

April 29, 1930.

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1,756,748

WATER HEATER GAS BURNER

Filed Dec. 9, 1926

2 Sheets-Sheet 1

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Fig. 1.

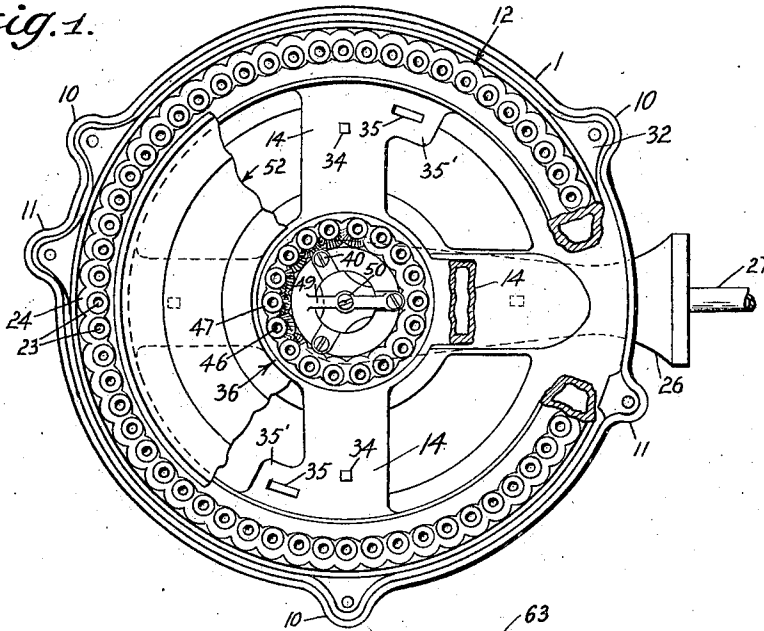


Fig. 2.

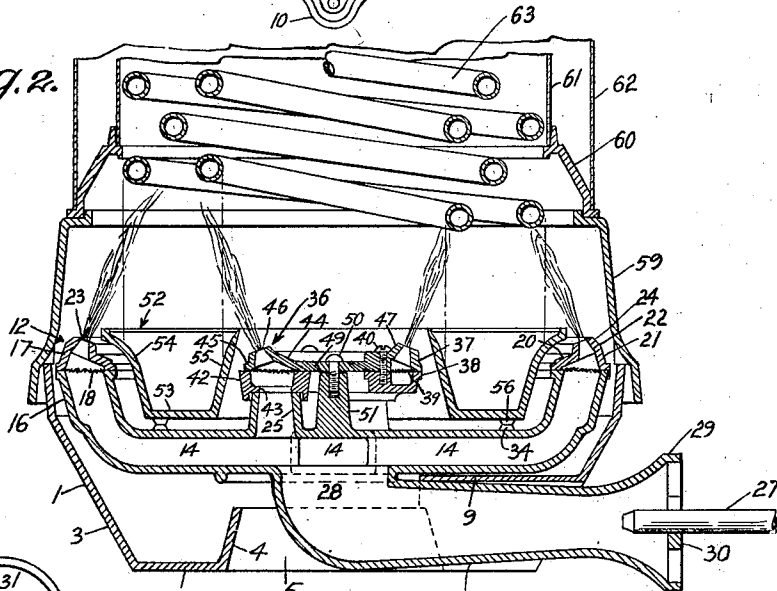
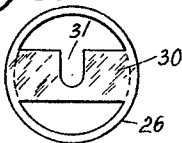


Fig. 3.



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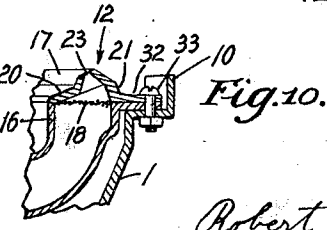
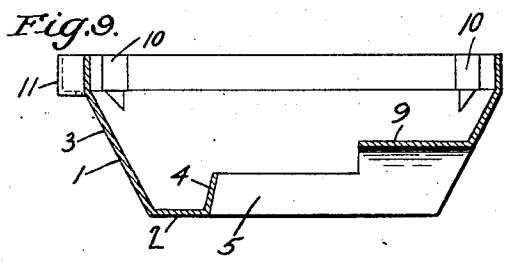
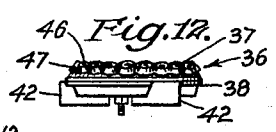
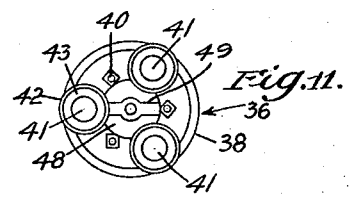
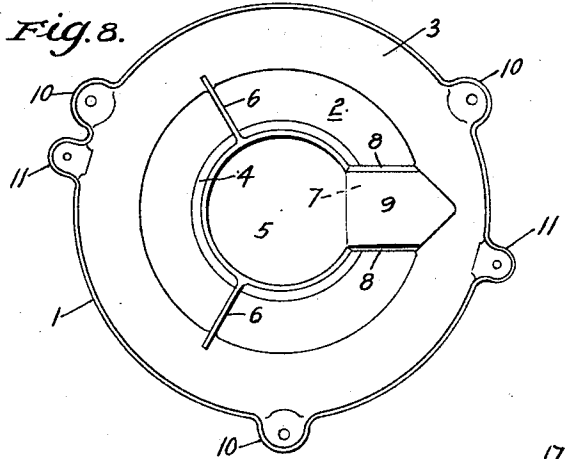
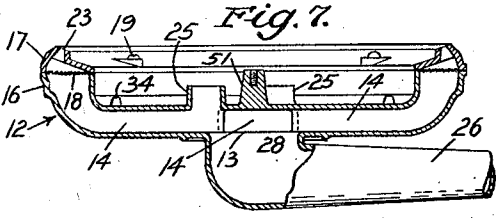
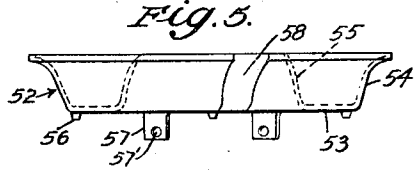
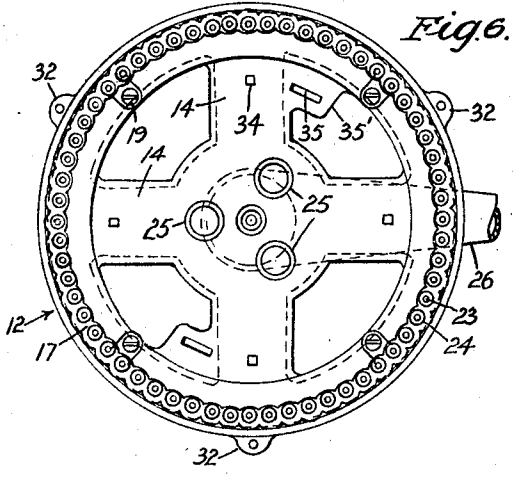
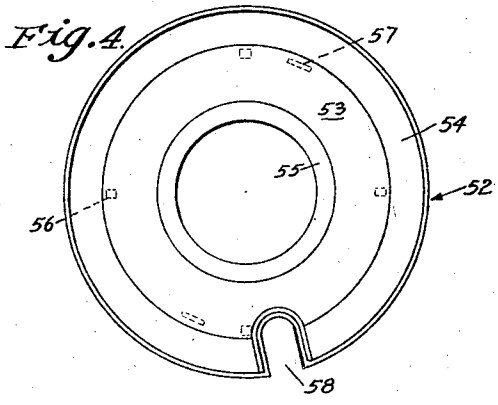
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2 Sheets-Sheet 2



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# UNITED STATES PATENT OFFICE

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## WATER-HEATER GAS BURNER

Application filed December 9, 1926. Serial No. 153,506.

The present invention relates to improvements in gas burners and has particular reference to a burner adapted to be used in connection with an automatic or instantaneous water heater, in which a heating coil is arranged above the burner and the burner started by the flow of water through the heating coil and lit by means of a pilot light. An arrangement of this character presents the problem, how to protect the burner from the products of condensation and other matter dropping from the heating coils and thereupon, and which products and matter are apt to clog the holes of the burner and render the same less effective.

It is the principal object of the present invention to solve this problem, and to arrange the burner relative to the heating coil in such a manner that the perforations of the burner lie outside the dripping zone of the heater while a pan is arranged to receive the drippings. It is further proposed to arrange the pan in such a manner that its edges are immediately subject to the heat of the burner flame, so that any condensates dropping in the pan are vaporized. It is further proposed to arrange the perforations of the burner in such a manner that the burner flame emanates from the burner at an angle, so that it strikes the heating coil directly although the burner is disposed outside of the dripping zone.

It is further proposed in the present invention to provide a double burner effect by arranging two concentric burners, one lying inside of and the other outside of an annular dripping zone so that both are protected from the drippings. A further object of the invention is to support an annular pan between the two burners for the purpose of catching the drippings as well as for the purpose of guiding the draft of atmospheric air into the immediate vicinity of the burner flame. A further object of the invention is to arrange structural details in such a manner that the draft rises on opposite sides of each burner flame and comes into immediate contact therewith.

It is further proposed to provide improved features in connection with a burner of the

character described that will facilitate the assembling and the taking apart of the same without necessitating the removal of the gas feed pipe structure from the heater.

Other and further objects of the invention will appear as the specification proceeds.

The preferred form of the invention is illustrated in the accompanying drawings in which:

Figure 1 shows a top plan of my burner, certain parts being broken away to disclose interior parts thereof.

Fig. 2 is a central vertical section through my burner with a portion of the heating coil superimposed thereon.

Fig. 3 is an end face view of a feed tube used in connection with my burner.

Fig. 4 is a top plan of a dripping pan and Fig. 5 is a side view of the same.

Fig. 6 is a top plan of my outer burner ring with its gas chamber and feed tube, and Fig. 7 is a central vertical section through the same.

Fig. 8 is a top plan of a supporting pan for my burner, and Fig. 9 is a central vertical section through the same.

Fig. 10 is a fragmentary sectional detail illustrating the manner in which the burner is supported on the supporting pan.

Fig. 11 is a bottom plan of my inner burner ring, and Fig. 12 is a side view thereof.

While I have shown only the preferred form of the invention, I wish to have it understood that various changes or modifications may be made within the scope of the claims hereto attached without departing from the spirit of the invention.

Referring to the drawings in detail, the supporting pan 1 which may rest on suitable legs not shown in the drawings, is annular in form and consists of a bottom ring 2, an outwardly slanting outer wall 3 and an inwardly slanting inner wall 4 so as to leave a central air passage 5. The two walls are reinforced and interconnected by suitable webs 6. A section of the bottom ring is raised as shown at 7 by the flanged extensions 8 of the inner wall 4, which latter extensions are bridged by the arc 9 adapted to form a roof for the feed tube of my burner to be men-

tioned hereinafter. Three ears 10 are formed in the upper rim of the outer wall 3 in which corresponding lugs of the outer burner are seated and two further ears 11 are adapted to receive rods (not shown) connecting the burner arrangement to the superstructure.

The outer burner 12, shown in detail in Figs. 6 and 7, comprises a flat gas chamber 13 having four horizontal hollow arms 14 extending therefrom in radial direction, the arms curving upwardly at their outer ends and terminating in the hollow burner ring consisting of two complementary sections 16 and 17 separated by the usual wire gauze 18 and interconnected by bolts 19. The upper section is formed with two slanting surfaces 20 and 21 intersecting at 22 to form a ridge, and the inner surface 20 is provided with a series of perforations 23 surrounded by small embossments 24. It will be noted that the axis of these perforations slant inwardly toward the axis of the burner and at a point above the latter.

The central gas chamber 13 has also three vertical tubes 25 rising therefrom which latter direct the gas into the inner burner ring to be described hereinafter. The feed tube 26 which connects with the gas pipe 27 of the distributing system (see Fig. 2) is arranged horizontally and radially under the burner and discharges into the center thereof as shown at 28. Its outer end flares, as at 29, and is partly closed by a transverse bar 30 (Fig. 3), which latter is recessed, as at 31, to provide a seat for the gas pipe 27. It will be noted that this construction allows the burner to be inserted and removed by a tilting motion, without disturbing the fixed gas pipe. The outer burner is provided with external lugs 32 adapted to be seated in the ears 10 of the supporting pan (see Fig. 10) and to be secured thereto by bolts 33. The said burner has also small lugs 34 projecting from the arms thereof to serve as supports for the drip pan to be described later and is formed with slots 35 in small webs 35' extending from two of the arms, by means of which the drip pan is positioned, as will appear later.

The inner burner ring 36 illustrated in detail in Figs. 11 and 12, is formed of complementary top and bottom sections 37 and 38 separated by the wire gauze 39 and fastened together by bolts 40. The bottom section 38 is formed with three perforations 41 arranged to register with the vertical tubes 25 of the outer burner ring while embossments 42 surround marginal portions 43 which position the inner burner when telescoped over the tubes 25. The upper section 37 of the inner burner is formed with two intersecting slanting surfaces 44 and 45 presenting a ridge, and the outer surface 45 is provided with a plurality of perforations 46 extending through small emboss-

ments 47 and slant outwardly so as to give the flame emanating from these perforations an outward slanting direction as indicated in Fig. 2. The inner burner is in the form of a ring with an open center 48 which is bridged by a transverse bar 49 allowing the inner burner ring to be secured to the outer burner ring by means of a screw 50 extending through the bar 49 into a boss 51 rising from the center of the outer burner.

When the two burner rings are thus secured together they form an annular depression between the same, as appears from Fig. 2, the depression being open since it is formed by the radial arms of the outer burner so that air may rise therethrough. In this depression is accommodated the drip pan 52 formed with a flat bottom 53, an outwardly slanting outer wall 54 and an inwardly slanting inner wall 55. This pan is illustrated in detail in Figs. 4 and 5 and has four lugs 56 projecting from the bottom face adapted to rest on the lugs 34 rising from the arms of the outer burner, while two further lugs 57 extending from the bottom of the pan are adapted to project through the slots 35 in the webs 35' so as to definitely position the pan. These lugs are held against removal by cotter pins (not shown) insertible through holes 57'. The upper edges of the pan extend to within close proximity of and slightly above the two burner rings so that, the walls of the pan not only guide the draft of secondary air immediately past the perforations of the burner but are also heated by the burner flames for the evaporation of the condensate that may drop on the pan. A recess 58 is formed in the outer wall and the outer edge of the bottom of the pan to accommodate the pilot burner (not shown).

The remaining structure of my arrangement includes the base 59 resting on the edge of the supporting pan 1, a ring 60 resting on the base, an inner jacket 61 supported on the ring, an outer jacket 62 also resting on the ring and the heating coil 63. For the purposes of my invention the essential feature of this superstructure is that the heating coil and preferably the inner jacket are arranged vertically above the drip pan 52 so that, any condensates or other substances dropping from the heating coil and the jacket are caught by the drip pan and are prevented from clogging up the perforations of either burner.

It will be seen from the above description that the construction and the manner of assembling my burner is very simple. After the supporting pan 1 has been suitably placed, the outer burner may be positioned therein by guiding the feed tube 26 through the open center and under the roof formed by the arc 9 until the outer end passes over the pipe 27 when the burner may be dropped in place, which will seat the pipe 27 in the recess 31

in the bar across the open end of the feed tube. The lugs 32 of the burner, during this operation, drop into the ears 10 of the supporting pan and are secured thereto by the bolts 33 (see Fig. 10). Next the inner burner is positioned so that the embossments 42 telescope on the tubes 25 and is fastened by means of the screw 50. The pan may then be dropped in place, its position being determined by the lugs 57 entering the slots 35 in the webs 35'. Cotter pins introduced through the holes 57' hold the pan in place. The superstructure may then be built up in a conventional manner.

It will be noted that the drip pan catches any condensates or solid matter dropping from the heating coil or inner jacket, that the two burners are altogether outside of the dripping zone while the flames of the burners strike the coil as effectively as they would if the burner were placed directly below the heating coil, and that secondary atmospheric air is guided by the drip pan into immediate proximity of the burner flames. The draft is also caused to rise between the outer ring and the supporting pan and through the open inner ring, and the slanting top surfaces of the two burner rings allow the rising air to immediately commingle at the discharge zones of the two burners.

Having thus described my invention, what I claim as new is as follows:

1. A burner of the character described comprising a gas chamber, two sets of tubular discharge arms extending therefrom, and two independent burner rings supported on the sets of arms respectively and arranged in concentric relation, the said rings provided with perforations arranged to discharge the gas in a column defined by the burner rings.

2. A burner of the character described comprising a gas chamber, two sets of discharge arms extending therefrom, two burner rings supported on the sets of arms respectively and arranged in concentric relation, the arms being formed to provide a depression between the same, and an annular pan adapted to be seated in said depression.

3. A burner of the character described comprising two concentric burner rings formed with perforations discharging toward a column defined by the rings, and an annular pan supported between the rings, the edges of the pan being adjacent the perforations in the burner rings so as to be heated by flames emanating therefrom.

4. A burner of the character described comprising two concentric burner rings formed with perforations slanting upwardly and toward one another, and guide means interposed between the rings causing rising air to be guided into the immediate vicinity of the burner perforations.

5. A burner of the character described having a radial feeding tube disposed thereun-

der, a recessed element at the entrance of the feeding tube allowing a gas pipe to be seated in the recess thereof and allowing the burner to be tilted relative to the pipe for the purposes of assembly or removal.

6. A burner of the character described comprising two concentric burner rings, each having two slanting upper surfaces intersecting to form a ridge and discharge perforations arranged in one of the surfaces, and guide means arranged relative to the two burner rings so as to guide rising air toward and along the slanting surfaces into the immediate proximity of the burner flame.

In testimony whereof, I affix my signature.  
ROBERT C. HOYT.

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