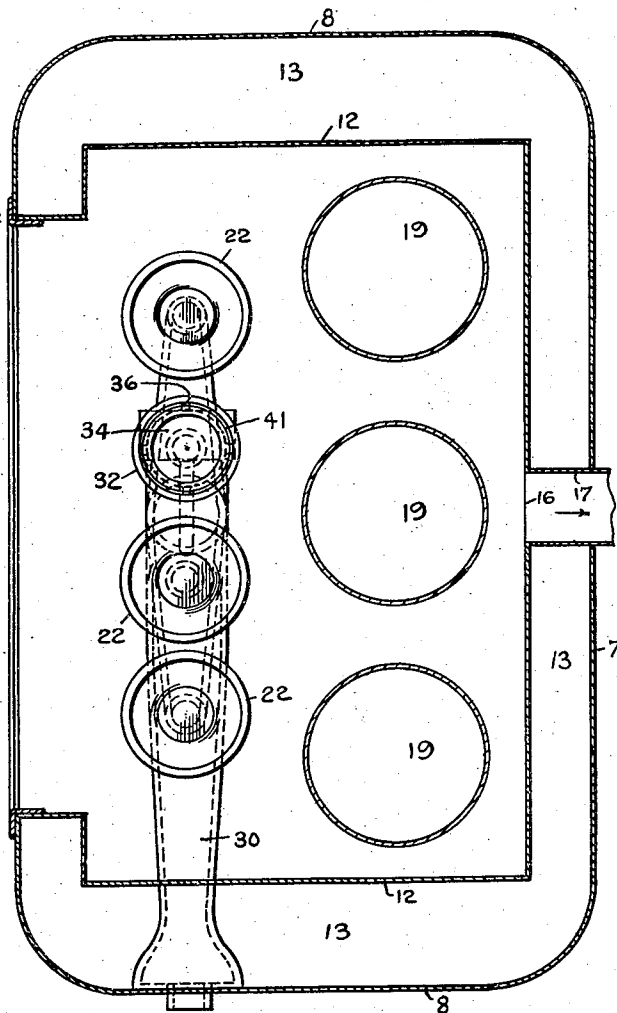


Fig. 2

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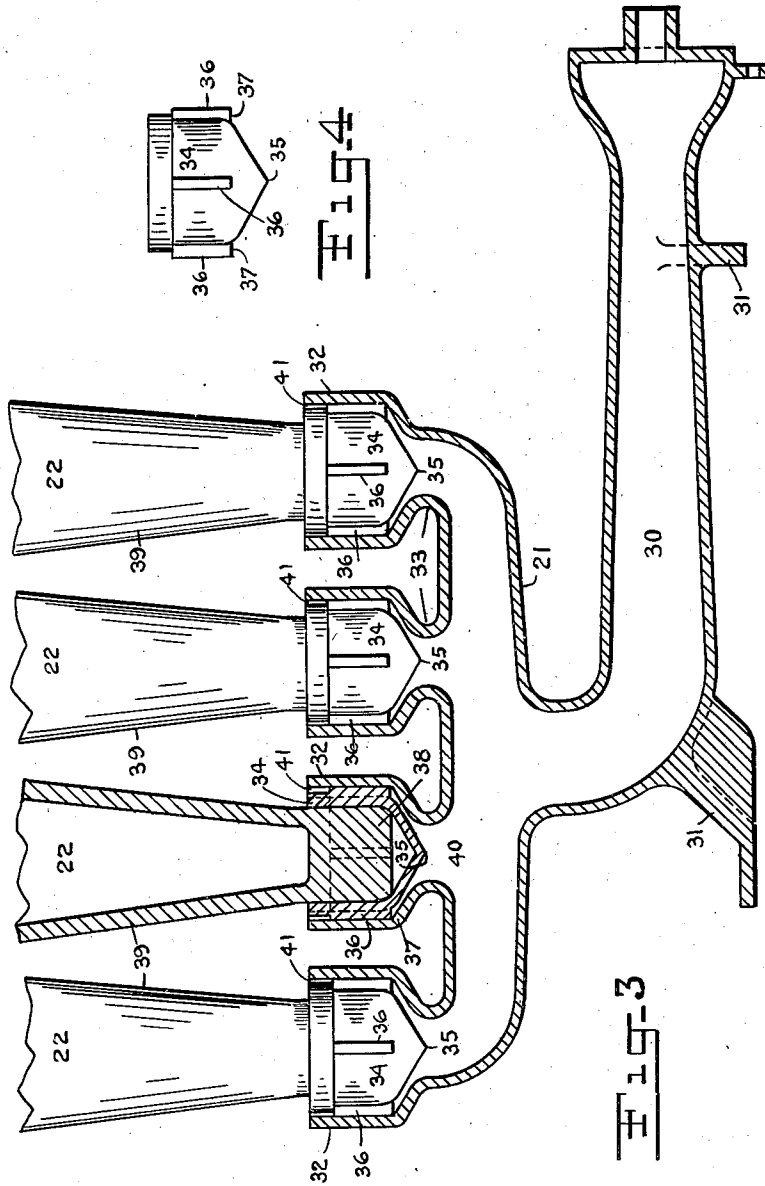
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# UNITED STATES PATENT OFFICE

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## GAS HEATER

Application filed February 21, 1928. Serial No. 255,881.

The present improvements relate in general to heaters and more particularly to that type of heater employing hydrocarbon gases as fuel.

5 A primary object, among others, of the present invention is to provide an improved heater construction adapted for use in habitable quarters, wherein maximum heating results are obtained. Another object is to  
10 provide an improved burner construction having a novel arrangement of parts cooperating with a radiant body, affording an improved heating unit.

15 Various other objects and advantages, of the present improvements, will be apparent upon reference to the accompanying drawings, in which

Fig. 1 is a sectional view of a parlor heater illustrating the improved construction;

20 Fig. 2 is a plan view taken on line 2—2 of Fig. 1;

Fig. 3 is a sectional view of the burner or heating unit; and

25 Fig. 4 is a side elevation of the removable cup or pocket.

Referring to Fig. 1, the parlor heater illustrating the improved construction comprises an outer upright casing 5 having the front and rear plates 6 and 7 respectively,  
30 and sides 8. Said casing is provided with a head 9 having an opening 10 to the atmosphere, said head being of any desired form, pleasing to the eye, for presenting a neat appearance. The casing 5 has an open bottom  
35 and is supported on a perimetric frame having legs 11.

Suitably mounted within casing 5, is a drum 12 providing a combustion chamber 12' as hereinafter described. Said drum is  
40 somewhat smaller in cross-section than casing 5, and is concentrically mounted therein, said casing and drum having common longitudinal axes. In thus disposing the drum 12 in spaced relation to the casing 5, an annular  
45 or peripheral air duct or flue 13 is defined. As illustrated, said flue has free communication with the atmosphere at the base of the casing indicated at 14, and affords an air conduit or flue for the passage of air from  
50 the base to the top of the structure, between

the upright walls of the casing and drum. Although the drum 12 terminates just beneath the casing head 9, the flue 13, continues, in effect, to the opening 10, its limits in this region being defined by the head 9.

The drum 12 has a closed top 15 but is provided with an opening 16 at the upper rear side thereof for the discharge of hot air, combustion gases, etc., a combustion flue 17 being sealed to said opening, bridging air duct 13  
60 and passing through casing 5 to the atmosphere, as for example, a chimney. The base of said drum is closed with the exception of apertures 18 therein for admitting secondary air to the fuel burners.

Positioned eccentrically of the drum, and spaced from the walls thereof, is a plurality of air ducts or flues 19, which extend longitudinally through the drum from top to bottom, communication with the atmosphere being afforded, at the bottom through openings  
70 20, and at the top through space 9' and opening 10. Although any number of such flues may be provided, three are preferable for accomplishing most efficient results.

Suitably mounted in the lower fore portion of the combustion chamber 12' is the burner or heater unit 21. While the heated air and combustion products ascend from said unit through the chamber 12' to flue 17, heat is also transmitted to the surrounding atmosphere, by radiation from the refractory elements 22 of the burners, through opening  
80 23 of the drum 12 and grid 24 in casing 5. The grid 24 may be open, or provided with mica as desired.

It will be noted that when the burners are lighted, convection currents will be set up in flues 13 and 19, cool air entering at the bottom thereof, being heated by the gases of the combustion chamber 12' as the air ascends and leaving the casing through top opening  
90 10. In order that a maximum amount of heat may be transferred to the air ducts, means are provided for compelling the combustion gases and hot air in chamber 12' to follow a zigzag course in their travel to flue 17. Accordingly a deflector plate 25 and laterally extending baffles or deflectors 26 and 27  
100 are positioned within the drum 12 between

openings 23 and 16. These baffles are secured, in spaced relation, to the walls of the drum, and embrace or encircle the air ducts 19. As illustrated the baffles 26 extend from the front wall of the drum and terminate short of the rear wall thereof, likewise baffles 27 project from the rear wall and terminate short of the front wall. This staggered arrangement affords a relatively long passage compelling the hot products to follow a tortuous path through chamber 12'. Therefore, before the gases may ultimately be discharged, they alternately come in contact with the drum walls and walls of air ducts 19. With every such contact, heat is conducted through the walls to the air in ducts 13 and 19, it being noted that the gases completely encircle the ducts 19 several times in their travel. The abrupt turns in the tortuous path are of distinct advantage, since the gases exert a scouring action on the drum walls at these points thereby freeing same of deposits and maintaining a clear passage.

The present improvements accordingly provide a plurality of upright air circulation ducts housed within one another, one of which (defined by drum 12) affords a combustion chamber 12'. A maximum transfer of heat is obtained by providing a hot air flue 13 surrounding the chamber 12', and by disposing flues 19 within said chamber. Furthermore the proximity of flues 19 to the burners and the arrangement of deflector 25 insure an extensive transfer of heat directly from the unit 21 to ducts 19.

Referring more particularly to Figs. 3 and 4, the heating unit 21 comprises a mixing chamber 30 having the usual inlet for gas and primary air, and securing means or supports 31 for mounting in the combustion chamber 12'. Cast integrally with the mixing chamber are a plurality of upstanding sleeves 32 having preferably cylindrical walls. As illustrated, said sleeves have contracted necks 33 at their point of union with the chamber 30. The number of sleeves provided on the chamber may be varied as desired. As the burners are identical, the structure of one only will be described.

The sleeve or cylindrical body 32 affords, with its contracted neck, a pocket or cup in which the remaining elements of the burner are supported. A second cup or inverted dome-shaped member 34 is supported within said cup 32. This cup 34, see Fig. 4, has a cylindrical wall of substantially the same height as the wall of cup 32, but of somewhat less diameter than cup 32. The wall of cup 34 is gradually contracted to form a dome with apex 35, presenting a surface symmetrical with the contracted neck 33 of cup 32. Ribs 36 are cast on the exterior wall of cup 34 and extend from adjacent the end of the cup to the contracted dome thereof, where they terminate forming supporting means 37.

Three or more such ribs may be provided in spaced relation about the periphery of the cup.

By referring to Fig. 3 the position of cup 34 in cup 32 will be observed. When the cup 34 is placed in position in pocket or cup 32, the supporting ends 37 of ribs 36 contact the contracted neck 33 thereof, the relation and proportion of parts being such that the inner cup is spaced from the outer cup thereby forming an annular jet orifice for the gaseous mixture while the bottom or dome of cup 34 is suitably spaced from neck 33. It will be noted that when the parts are thus assembled, the upstanding walls of the cups are flush at their ends, but the ribs 36 terminate short of the plane of said ends. These ribs serve the dual function of spacers for the cups, as well as supports, in co-operation with supporting neck 33, for the inner cup or pocket.

Mounted in the inner cup or pocket 34 is a refractory member or ceramic 22, having a solid base 38, of cylindrical form and a hollow frusto-conical body 39. The element 22 is so proportioned that its base 38 has a nice fit within cup 34, whereby the element will be firmly supported in upright position by said cup. While the cup 34 is telescoped in cup 32 with a close fit, and ceramic 22 likewise closely fitted in cup 34, both these elements are readily removable for facilitating cleaning and replacement.

Assuming the gas cock for the mixing chamber 30 to be on, the gaseous mixture reaches the cup 32 from chamber 30 through inlet 40 of contracted neck 33. The bottom of cup 34 now functions to deflect or direct the gases to the annular chamber between the cups whence it ascends to the annular orifice 41 where it is ignited. Since ribs 36 do not extend the entire height of the cups, the mixture spreads throughout the chamber 41 affording an annular gaseous ring which burns with an annular flame with the ceramic axially thereof.

As illustrated, the burner parts are so proportioned and arranged that burning of the mixture occurs neither beneath or within the refractory element 22. In the present construction the gas is burned on the outside of the radiant and therefore permits a free supply of secondary air about the burner, thus eliminating the possibility of producing obnoxious odors, carbon monoxide, etc. Furthermore the firm and accurate setting of the ceramic with respect to the inner cup, and also a similar setting of said cup with respect to the pocket or outer cup 32, insures a complete annular flame, the ceramic by its form and disposition materially contributing thereto. A hollow refractory element of the type depicted, surrounded by a cylindrical sheet of flame, is found to increase radiation of the heat and therefore provides a feature

of economy in use in the improved heater set forth.

Although the improvements have been illustrated in connection with a casing of rectangular design, it is apparent that same may be varied as desired without departing from the scope of the invention.

Various other embodiments and modifications within the scope of the improvements herein set forth may be apparent to those skilled in the art.

We claim:

1. A burner construction comprising a mixing chamber terminating in a cup shaped wall, a fuel inlet in the base thereof, a cup mounted within and coextensive with said wall and defining burner orifices therewith, said cup having a pointed bottom extending to said inlet, and a refractory body supported in said cup.

2. A burner for gaseous fuels comprising a cup having an inlet at its base, a second cup telescopic therein and having a pointed base extending to said inlet, means for spacing said cups and a refractory body supported by said second cup.

3. A burner construction comprising a cylindrical body having a contracted lower portion, a cup supported in said body and spaced therefrom thereby forming an annular jet orifice, said cup being coextensive with the contracted portion for defining a fuel inlet for said orifice, and a ceramic supported in said cup.

4. A burner construction comprising a body having upstanding contiguous walls, inlet means for said body for supplying fuel thereto, a receptacle adapted to hold a refractory element supported within said body and spaced therefrom, said receptacle having a pointed base directed toward said inlet.

5. A gas burner comprising a cup having a fuel inlet, an inverted dome-shaped member fitted within said cup having its bowl positioned axially of said inlet and providing a deflector therefor, the base of said member being flush with the end of said cup, means for spacing said member and cup and a refractory element supported by said member.

Witness our hands this 16th day of February, 1928, at the city of Milwaukee, in the county of Milwaukee, State of Wisconsin.

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