March 12, 1946. A. VON HAASE 2,396,306

OIL BURNER

Filed May 24, 1944 2 Sheets-Sheet 1

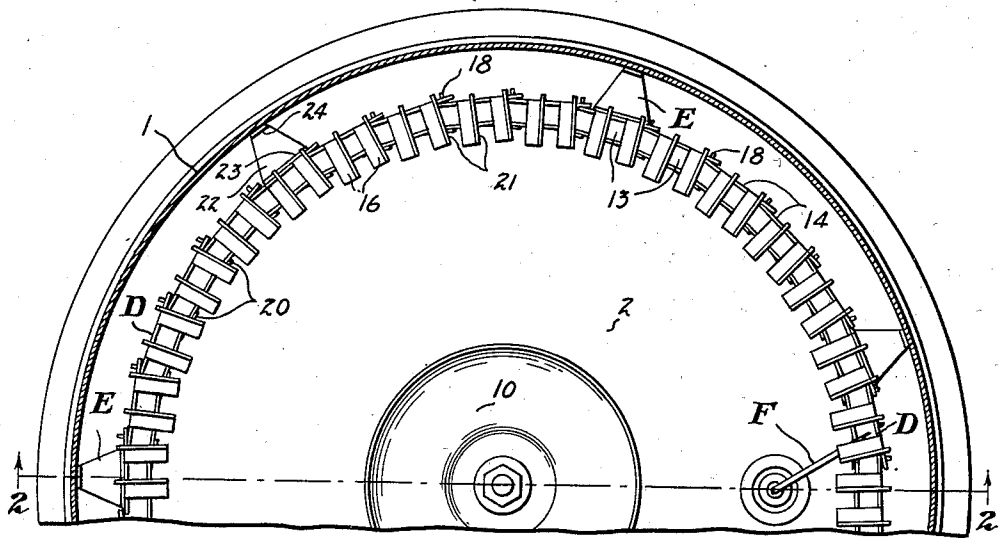


Fig. 1

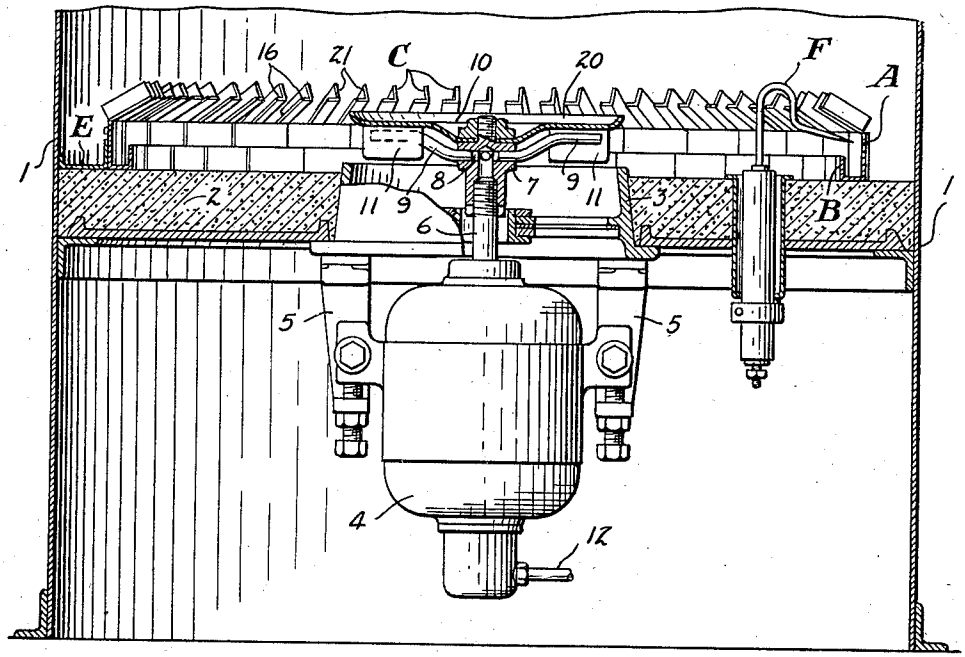


Fig. 2

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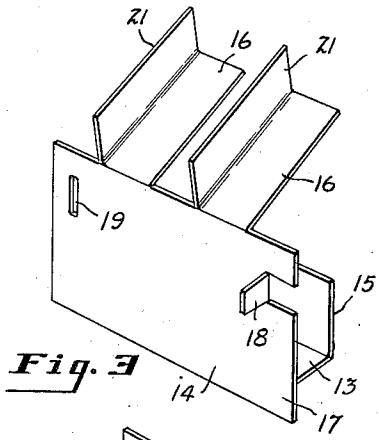


Fig. 3

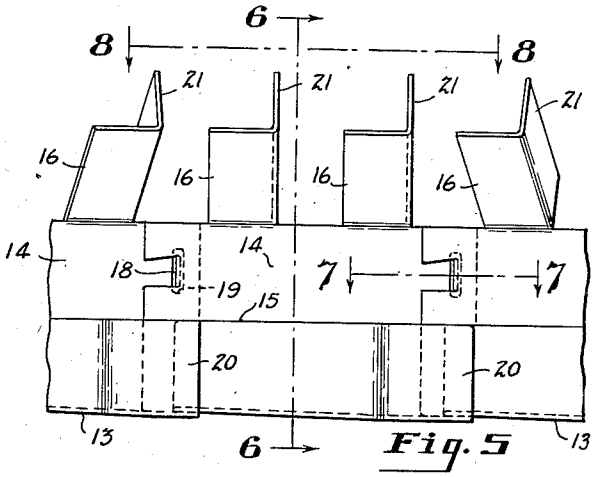


Fig. 5

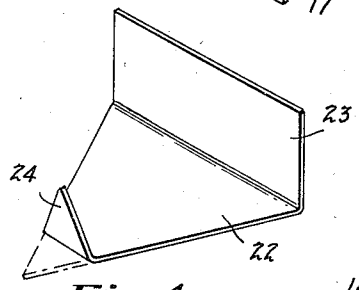


Fig. 4

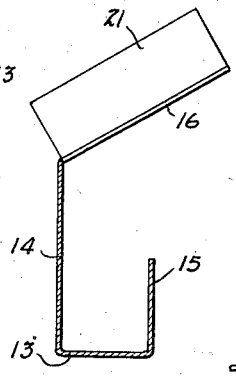


Fig. 6

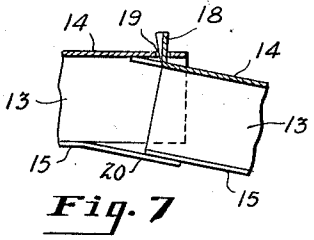


Fig. 7

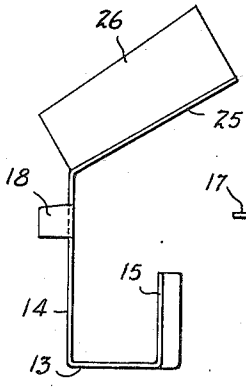


Fig. 9

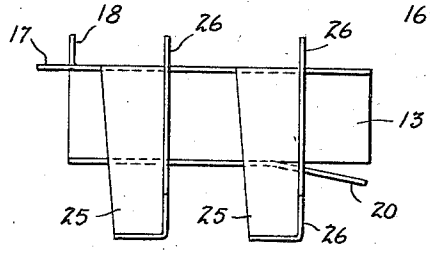


Fig. 10

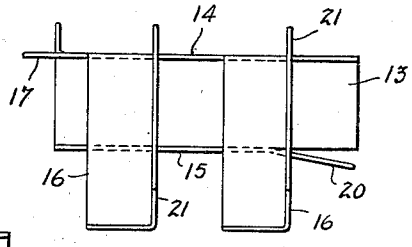


Fig. 8

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UNITED STATES PATENT OFFICE

2,396,306

OIL BURNER

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Application May 24, 1944, Serial No. 537,024

9 Claims. (Cl. 158—4)

This invention relates to oil burners of the wall flame type, in which oil and air are discharged radially outwardly and horizontally from a central rotary distributing head against a combustion ring near the wall of the combustion chamber, and more particularly to an improved combustion ring and to the construction of the sheet metal segments of which the ring is composed.

It is an object of the present invention to provide a ring segment so constructed that identical segments may be interlocked, end to end, to form a circumferentially continuous combustion ring of a size and configuration suitable for the particular combustion chamber in which it is installed, and also to provide a combustion ring that need not be anchored either to the hearth or to the wall of the combustion chamber, and which is free to expand or to contract as it is heated and cooled.

A further object of the invention is to provide a ring segment that has integral arms that form a portion of an annular flame controlling grill.

An additional object of the invention is to provide a combustion ring that has an improved flame controlling grill.

With the above and other objects in view, the invention may be said to comprise the combustion ring as illustrated in the accompanying drawings, hereinafter described and particularly set forth in appended claims, together with such variations and modifications thereof as may be apparent to one skilled in the art to which the invention pertains.

Reference should be had to the accompanying drawings forming a part of this specification, in which:

Fig. 1 is a fragmentary horizontal section through a furnace combustion chamber looking down upon a portion of the combustion ring;

Fig. 2 is a vertical section taken on the line indicated at 2—2 in Fig. 1;

Fig. 3 is a perspective view of one of the ring segments;

Fig. 4 is a perspective view of one of the spacers imposed between the furnace wall and the combustion ring;

Fig. 5 is a fragmentary elevation of a portion of the combustion ring looking from the inside thereof.

Fig. 6 is a section taken on the line indicated at 6—6 of Fig. 5;

Fig. 7 is a section taken on the line indicated at 7—7 in Fig. 5;

Fig. 8 is a top plan view of one of the segments viewed as indicated at 8—8 in Fig. 5;

Fig. 9 is an end elevation of a ring segment of modified construction, and

Fig. 10 is a top plan view of the segment shown in Fig. 9.

In Figs. 1 and 2 of the accompanying drawings the combustion ring of the present invention is shown mounted in a furnace that has an upright enclosing wall 1 and a horizontal hearth 2 suitably supported within the wall 1. The hearth 2 has a central opening in which a collar 3 is mounted, the collar 3 forming a passage for air and a support for a motor 4 that is mounted on suitable brackets 5 attached to the collar 3. The motor 4 has a hollow vertically disposed shaft 6 that extends upwardly into collar 3 centrally thereof. To the upper end of the shaft 6 there is attached a distributing head 7 that has a central chamber 8 communicating with the hollow shaft 6 and with radially extending discharge tubes 9 that are attached to the head 7. A substantially flat horizontally disposed disk 10 is attached to the upper end of the head 7, overlies the discharge tubes 9 and carries radially disposed fan blades 11, that extend downwardly between the tubes 9. Oil is supplied to the hollow shaft 6 through a suitable supply line 12 and during operation of the burner the oil is discharged outwardly toward the wall 1 through the tubes 9, air being at the same time drawn upwardly through the collar 3 and discharged horizontally with the oil by the fan blades 11. The oil and air discharged by the rotating distributing head impinges against a combustion ring that has an outer circumferentially continuous intercepting wall A against which the drops of oil engage, and an inner circumferentially continuous air deflecting wall B that is spaced inwardly from the wall A and that is of a height less than that of the wall A. A flame controlling grill C projects inwardly and upwardly from the top edge of the wall A and overlies the air deflecting wall B. The combustion ring is formed of a series of identical segments D that are interlocked end to end and are spaced from the wall 1 by means of spacing members E positioned at suitable intervals throughout the circumference of the ring. The oil impinging against the intercepting wall A is ignited by suitable means, such as an electrical ignition device F.

The intercepting wall A is quickly heated by the burning oil, so that oil striking against the face thereof is vaporized and passes upwardly with the air current through the grill C, where it is consumed by the flame.

The segments D of the combustion ring are of substantially identical construction and are

adapted to interlock end to end to form a ring of the desired diameter that conforms to the configuration of the enclosing wall of the combustion chamber. As shown in Figs. 3 to 8, each segment D has a flat base portion 13 adapted to rest upon the hearth 2, an outer flange 14 that forms a section of the oil-intercepting wall A, and an inner flange 15 of less height than the flange 14 that forms a section of the air-deflecting wall B.

A plurality of arms 16 project upwardly and inwardly from the top edge of the flange 14 of each segment; these arms, which are formed integrally with the flange, form the spaced bars of the flame-controlling grill C. The flange 14 has an end portion 17 that extends beyond one end of the base portion 13 and a tongue or lug 18, which may be struck up from the projecting end portion 17, projects outwardly from the flange 14. At the opposite end of the flange 14 at the same height as the tongue or lug 18, a slot 19 is formed in the flange 14 that is adapted to receive the tongue or lug 18 of an adjoining segment. At the end of the segment opposite that having the extension 17, an end portion 20 of the flange 15 is severed from the base member 13 and bent outwardly at an angle to the base member so as to provide a flaring space between the flanges to receive an end of an adjoining section, as illustrated in Fig. 7 of the drawings. The channel of one segment fits within the channel of the next adjoining segment and the lug 18 of each segment extending through the slot 19 of the adjoining segment provides pivotal connections between the segments which enables the relative angular positions of the segments to be adjusted to conform the segments to the curvature of the ring being built. The flanges 14 and 1 of the segments are in overlapping relation so that the oil-intercepting and air-deflecting walls A and B are continuous.

Each of the arms 16 has an upright flange 21 along one edge thereof, the flanges 21 being formed by the metal struck up from the spaces between the arms 16 which are integral extensions of the sheet metal flanges 14. The flanges 21 serve to direct the rising mixture of oil vapor and air so as to produce a uniform flame along the top of the combustion ring.

The combustion ring is installed upon the horizontal hearth 2 by interlocking the segments D and has no attachment to the hearth 2 or to the surrounding wall 1. It is desirable, however, that the combustion ring be positioned at a fixed distance inwardly from the wall 1 and the proper spacing of the combustion ring with respect to the wall 1 is obtained by means of the spacing members E. Each of the members E has a triangular base portion 22, adapted to seat upon the hearth 2, and has an upright flange 23 along one side thereof. The flange 23 is adapted to bear against the outer face of the flange 14 of one of the segments D and the desired spacing from the wall 1 is obtained by bending the tip of the triangular base member 22 upwardly to form a flange 24 for engagement with the wall 1. The pointed end of the base portion 22 can be readily bent at different distances from the tip thereof so as to obtain the desired spacing between the wall 1 and the combustion ring.

In the operation of the burner, oil is thrown from the radiating pipes 9 horizontally and radially outwardly against the intercepting wall A. At the same time, air is directed radially and horizontally by means of the fan blades 11 beneath the disk 10, over the hearth 2 and against the air deflecting wall B, where the stream is deflected upwardly and outwardly into the spaces between the arms 16 to mix with the vaporized oil and carry the same through the grill into the flame.

In Figs. 9 and 10 of the drawings, a slightly modified construction is shown in which the ring segments have grill-forming arms 25 that differ from the arms 16 in that they are tapered toward their free ends. In forming these arms, tapering slots are formed between the arms 25 and the sheet metal struck up from the tapering slots form flanges 26 along edges of the arms 25, which gradually increase in height toward the free ends of the arms. The grill formed by the arms 25 overlies the base 13 and the flange 14 of the segment and provides for a more uniform flow of air through the inclined grill to the flame.

Although several embodiments of the invention have been herein shown and described, it will be understood that numerous modifications of the construction shown may be resorted to without departing from the spirit of this invention as defined in the appended claims.

What I claim is:

1. A combustion ring for oil burners comprising an outer circumferentially continuous upright intercepting wall, an inner circumferentially continuous air deflecting wall of less height than the intercepting wall and spaced inwardly therefrom, and a flame controlling grill comprising circumferentially spaced arms integral with the intercepting wall and extending upwardly and inwardly over said deflecting wall, each of said arms having an upturned flange along one edge thereof, each of said arms decreasing in width from its lower to its upper end and each of said flanges increasing in height toward the upper end of the arm.

2. In an oil burning heater, the combination with a hearth and an upright surrounding wall, of a combustion ring within said wall composed of a series of identical sheet metal segments, each having a base portion resting upon the hearth, an inner upright flange that forms a section of a circumferentially continuous air deflecting ring and an outer flange higher than the inner flange that forms a section of a circumferentially continuous oil intercepting flame wall, said segments having interengaging lugs and slots and being secured together with said inner and outer flanges in overlapping relation, and spacing members interposed between said ring and the surrounding wall, each of said spacing members comprising a sheet metal member having an outwardly tapering base resting upon the hearth, an upright flange along the wide end thereof engaging the outer flange of one of said segments and an upturned flange at its narrow end engaging the surrounding wall.

3. A one piece sheet metal segment constructed to interlock with other similarly constructed segments in an oil burner combustion ring and comprising a base portion adapted to seat upon a hearth, an upright outer flange having a laterally projecting lug adjacent one end and an opening adjacent its opposite end adapted to receive the lug of an adjoining segment, and an inner flange of less height than the outer flange, said flanges being adapted to overlap corresponding flanges of adjoining segments to form continuous oil intercepting and air deflecting walls.

4. A one piece sheet metal segment constructed to interlock with other similarly constructed segments in an oil burner combustion ring and com-

prising a base portion adapted to seat upon a hearth, an upright outer flange having a laterally projecting lug adjacent one end and an opening adjacent its opposite end adapted to receive the lug of an adjoining segment, and an inner flange of less height than the outer flange, one end of said inner flange being bent inwardly away from the outer flange to permit entry of an end of an adjoining segment.

5. A one piece sheet metal segment constructed to interlock with other similarly constructed segments in an oil burner combustion ring and comprising a base portion adapted to seat upon a hearth, an upright outer flange extending beyond one end of said base portion and having a lug struck up from the projecting end portion and projecting outwardly, said flange having an opening adjacent its opposite end to receive the lug of an adjoining segment, and an inner flange of less height than the outer flange, said inner flange having an end portion severed from the base and bent inwardly away from said outer flange to provide a space to receive an end of an adjoining segment.

6. A one piece sheet metal segment constructed to interlock with similarly constructed segments in an oil burner combustion ring and comprising a base portion adapted to seat upon a hearth, an upright oil intercepting flange along the outer edge of said base portion, an upright air deflecting flange of less height than said intercepting flange along the inner edge of said base portion, and a flame controlling grill portion overlying said base portion and air deflecting flange comprising spaced arms integral with said intercepting flange and projecting inwardly and upwardly from the upper edge thereof, each of said arms having a flange along one edge thereof.

7. A one piece sheet metal segment constructed to interlock with similarly constructed segments in an oil burner combustion ring and comprising a base portion adapted to seat upon a hearth, an upright oil intercepting flange along the outer edge of said base portion, an upright air deflecting flange of less height than said intercepting flange along the inner edge of said base portion, and a flame controlling grill portion overlying said base portion and air deflecting flange comprising spaced arms integral with said intercepting flange and projecting inwardly and upwardly from the upper edge thereof, said arms having flanges along corresponding edges thereof, each flange being substantially upright and extending the full length of the arm.

8. A one piece sheet metal segment constructed to interlock with similarly constructed segments in an oil burner combustion ring and comprising a base portion adapted to seat upon a hearth, an upright oil intercepting flange along the outer edge of said base portion, an upright air deflecting flange of less height than said intercepting flange along the inner edge of said base portion, and a flame controlling grill portion overlying said base portion and air deflecting flange comprising spaced arms integral with said intercepting flange and projecting inwardly and upwardly from the upper edge thereof, said arms being tapered from their inner to their outer ends to provide outwardly flaring slots between them and each having a flange along its full length that extends upwardly from one edge thereof and increases in height from its inner to its outer end.

9. A one piece sheet metal segment constructed to interlock with similarly constructed segments in an oil burner combustion ring and comprising a base portion adapted to seat upon a hearth, an upright oil intercepting flange along the outer edge of said base portion, an upright air deflecting flange of less height than said intercepting flange along the inner edge of said base portion, and a flame controlling grill portion overlying said base portion and air deflecting flange comprising spaced arms integral with said intercepting flange and projecting inwardly and upwardly from the upper edge thereof, said arms being tapered outwardly and separated by outwardly flaring slots, each arm having a flange along one edge that is formed by the metal from the adjacent slot, each flange extending upwardly at substantially right angles to the arm.

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