Oct. 20, 1936. D. H. WASHBURN 2,058,196

OIL BURNER

Filed July 15, 1933

Fig. 1.

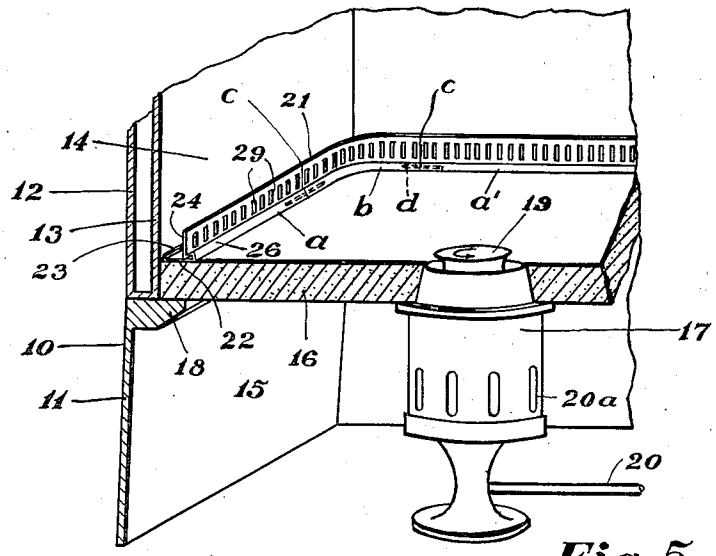


Fig. 2.

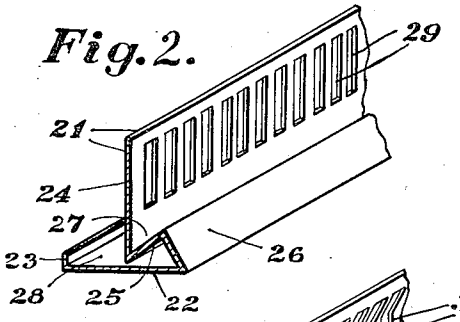


Fig. 3.

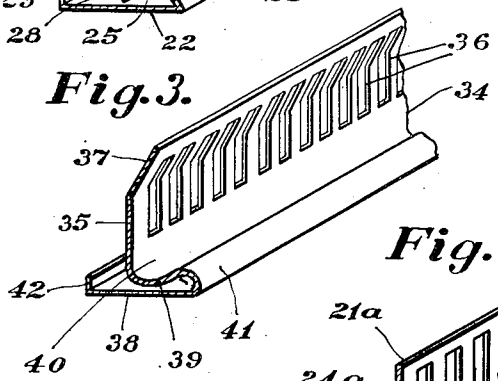


Fig. 4.

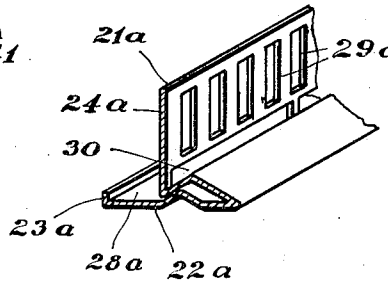


Fig. 5.

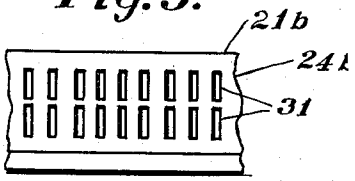


Fig. 6.

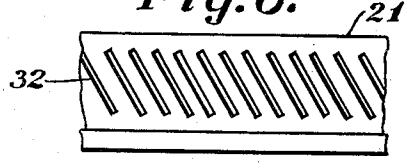
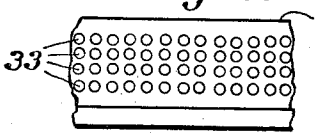


Fig. 7.



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Patented Oct. 20, 1936 2,058,196

UNITED STATES PATENT OFFICE

2,058,196

OIL BURNER

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Application July 15, 1933, Serial No. 680,581

7 Claims. (Cl. 158—4)

This invention relates to oil burners, and particularly to the construction of the hearth or burner ring of the hearth; and the object of the invention is to provide a burner ring disposed adjacent the peripheral wall of the firebox of a furnace or boiler adjacent the lower end of the water jacket or leg of the boiler so as to provide a flame which will extend vertically of the wall of the furnace, producing the most efficient and practical type of burner for apparatus of the class described; a further object being to provide a burner ring including a base portion, a vertical perforated wall portion forming the burner wall or flange proper of the ring and a grooved or channel portion in which the oil discharged from a rotary burner head will collect in the initial starting of the burner; a still further object being to provide a device of the class described wherein the base portion of the ring is so constructed as to engage the peripheral wall of the firebox and serve to space the vertical wall or flange a predeterimned distance from the firebox wall so as to properly position the flame of the burner with respect to said wall; a still further object being to provide a burner ring which is constructed from sheet metal rendering it simple and economical in construction, as well as simplifying the installation of the ring and the construction of the entire hearth, as well as facilitating the removal of the ring for cleaning, replacement and other purposes; and with these and other objects in view, the invention consists in a device of the class and for the purpose specified, which is simple in construction, efficient in use, and which is constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawing forms a part, in which the separate parts of my improvement are designated by suitable reference characters in each of the views, and in which:

Fig. 1 is a sectional perspective view of a part of a furnace diagrammatically illustrating a rotary burner and showing part of the hearth construction with one of my improved burner rings thereon.

Fig. 2 is an enlarged, sectional and perspective view of part of the ring shown in Fig. 1.

Fig. 3 is a view similar to Fig. 2 showing a modification.

Fig. 4 is a view similar to Fig. 2 showing another modification; and,

Figs. 5, 6 and 7 are face views of rings similar to that shown in Fig. 2 but showing different arrangements of apertures or perforations therein.

For the purpose of illustrating one method of carrying my invention into effect, I have shown in Fig. 1 of the drawing, a part of a furnace 10, upon the base 11 of which is arranged the usual water leg or manifold 12, the inner wall 13 of which borders the flared box or combustion chamber 14 of the furnace, which in the construction shown is separated from the ash pit 15 by a hearth plate 16 of any suitable refractory material. The hearth plate 16 extends from the upper end of a rotary oil burner 17 outwardly to a supporting flange 18 on the base 11.

The burner 17 includes a revolving fuel discharge head 19 from which fuel oil supplied to the burner through a pipe 20 and air supplied through openings 20a are discharged over the surface of the hearth plate 16 into engagement with one of my improved burner rings 21. The burner may be of any desired form and construction, such for example, as a burner as disclosed in my prior application, Serial Number 625,092, filed July 27, 1932. The burner ring 21 in the construction shown is fashioned from sheet metal and includes a bottom or base portion 22 having at its free end an upturned flange 23 which is adapted to engage the wall 13 so as to space the vertical burner wall or flange 24 a predetermined distance from the wall 13 to produce the desired and most efficient arrangement of the frame with respect to the wall so that the greatest possible amount of heat may be utilized in heating the water or the water leg 12 and to maintain said water at the desired temperature for the successful operation of the furnace, and to further accomplish this result by the least amount of fuel.

The vertical wall or flange 24 joins the base 22 through an upwardly and inwardly extending wall part 25 and a downwardly and inwardly extending wall part 26. The part 25 in conjunction with the wall 24 forms a groove or channel 27 in which oil may collect in initially starting the burner, and the oil so collected may be ignited through suitable igniting means commonly employed in apparatus of this class and which forms no part of my present invention.

It will also be apparent that the flange 23 and the vertical wall 24 forms another channel 28 upon the surface of the base 22 outwardly of the wall 24, in which oil that may pass through the apertures or perforations 29 in the wall 24 may be collected, and this oil will be ignited and burned in the same manner as the oil collected in the groove or channel 27.

With the type of ring shown in Figs. 1 and 2

of the drawing, it will be understood that the oil or vapor discharged from the burner head 19, will either strike directly on the wall 24 or pass over the wall 26 and the major part thereof originally collect in the groove 27, although some may pass through the apertures 29 and collect in the channel 28. However, after the burner has been started and the ring heated by virtue of the burning oil, a blue flame will be formed and generated at the top of the wall 24, preferably at the top of the rear surface thereof, to extend up along the inner wall 13 of the boiler, the apertures 29 operating to break up the flame into a multiplicity of nozzles or burner elements, it being understood, however, that the flame arising from said so-called nozzles will diverge and form a substantially annular flame around the fire box and in close proximity to the wall thereof. It will be apparent that the oil vapor and air form a combustible gas which is burned from the top of the ring.

It will be understood that the air and oil vapor mixture forms at the ring a combustible mixture, and during the operation of the burner, the flame arising from this mixture will continue to burn over the ring and above the surface of the hearth proper. This method of burner operation keeps the flame well away from the burner head and concentrates the flame initially on the furnace wall, after which it will pass upwardly through the entire firebox and around the usual water jackets and out through the flue.

In Fig. 4 of the drawing, I have shown at 21*a* a slight modification of the structure shown in Fig. 2, wherein the wall 24*a* includes at its lower end large openings 30 so that the oil will not collect in the groove or channel as 27 in Fig. 2, but will pass into the channel 28*a* formed upon the upper surface of the bottom plate 22*a* between the wall 24*a* and the flange 23*a*. With this form of construction, it will be apparent that in initially starting the burner, the oil will burn in the channel 28*a* outwardly of the wall 24*a*. In this connection, it will be understood that some of the flames will pass through the apertures 29*a*.

The general structure of the ring shown in Figs. 5, 6 and 7 may be identical with that shown in Figs. 2 and 4, or in fact, with that shown in Fig. 3, excepting that instead of providing vertically arranged single apertures 29, 29*a*, the ring 21*b* shown in Fig. 5 has its wall 24*b* provided with two rows of vertically spaced apertures 31 arranged and spaced longitudinally of the wall 24*b*. The ring 21*c* shown in Fig. 6 of the drawing has single apertures 32 arranged angularly to the vertical instead of perpendicular. The ring 21*d* shown in Fig. 7 of the drawing has a series of vertically spaced circular apertures 33. At this time, it will be understood that other forms and arrangement of burner apertures may be provided, it being understood that the purpose of these apertures is to break up the combustible mixture to produce better vaporization and a more desirable flame.

In Fig. 3 of the drawing, I have shown at 34 a ring which differs from the ring shown in Fig. 2, primarily in that the vertical wall 35 having the apertures 36 has its upper end bent or flared inwardly as at 37, and this bending or flaring may be varied as to angularity to suit different types of furnaces and will, to certain degrees, control the flame or the character of the separate flames as they extend from the upper end of the ring or the apertures 36 therein.

With this construction, the wall 35 joins the bottom wall 38 through an outwardly and upwardly curved portion 39 forming an oil trough 40 similar to the groove or channel 27 and the wall 39 is rounded at its inner side and curved downwardly as at 41, the bottom wall 39 having at its outer end the upturned flange 42 similar to the flange 23. In this connection, it will be understood that the rings 21 and 21*a* as well as the rings 21*b*, 21*c* and 21*d* may all be fashioned with their upper ends curved or flared as seen at 37 in Fig. 3 of the drawing.

My improved ring construction may be fashioned to conform with the contour of any kind or class of furnaces and boilers, and it will also be apparent that the ring may be composed of a plurality of sections or parts coupled together to form a continuous or substantially continuous ring, for example, two straight sections *a*, *a'* may be coupled with an angular or curved corner section *b*, as indicated at *c*, the edges of the sections abutting and being keyed together by pins *d* fitting within the chambers formed between the walls 22, 25 and 26, or any other means of attaching the sections together may be employed.

While I have shown certain details of construction for carrying my invention into effect, I am not necessarily limited in these respects, and various changes in and modifications of the construction herein shown and described may be made within the scope of the appended claims without departing from the spirit of my invention or sacrificing its advantages.

Having fully described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. A burner ring of the class described fashioned from a strip of sheet metal, one side of which is fashioned to form an outer flange, the other side portion of the strip being folded inwardly upon itself and then angularly thereto to form a vertically arranged wall portion inwardly of said outer flange, and said vertical wall portion having longitudinally spaced apertures.

2. A burner ring of the class described fashioned from a strip of sheet metal, one side of which is fashioned to form an outer flange, the other side portion of the strip being folded inwardly upon itself and then angularly thereto to form a vertically arranged wall portion inwardly of said outer flange, said vertical wall portion having longitudinally spaced apertures, and the upper end of said vertical wall being flared inwardly.

3. A burner ring of the class described, said ring comprising a strip fashioned to form a bottom wall, a vertical perforated wall forming a continuation of one side edge of said strip and disposed intermediate the side edges of the bottom wall, said strip having an oil receiving channel adjacent to and longitudinally of said vertical wall and the perforations of said vertical wall being disposed in close proximity to each other and spaced longitudinally of the strip, and said bottom wall extending outwardly beyond the vertical perforated wall to space said vertical wall a predetermined distance from the wall of a furnace firebox in connection with which the ring is employed.

4. A burner ring of the class described, said ring comprising a strip fashioned to form a bottom wall, a vertical perforated wall forming a continuation of one side edge of said strip and disposed intermediate the side edges of the bot-

tom wall, said strip having an oil receiving channel adjacent to and longitudinally of said vertical wall and the perforations of said vertical wall being disposed in close proximity to each other and spaced longitudinally of the strip, said bottom wall extending outwardly beyond the vertical perforated wall to space said vertical wall a predetermined distance from the wall of a furnace firebox in connection with which the ring is employed, and the upper end of said perforated wall being flared inwardly with respect to said ring.

5. A burner ring of the class described, said ring comprising an elongated strip-like body fashioned to form a bottom wall having upwardly extending side flanges forming on the upper surface of the bottom wall a channel, one of the side flanges extending inwardly, downwardly and upwardly over the bottom wall to form, intermediate the side edges of the bottom wall, a vertical perforated wall, and a channel at the base of and extending longitudinally of said vertical wall.

6. A burner ring of the class described, said ring comprising a strip fashioned to form a bottom wall and a vertical perforated wall forming a continuation of one side portion of said bottom wall and disposed intermediate the side edges of the bottom wall, said strip having an oil receiving channel adjacent to and longitudinally of said vertical wall and partially formed thereby, and the perforations of said vertical wall being disposed in close proximity to each other and spaced longitudinally of the strip.

7. A burner ring of the class described, said ring comprising an elongated strip-like body fashioned to form a bottom wall having upwardly extending side flanges forming on the upper surface of the bottom wall a channel, one side flange extending inwardly, downwardly and upwardly over the bottom wall to form intermediate said side flanges a vertical wall having longitudinally spaced apertures, a channel at the base of and extending longitudinally of said vertical wall, and the upper end of said vertical wall being flared in the direction of that side of the ring having the first named side flange.

DONALD H. WASHBURN.