Dec. 11, 1928. 1,695,030

J. SCHEMINGER, JR

ROTARY OIL BURNER

Filed May 10, 1926

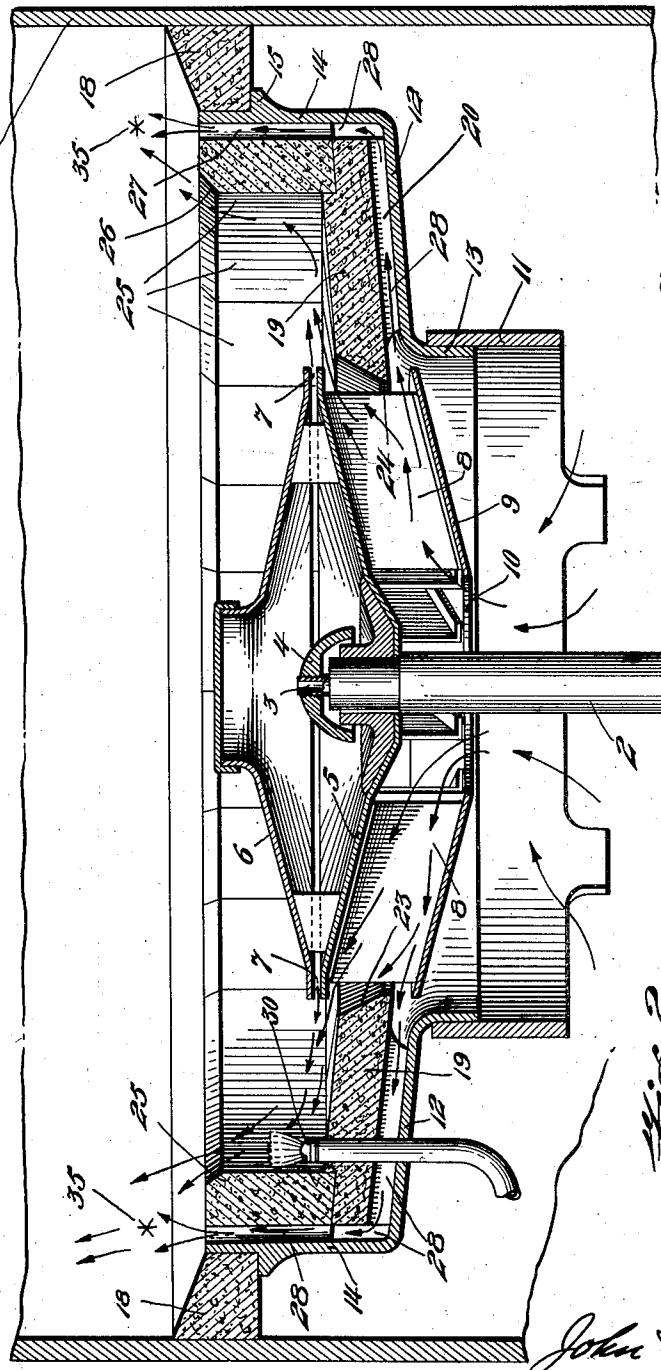


Fig. 1.

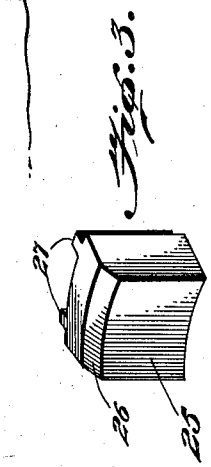


Fig. 3.

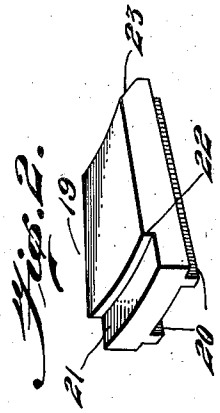


Fig. 2.

Inventor
John Scheminger Jr
By Dowell and Dowell
Attorneys

Patented Dec. 11, 1928. 1,695,030

UNITED STATES PATENT OFFICE.

JOHN SCHEMINGER, JR., OF PROVIDENCE, RHODE ISLAND.

ROTARY OIL BURNER.

Application filed May 10, 1926. Serial No. 108,191.

This invention relates to oil-burners and more particularly to domestic burners or heaters of the type characterized by rotary burner-heads.

The primary object of the invention is to provide an improved fire-box construction combined with a rotary burner-head for effecting or producing complete combustion of liquid fuel used in rotary oil burners or the like, and to prevent waste or loss of unconsumed fuel which is incident to the use of oil burners or heaters of the type referred to as heretofore ordinarily constructed.

A further object is to provide such burners or heaters with means for effecting economical prolongation of the combustion period, in order that fuel supplied through the burner may be completely consumed and thus prevent the waste or loss which usually results from the escape of combustible gases or disintegrated fuel particles which are liberated before complete combustion has taken place.

The invention will first be hereinafter more particularly described, with reference to the accompanying drawings, which are to be taken as a part of this specification, and then pointed out in the claims at the end of the description.

In said drawings, Fig. 1 is a vertical sectional elevation taken diametrically through the fire-box and rotary distributing head of an apparatus embodying my invention;

Fig. 2 is a perspective view of one of the bricks used in the construction of what I term the fire-deck; and

Fig. 3 is a perspective view of another form of fire-brick adapted for use in the construction of the vertical wall or fire-ring surrounding said fire-deck.

In said drawings, the numeral 1 denotes the inner wall of the furnace or fire-box having mounted centrally therein a tubular shaft 2 containing an ordinary liquid fuel feed pipe 3 having secured on its upper end an inverted cup-like device 4 adapted to distribute oil discharged from said pipe upon a rotating distributing plate 5, fixed on the shaft 2 and preferably dish-shaped or concave on the upper side thereof for co-operation with a superposed cover-plate or top 6 of similar form inverted and supported upon and in opposed relation to said first named plate, as shown, or by any suitable means, so that the opposed plates may be arranged with their corresponding marginal edges spaced apart sufficiently to provide a restricted peripheral oil-discharge passage 7 surrounding the distributing device and subjacent concave surface of the aforesaid distributing plate 5. Underneath the distributing plate 5 are secured a series or plurality of radial fan blades 8, whose lower edges are secured to a bottom plate 9 having a central opening 10 therein through which the shaft 2 extends; said parts forming a distributing head with a type of underslung fan similar to that shown and described in Letters Patent No. 1,569,580 granted January 12, 1926, for improvements in oil distributing heads for rotary oil burners, which is a preferred form, though other forms may be used. Suitably supported below the burner-head is an annular metal plate or ring 11 which in turn supports an annular metallic plate of angular form in cross-section formed with a slightly inwardly inclined substantially horizontal portion 12, having a depending annular marginal flange 13, which fits snugly within the ring 11, and an upright annular portion 14 which surrounds and forms a support or abutment for the vertical wall surrounding the fire-deck. The opening through the annular flange 13 of the angular fire-deck-supporting plate or ring is slightly larger than the bottom plate 9 of the distributing head to permit the passage of air upwardly around the periphery of said bottom plate into an air duct under the bottom of the fire-deck as hereinafter described. The space between the annular vertical member 14 of the fire-deck supporting ring and the inner wall of the furnace or fire-box is bridged and sealed in the usual manner by a fire clay or cement body 18 which is supported by and between said wall and a circumferential rib or shoulder 15 on the outer side of said supporting ring, as shown. The fire-deck comprises a circular series of correspondingly shaped segmental fire-bricks 19 of the form shown in Fig. 2, supported upon the horizontal inwardly inclined portion 12 of the annular metallic support in such manner that the inner ends of the series of bricks project inwardly past the air passage between the central opening in the part 12 of the supporting plate and the outer edge of the bottom plate 9 of the fan structure of the rotating head. The fire-bricks 19 are each formed with a supporting rib or ribs 20 on the bottom or under side thereof,

so as to provide radially extending supports spaced apart sufficiently to provide air ducts between pairs of ribs in communication with the air passage between the outer edge of the distributing plate 9 and the flange 13 of the fire-deck-supporting plate. The outer end-portions of the fire-bricks are each cut away on the upper side thereof so as to form a recess 21 of arcuate shape having a shoulder 22, to provide a seat and abutment for arcuate shaped or curved fire-bricks 25 seated upon the bricks 19 in said recesses 21, so as to form an upright wall or fire-ring within the upright part 14 of the fire-deck-supporting ring. The inner ends of the fire-brick 19 are beveled or inclined on the upper side thereof as at 23, so that when the circular series of bricks are laid in assembled relation to form the fire-deck, said beveled portions will form the lower upwardly inclined wall of an annular air passage between the inner ends of the fire-brick and the underside of the distributing plate 5, which forms the upper wall of the last named air passage which, as shown, is enlarged toward the receiving end thereof and decreases in size toward the outlet therefrom. The lower inwardly extending beveled end-portions of the fire-brick closely surround the outer sides of the fan blades 8 at a point between the upper and lower edges of said blades so as to provide an annular lip-portion 24 of the fire-deck over-hanging the outer edge of the bottom plate 9 of the distributing head or fan structure carried thereby. The fire-bricks 25 are of the segmental form shown in Fig. 3 of the drawings, their front faces being slightly concave and the front upper edges thereof being beveled, as at 26, and they are each formed with one or more ribs 27 spaced apart corresponding with the spacing of the ribs 20 on the fire-bricks 19, so as to provide vertical air ducts or channels 28 in communication with the ducts or channels between the ribs 20 of the bricks forming the fire-deck. It will be seen that the rear ends of the fire-bricks 19 are slightly removed or spaced from the vertical wall 14 of the metallic supporting plate to an extent equalling the width of the ribs 27 on the bricks 25 so as to provide a duct or channel around the interconnected ends or corners of the two rows of bricks of the same depth as the channels between adjacent ribs, so that the channel 28 is continuous and of uniform size or dimensions from the inlet end of the horizontal portion to the exit end of the upright part. It will be understood of course that opposite sides of the individual bricks of both the fire-deck and the vertical wall or fire-ring series are inclined or converge inwardly so that the adjacent sides of the bricks in each series contact the full length thereof when the bricks are laid in circular series around the distributing head.

A pilot light 30 is shown protruding up through the fire-deck and disposed within the fire-ring for initially igniting the mixture of oil and air and starting the burner, as heretofore in rotary oil burners.

In operation, it will be seen that upon rotation of the distributing head air will be drawn into the fan through the central opening 10 of the bottom plate 9, and discharged outwardly from the fan blades 8, as indicated by arrows in Fig. 1. At the same time that air is being thus discharged, oil is also being discharged from the distributing head through the channel 7, and is supported and carried outwardly by the air discharged between the distributing plate 5 and the upper beveled edge of the fire-deck 19. This mixture of oil and air is ignited by the pilot light 30 and the travel thereof and the consequent combustion is in a direction upwardly within and over the top of the fire-ring. Due to the plate 9 of the distributing head being overhung by the lip 24 of the fire-deck 19, a certain portion of the air discharged by the fan blades 8, finds its way through the channel 28, beneath the fire-deck 19, and beyond the fire-ring to an approximate point 35 (Fig. 1), slightly above said fire-ring, at which point it is introduced into the mixture of air and oil previously mentioned, and which at this point is in process of combustion and serves to supplement air already in use and to extend and prolong the general period of combustion and thereby more thoroughly consume the fuel units, thus preventing the escape from the fire box of unconsumed fuel.

It will be understood that various changes in the details and arrangement of parts may be made without departing from the spirit and scope of my invention, since various combinations and sub-combinations may be made to meet working requirements or conditions, and I therefore do not desire to be limited by the appended claims to the specific structure hereinbefore illustrated and described; such structure being merely illustrative of a preferred embodiment of my invention, and various changes may obviously be required to adapt the invention to furnaces or fire-boxes of different types.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In combination with a fire-box, a fire-deck having a central opening therein and spaced air ducts extending outwardly thereunder and upwardly therefrom around the combustion chamber, an oil distributing device revolubly mounted within said opening and having a restricted peripheral passage for discharging atomized oil, whereby a film of oil is caused to issue from said device

over the surface of said fire-deck, a feed-pipe, and means associated with said device for inducing an upwardly and outwardly moving current of air and dividing and forcing the same partly into and through said air ducts and a larger part under the film of oil issuing from said device.

2. In combination with a fire-box, an annular fire-deck having mounted on the outer margin thereof an annular upright fire-ring; said fire-deck having a central opening therein and air ducts extending outwardly thereunder, and said fire-ring having on the outer side thereof air ducts extending upwardly from the ducts under said fire-ring in spaced relation around the combustion chamber, a centrifugal oil distributing device revolubly mounted within said central opening, whereby a film of oil is caused to issue from said device over the surface of said fire-deck, and means for inducing a current of air and dividing and forcing the same partly into and through said air ducts and a larger part under the film of oil issuing from said distributing device.

3. In combination with the fire-box of a rotary oil burner, an annular substantially horizontal fire-deck having mounted on the outer margin thereof an annular upright fire-ring, an annular metallic plate of angular form in cross-section forming a support for said fire-deck and fire-ring; said support forming the outer horizontal and vertical walls of air ducts between it and said fire-deck and fire-ring; said air ducts extending outwardly under said fire-brick and upwardly therefrom to the top of said fire-ring; said fire-deck having a central opening therein in which is revolubly mounted a rotary distributing head having a restricted peripheral oil passage whereby a film of oil is caused to issue from said device over the surface of said fire-deck, and said air ducts extending in circular series around the combustion chamber, and means for inducing a current of air and dividing and forcing the same partly into and through said air ducts and out therefrom directly into the combustion chamber and a larger part under the film of oil issuing from said distributing device.

4. In combination with the fire-box of a rotary oil burner, an annular slightly inwardly and downwardly inclined fire-deck, an annular upright fire-ring mounted on the upper outer margin of said fire-deck, the latter having a central opening therein, a centrifugal oil distributing device revolubly mounted within the opening through said fire-deck, air ducts extending outwardly under said fire-deck and upwardly on the outer side of said fire-ring, a support for said fire-deck and fire-ring having a slightly inwardly and downwardly inclined portion and an upright portion forming the outer walls of said air ducts, the latter being spaced apart around the combustion chamber, and means for inducing a current of air and forcing a part thereof into and through said air ducts and a larger part under a film of oil issuing from said distributing device over the surface of said fire-deck.

5. In combination with the fire-box of a rotary oil burner, a fire-deck provided with a central opening therein and a rotary oil distributing device revolubly mounted within said opening; said fire-deck consisting of a circular series of substantially horizontal fire-bricks having supported thereon a circular series of substantially vertical fire-bricks forming a vertical wall surrounding said distributing device; said bricks having longitudinal ribs on the backs thereof seated against horizontal and vertical portions of a metallic plate supporting said fire-deck and fire-ring and forming the outer walls of air ducts between spaced ribs.

6. A fire-deck for the fire-box of a rotary oil burner comprising a circular series of substantially rectangular fire-bricks placed side by side around a central opening and having spaced ribs on their undersides resting upon a subjacent support and forming in connection therewith substantially horizontal spaced air ducts between said ribs, and a fire-ring extending around said fire-deck and means associated therewith to provide vertical air ducts in communication with said horizontal air ducts.

7. A fire-deck for the fire-box of a rotary oil burner comprising substantially rectangular fire-bricks placed side by side in circular series and having spaced ribs on their undersides resting upon a subjacent support and forming in connection therewith substantially horizontal spaced air ducts between said ribs; said fire-deck having mounted on the upper outer margin thereof a similarly constructed series of fire-bricks forming a vertical fire-ring with spaced air ducts between it and a vertical portion of said support so as to form continuations of said horizontal ducts.

8. In combination with the fire-box of a rotary oil burner, a fire-deck comprising a circular series of substantially rectangular fire bricks placed side by side around a central opening and having spaced ribs on the undersides thereof resting upon a subjacent support and forming in connection therewith substantially horizontal air ducts, a vertical fire-ring supported on said fire-deck and having vertical ribs arranged to provide air ducts between it and a vertical portion of said support in communication with said horizontal air ducts, a centrifugal oil distributing device revolubly mounted within said opening and adapted to discharge a film of oil over the surface of said fire-deck, and means associated with said device for

inducing a current of air and forcing a part thereof into and through said air ducts and another part under the film of oil issuing from said device.

9. In combination with the fire-box of a liquid fuel burner, a metal plate having a centrally disposed opening therein and an approximately horizontal portion and a substantially vertical portion adapted to form respectively the lower and outer walls of a fire-deck supported on said plate, a liquid fuel distributing device revolubly mounted within said opening, a fire-deck mounted on said plate consisting of a series of substantially horizontal disposed fire-bricks extending around said opening, and a fire-ring consisting of a series of substantially vertically disposed fire-bricks forming a vertical wall extending around said distributing device; said bricks having ribs on the backs thereof seated upon or against said horizontal and vertical portions of said supporting plate and spaced apart to provide air ducts leading from the inner edge of said fire-deck outwardly and upwardly into the combustion chamber.

10. In combination with the fire-box of a liquid fuel burner, a fire-deck-supporting plate having a centrally disposed opening therein, a centrifugal fuel distributing device revolubly mounted within said opening, a fire-deck mounted on said plate and comprising a circular series of substantially horizontal fire-bricks combined with a series of substantially vertical fire-bricks extending around said distributing device; said bricks having ribs on the backs thereof spaced apart and seated upon or against the horizontal and vertical portions of said supporting plate; the latter forming the outer walls of air ducts formed by and between said ribs; said distributing device being adapted to discharge a film of oil over the surface of said fire-deck, and means associated therewith for inducing an upwardly and outwardly moving current of air and dividing and forcing the same partly into and through said air ducts and partly under the film of oil issuing from the periphery of said distributing device.

In testimony whereof I affix my signature.

JOHN SCHEMINGER, JR.