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OIL BURNER AND MEANS OF CONTROLLING THE
COMBUSTION OF FUEL OIL THEREIN

2 Sheets-Sheet 1

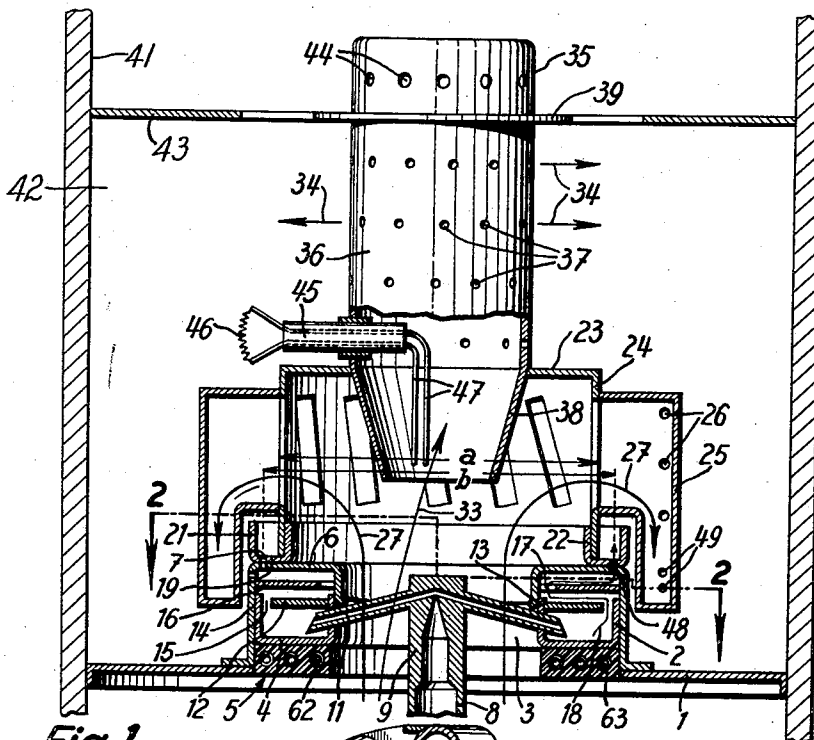


Fig. 1

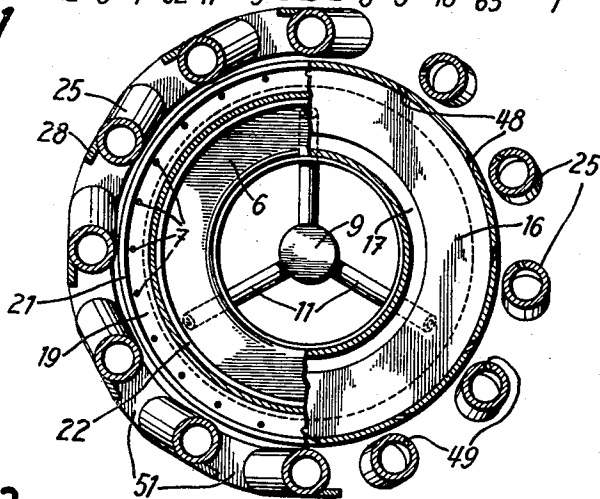


Fig. 2

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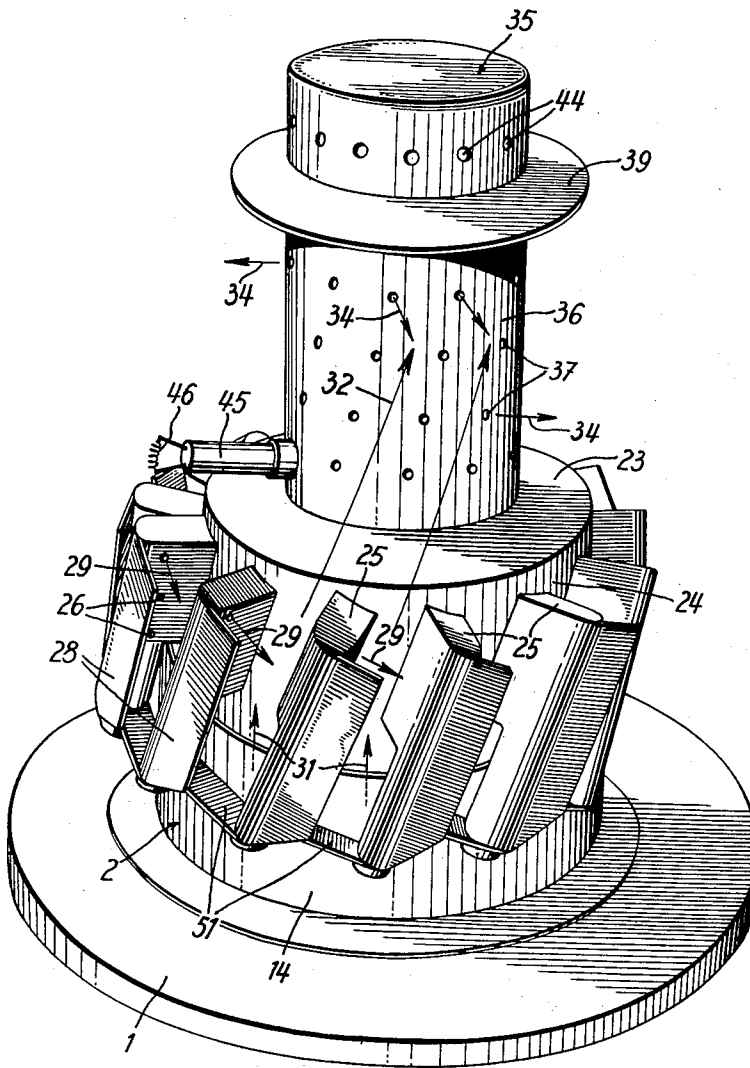
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2 Sheets-Sheet 2



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OIL BURNER AND MEANS OF CONTROLLING THE COMBUSTION OF FUEL OIL THEREIN

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The present invention relates to devices for improving the combustion of fuel oil in general, and in particular to an improved oil stove and an oil burner. More particularly, this invention relates to a means for improving the combustion of fuel oil in which the oil is supplied to the burner of an oil stove drop-by-drop and is then vaporized prior to the actual combustion process within a closed heated chamber, which is provided with outlet openings facing toward the combustion chamber of the oil stove, whereupon the vaporized oil is mixed within the combustion chamber with combustion air to form a combustible fuel mixture.

In order to attain a combustion of fuel oil of adequate efficiency it is primarily necessary to supply the oil vapor with a sufficient amount of oxygen. For producing a combustible mixture of oil vapor and air, one or the other of two different means are generally applied, namely, vaporization or atomization. While the latter means is only used for the operation of larger heating plants, the former is preferable for smaller furnaces, particularly smaller stoves or similar heaters.

In vaporizing the fuel oil it has been customary to use a bowl-shaped retort, the bottom of which was heated by means of a wick or the like so as to heat and gradually evaporate the oil within the bowl and covering the entire surface of the bottom thereof. This oil vapor combines with the air surrounding the burner to form a moist fuel mixture. Such a moist mixture of oil vapor and air has, however, the disadvantage that when burning it will produce a very large quantity of soot and smoke.

For shielding the fuel oil within the burner bowl from the flames in the combustion chamber, it has already been proposed to vaporize the oil within a closed heated chamber which is provided with relatively large outlet openings through which the oil vapor then passes into the actual combustion chamber. However, it has been found that, if primary air passes through the outlet openings into the closed vaporizing chamber, the flames within the combustion chamber will easily flash back into the vaporizing chamber and ignite the mixture of oil vapor and air therein.

It is the principal object of the present invention to provide means for increasing the efficiency of an oil stove and the oil burner therein by vaporizing the fuel oil within a closed chamber as intensely and thoroughly as possible so as to form a dry oil vapor and also prevent the flames within the combustion chamber of the stove from flashing back into the closed vaporizing chamber.

For attaining the above-mentioned object, the present invention provides suitable means for conducting the oil vapor which rises from the bottom of the vaporizing chamber so as to pass along suitable heating surface which increase the temperature of the oil vapor and at the same time produce a pressure head within the vaporizing chamber.

Such additional heating of the rising oil vapor results

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in a very thorough, intensive and dry vaporization of the fuel oil which, in turn, results in a very thorough combustion and thus in a much higher heating efficiency than was attainable in previous oil burners of this type.

Another important advantage attained by the present invention is the fact that the tarry oil residues commonly occurring in all bowl type oil burners will be totally avoided. Furthermore, while in previous oil burners of this type the preliminary treatment of the fuel oil as well as its combustion was usually accompanied by considerable noise, according to the present invention this will be accomplished absolutely silently. Another great advantage of the invention is that, while the starting of previous burners required a considerable length of time and as much as 30 to 45 minutes, the starting of a burner according to the invention requires no more than about 5 or 6 minutes. Finally, the pressure head produced according to the invention within the vaporizing chamber also effectively prevents any entry of primary air into such chamber, and it thus prevents the flames within the combustion chamber from flashing back into the vaporizing chamber.

The invention is preferably carried out by employing an oil burner which is provided with a closed heatable vaporizing chamber into which the end of the oil feed line extends and which has outlet openings facing toward the combustion chamber through which the oil vapor may enter into the latter. Behind this vaporizing chamber, the oil burner is provided with an ignition device which extends into the combustion chamber and therein ignites the oil vapor after it has been mixed with combustion air. According to the invention, the outlet openings of the vaporizing chamber from which the oil vapor is discharged into the combustion chamber are provided within the upper part of the vaporizing chamber, while the heating surfaces which produce the pressure head within the vaporizing chamber are provided between these outlet openings of the oil vapor and the bottom of the vaporizing chamber.

The mentioned heating surfaces may be further supplemented either by several horizontally mounted plates or the like following each other within the vaporizing chamber which are provided with openings or passages for the oil vapors or by at least one layer of heat-conductive material, for example, steel wool, within the vaporizing chamber, which allows the oil vapors to pass therethrough.

If the heating surfaces consist, for example, of two horizontal plates spaced above each other and extending almost across the entire cross-sectional area of the vaporizing chamber, the passages for the oil vapor in the lower plate facing toward the bottom of the vaporizing chamber are preferably disposed at one side of the chamber, while the passages in the upper plate facing toward the upper end of the chamber are disposed at the other side so that the oil vapor will flow through the vaporizing chamber not only in a vertical direction but also in a horizontal direction. If the passages in these plates are thus disposed, it is advisable to provide the outlet openings from the vaporizing chamber within the upper part thereof and at the same side where the passages are provided in the lower plate facing toward the bottom of the chamber so that, when the oil vapor flows through the passages in the upper plate, it has to flow once more in the horizontal direction through the upper part of the vaporizing chamber before it can leave this chamber and pass through the outlet openings into the combustion chamber.

The vaporizing chamber itself may, for example, be made in the form of an annular casing of circular, elliptical, or even rectangular shape in which the outlet openings for the oil vapor are provided at the outer upper edge

of such casing, while the central opening thereof serves as a passage through which the combustion air is drawn through the base of the burner into the combustion chamber above the vaporizing chamber.

For heating the fuel oil so as to be vaporized, an electric heating unit which preferably consists of several heating coils is provided underneath the bottom of the vaporizing chamber. These heating coils are preferably connected so as to be used individually or together or to be switched off entirely depending upon the amount of heat which they may be required to generate.

The present invention further provides the upper end of the oil feed pipe which projects from below into the central opening of the annular vaporizing chamber with at least one oil intake pipe which extends into such chamber and is disposed therein between the bottom of that chamber and the lower heat-conducting plate therein. If several such oil intake pipes are provided on the upper end of the main oil feed pipe the free ends of these intake pipes are preferably uniformly distributed within the annular vaporizing chamber near the bottom thereof, for example, in a star-shaped formation.

This particular design and arrangement of the end of the oil feed pipe projecting into the central opening of the annular vaporizing chamber has the advantage that the fuel oil supplied through the feed pipe will be cooled by the ascending combustion air which passes uniformly along the outside of the feed pipe before entering into the combustion chamber of the stove whereby the fuel oil will be prevented from vaporizing prematurely, that is, within the feed line. For this reason, it is also advisable to make the end of the feed pipe of a material which has a low thermal conductivity.

For insuring that the fuel oil supplied through the feed pipe will be uniformly distributed to the oil inlet pipes leading into the vaporizing chamber, and for preventing the fuel oil from flowing into this chamber too quickly, the end of the feed pipe is preferably provided with a nozzle-like constriction from which the oil will then flow into the slightly downwardly inclined intake pipes and pass drop-by-drop into the vaporizing chamber.

Another advantageous feature of the present invention consists in mounting a cylinder or the like which is closed at its upper end at a point above the central opening of the annular vaporizing chamber and coaxially therewith so as to cover the opening. The side wall of this cylinder is provided with a plurality of uniformly distributed outlet openings through which the combustion air which is drawn through the central opening in the vaporizing chamber can pass into the combustion chamber. The outer diameter of this cylinder is preferably made smaller than the diameter of the ring of outlet openings for the oil vapor which are provided along the outer upper edge of the vaporizing chamber, so that the oil vapor will rise laterally along the cylinder and will mix with the combustion air emerging from the outlet openings in the side wall of the cylinder to form a combustible mixture.

This cylinder which uniformly distributes the combustion air within the combustion chamber has preferably mounted thereon a tube of a smaller diameter than the cylinder and extending coaxially thereto. This tube is closed at its upper end and the side wall thereof is likewise provided with a large number of uniformly distributed air outlet openings. By providing such additional perforated tube on the air-distributing cylinder, it is possible first to supply the oil vapor emerging from the vaporizing chamber with primary air which combines with the oil vapor into a combustible mixture, and then to supply such mixture through the outlet openings in the wall of the tube with additional secondary air.

The cylinder is provided with a plurality of radially projecting hollow ribs which are uniformly distributed along the side wall of the cylinder and communicate with the inside thereof. Each of these ribs is provided with at least two air outlet openings which extend in a tangential direction and are disposed above each other for con-

ducting the primary combustion air which has passed through the cylinder and the ribs in such tangential direction into the oil vapor within the combustion chamber so as to intermix and thoroughly combine the oil vapor with the combustion air.

The combustion air and the oil vapor may be still more intimately mixed by providing suitable guide surfaces on the outer edges of the hollow ribs. These guide surfaces should extend in a peripheral direction at least along the area of the ribs in which the air-outlet openings are located. The ribs themselves should furthermore be inclined at an angle of about 20 to 25° to the vertical plane. The combustion air will then emerge from the ribs in a downwardly inclined direction, and, after mixing with the oil vapor, ascend in a spirally curved direction.

If, after starting the operation of the burner for only a short time, the heating unit should be switched off to reduce the consumption of electric current, it will be necessary to generate the heat, which is required to continue the vaporization of the fuel oil, by carrying out a part of the combustion at a point closely adjacent to the vaporizing chamber. The outer wall of the vaporizing chamber is for this purpose provided with additional oil-vapor outlet openings at a point directly underneath the cover plate of the chamber and extending in a tangentially inclined direction. The oil vapor, after being produced within the vaporizing chamber, will then be discharged therefrom through these additional tangential outlet openings and after being mixed with primary combustion air, it will burn up directly adjacent to the vaporizing chamber and thereby heat the latter. The most effective manner of supplying the primary air will in this case be attained by extending the hollow ribs downwardly along the outer wall of the vaporizing chamber and spaced at a small distance therefrom so that, when the combustion air is discharged from the downwardly projecting ends of the ribs through additional, tangentially inclined outlet openings in these lower ends of the ribs, it will impinge directly and at an angle upon the oil vapor which emerges laterally from the vaporizing chamber. Thus, the oil vapor will combine very intimately with the combustion air and form an easily combustible fuel mixture.

In order to insure that the combustion of the oil vapor emerging from the lateral outlet openings of the vaporizing chamber will occur at an area as closely as possible to the outer side wall of the vaporizing chamber and preferably directly adjacent thereto, additional guide surfaces are provided between the air outlet openings in the upper part of the ribs and the additional outlet openings in the lower ends of the ribs. These guide surfaces extend at right angles to the ribs and connect each rib with the adjacent rib. If the ribs themselves are inclined as above described, these guide surfaces will then also be inclined relative to the horizontal plane so that the combustion gases will at first be deflected in the downward direction.

For preventing the combustion gases from rising too quickly within the combustion chamber, the perforated pipe socket which is mounted on the air-distributing cylinder is preferably provided with one or more laterally projecting guide surfaces at a point above its air outlet openings. These guide surfaces retard the ascent of the combustion gases within the combustion chamber by deflecting the same. Additional guide surfaces may also be mounted on the inner wall of the combustion chamber which cooperate with the guide surfaces on the tube by forming an intermediate throttling passage for the combustion gases. Above these guide surfaces, the side wall of the upper closed end of the tube may be provided with additional air outlet openings through which any possible components of the mixture of oil vapor and air which have not as yet been completely combusted below these guide surfaces will be supplied with additional combustion air.

The ignition unit is mounted at a point above the out-

let openings for the oil vapor, and preferably at the level in which the air-outlet openings in the pipe socket are located. It may be secured either on the side wall of the combustion chamber or on the tube. In the latter case, the lead-in wires for the electric ignition coil may be passed through the central opening in the vaporizing chamber and through the inside of the cylinder and the tube thereon.

The oil burner according to the invention is preferably used in an oil stove which includes an oil tank, which is connected by a feed pipe to the burner, and has a combustion chamber therein which may be connected to a chimney or the like. The oil burner may in that case be mounted on a horizontal base plate which closes the entire lower end of the combustion chamber and has an opening therein which coincides with the central opening of the annular vaporizing chamber of the oil burner so that the combustion air can flow from below into and through the burner and thus into the combustion chamber of the stove. If the combustion chamber is of a cylindrical shape, the inner wall thereof will be heated very uniformly by the flames which are directed substantially radially toward this wall.

In comparison with a coal stove which generally can only be very roughly controlled by a variation in the supply of combustion air, an oil stove if properly equipped will allow a much more accurate control of the combustion process, and thus a much more efficient operation of the stove itself and a much better utilization of the heat energy contained in the fuel. For attaining such accurate control and for realizing the advantages thereof to the fullest extent which was then possible, previous oil stoves of modern design were generally equipped with special control means of different types.

Further objects, features, and advantages of the present invention will be apparent from the following detailed description thereof, particularly when read with reference to the accompanying drawings, in which—

Fig. 1 shows a vertical cross section of the oil burner according to the invention;

Fig. 2 shows a cross section taken along line 2—2 of Fig. 1;

Fig. 3 shows a perspective view of the same oil burner.

Referring to the drawings, the oil burner according to the invention has an annular vaporizing chamber 2 of a substantially rectangular cross-sectional shape which is secured to an annular base plate 1 and has a central opening 3. Directly underneath the bottom 4 of vaporizing chamber 2, which forms an annular bowl and is adapted to receive the fuel oil for vaporization therefrom, suitable heating means 5 are provided which preferably consist of a plurality of heating coils which are connected in parallel, for example, of one heating coil of about 100 watts and a second coil of about 300 watts.

As illustrated particularly in Fig. 2, the upper cover plate 6 of vaporizing chamber 2 is provided near the outer edge thereof with a ring of outlet openings 7 through which the oil vapor which has been produced in chamber 2 passes into the combustion chamber.

The fuel oil is supplied through a feed pipe 8, the upper end 9 of which projects from below into the central opening 3 of the annular vaporizing chamber 2 and preferably carries three oil inlet pipes 11 which are disposed at an angle of 120° relative to each other, as illustrated particularly in Fig. 2. These three inlet pipes 11 extend into vaporizing chamber 2 and terminate directly above its bottom 4. In order to attain an oil feed as uniform as possible but of not too great a volume, the upper end 9 of feed pipe 8 is preferably made of a nozzle-like shape. Furthermore, inlet pipes 11 are inclined at such an angle toward the bottom 4 of vaporizing chamber 2 that the oil which emerges from the nozzle end 9 of feed pipe 8 will flow through inlet pipes 11 only at a relatively slow velocity and will

fall upon the bottom 4 of vaporizing chamber 2 drop-by-drop.

Above the outer ends of inlet pipes 11, vaporizing chamber 2 is provided internally with a horizontal metal ring 12, the inner edge of which engages directly against the inner wall 13 of chamber 2. This ring 12 is made of a width less than that of the bottom 4 so that an annular slot 15 will be formed between its outer edge and the outer wall 14 of chamber 2. At a suitable distance between the upper cover plate 6 of chamber 2 and ring 12 a similar metal ring 16 is mounted in a horizontal position. This ring 12, however, abuts directly against the outer wall 14 of chamber 2, and it is made of a width so that another annular slot 17 is formed between its inner edge and the inner wall 13 of chamber 2. This staggered arrangement of slots 15 and 17 produces the result that the oil vapor which rises from the bottom 4 of vaporizing chamber 2, in passing to the outlet openings 7 in cover plate 6, must flow horizontally along the outer surfaces of rings 12 and 16 in the direction as shown in Fig. 1 by the arrow 18.

Rings 12 and 16 thus exert a double effect upon the passing oil vapor. On the one hand, they will produce a drag upon the flow of the oil vapor so that at the inside of vaporizing chamber 2 a certain pressure head will be formed which prevents any combustion air from entering into vaporizing chamber 2. On the other hand, however, rings 12 and 16 will operate as additional heating surfaces and transmit the heat which they receive from the walls of chamber 2 to the oil vapor as it passes along the same. The vapor will thereby be superheated and dried, and any incompletely vaporized oil particles will thereby be fully vaporized, so that the dry oil vapor after emerging from vaporizing chamber 2 and mixing with the combustion air will burn down completely.

The upper cover plate 6 of vaporizing chamber 2 further carries an annular trough 19 of a U-shaped cross section, the outer wall 21 of which surrounds the outlet openings 7 in the outward direction and the inner wall 22 of which serves for centering an inverted cup-shaped cylinder 23 which is closed at its upper end and is fitted over vaporizing chamber 2. This cylinder 23 has an outer diameter *a* as indicated in Fig. 1 which is smaller than the inner diameter *b* of the ring of outlet openings 7 in the upper cover plate 6 of chamber 2.

As illustrated particularly in Fig. 3, the outer wall 24 of cylinder 23 is provided with a plurality of radially projecting ribs 25 which are uniformly distributed along this wall 24 and the inside of which communicates with the inside of cylinder 23. Each of these ribs 25 is provided, for example, with three outlet openings 26 which extend in a tangential direction and are disposed above each other. The combustion air will thus pass in the direction shown by arrows 27 through the central opening 3, cylinder 23, and ribs 25 and will be discharged therefrom into the combustion chamber through outlet openings 26. Ribs 25 have guide plates 28 on their outer wall which extend in a peripheral direction and they are also inclined at an angle of about 20 to 25° to the vertical plane. Through the guiding action of these tangential guide plates 28 and such inclination of ribs 25, the combustion air will pass from the outlet openings 26 in ribs 25 in a tangential direction as shown by arrows 29, meet and thoroughly intermix with the oil vapor rising from outlet openings 7 in cover plate 6 of vaporizing chamber 2, and then rise in the form of a combustible fuel mixture spirally upward into the combustion chamber above cylinder 23 in the direction as shown in Fig. 3 by arrows 32.

In order to render such mixture of oil vapor and air still more highly combustible, secondary air is supplied thereto in the direction shown by arrows 33 and 34 through a tube 35 which is mounted in the central opening of cylinder 23, and through a plurality of uniformly distributed outlet openings 37 in the outer wall 36 of

tube 35. These outlet openings 37 are staggered relative to each other so that the lines connecting the openings in the upper rows with the corresponding openings in the lower rows are disposed at an angle of about 10 to 30° to the vertical plane. For separating the air which passes through the central opening 3 into primary combustion air which passes into the combustion chamber through outlet openings 26 in ribs 25 and secondary combustion air which passes into the combustion chamber at a higher level through outlet openings 37 in tube 35, the lower end 38 of the latter is funnel-shaped and extends into cylinder 23.

Above these outlet openings 37, tube 35 also carries an outwardly projecting ring 39 which may cooperate with a further metal ring 43 which concentrically surrounds ring 39 and is mounted on the inner wall 41 of combustion chamber 42 for preventing the combustion gases from rising too quickly. Above this ring 39 tube 35 is provided with another ring of air outlet openings 44 through which additional combustion air will be supplied to the combustion gases which have passed upwardly through the annular gap between rings 39 and 43 so that any residual oil vapor within these gases which has not as yet been burned up below rings 39 and 43 will now be burned up completely.

For igniting the combustible fuel mixture which rises in the direction shown by arrow 32, the invention provides an electric ignition unit 45 which extends through the wall of tube 35 directly above cylinder 23. The ignition coil 46 of this unit 45 projects radially beyond the outer wall of cylinder 24. The lead-in wires 47 of ignition coil 46 may extend through the central opening 3, cylinder 23, and the lower end of tube 35.

As illustrated particularly in Figs. 1 and 2, the outer wall 14 of vaporizing chamber 2 is further provided at a point intermediate the upper metal ring 16 and the upper cover plate 6 with additional outlet openings 48 which extend in a tangential direction. These outlet openings 48 are equal in number to the hollow ribs 25 but are laterally displaced relative thereto. For supplying combustion air also directly to the oil vapor which emerges from these additional outlet openings 48, ribs 25 are extended in the downward direction and each of them is provided with two additional air outlet openings 49 which are disposed at the same level as the tangentially inclined outlet openings 48 and extend in a direction toward these openings. As illustrated in Fig. 3, the downwardly projecting parts of the adjacent ribs 25 are connected by guide plates 51 which are mounted between the upper air outlet openings 26 in ribs 25 and the additional lower air outlet openings 49. These guide plates 51 extend at right angles to the walls of ribs 25 and are therefore likewise inclined at an angle of 20 to 25° to the horizontal plane. They prevent the mixture of oil vapor and air forming underneath these guide plates 51 from rising so that it will burn up directly adjacent to the outer wall 14 of vaporizing chamber 2 and thereby heat the latter.

The operation of the oil burner as illustrated in Figs. 1 to 3 is as follows:

For starting the operation, it is first necessary to switch on the heating unit 5 so as to heat the bottom 4 of vaporizing chamber 2. Thereupon, fuel from an oil supply tank (not shown) is supplied through feed pipe 8 to the downwardly inclined inlet pipes 11, from which it will pass drop-by-drop upon the heated bottom 4 of vaporizing chamber 2 where it will thus be very quickly vaporized. The oil vapor then flows in the direction shown by arrow 18 along rings 12 and 16, whereby it is dried by the heat emitted from these rings and any liquid oil particles which might still be contained therein will be thoroughly vaporized before passing out of the vaporizing chamber through the upper outlet openings 7 and the lateral outlet openings 48. Outside of the vaporizing chamber 2, the oil vapor will

then intermix with the air contained in the combustion chamber 42 and surrounding the oil burner so as to form a combustible mixture which is then ignited by the ignition coil 46.

This initial combustion produces a partial vacuum within the combustion chamber 42 whereby a fresh supply of combustion air will be drawn from below into the burner through the central opening 3. This air will flow, on the one hand, as primary air out of the outlet openings 26 and 49 in ribs 25 and, on the other hand, as secondary air out of the outlet openings 37 in the outer wall of tube 36, and combine with the oil vapor emerging from vaporizing chamber 2 to form an easily combustible mixture within the combustion chamber.

After the oil burner has thus been started for only a short time, vaporizing chamber 2 will have been heated, on the one hand, by heating unit 5 and, on the other hand, by the initial combustion in its immediate vicinity to such a high temperature that the vaporization of the newly supplied fuel oil will considerably accelerate. This will also considerably increase the volume of oil vapor emerging from outlet openings 7 in cover plate 6 of vaporizing chamber 2 so that the primary air supplied through ribs 25 in the direction shown by arrows 27 and 29 will be just sufficient to form a combustible fuel mixture which rises upwardly in the direction shown by arrows 32 and will only burn up above cylinder 23 after the secondary air has been passed into this mixture through outlet openings 37 in tube 36 in the direction shown by arrows 34. Since the metal ring 39 on the upper part of tube 35 prevents the combustion gases from rising too quickly, those gases passing to the area around this upper part will only contain relatively few uncombusted components which will then burn up almost completely after additional combustion air has been supplied thereto through the outlet openings 44 in tube 36 above ring 39.

Since the oil vapor issuing from outlet openings 48 in the outer wall 14 of vaporizing chamber 2 and after the necessary combustion air has been added thereto through the lower outlet openings 49 in ribs 25 will also subsequently burn up directly adjacent to the outer wall 14 of vaporizing chamber 2 and maintain the latter at the required temperature, heating unit 5 may be switched off relatively soon. This is due primarily to the fact that the lower air outlet openings 49 face toward the outer wall 14 of vaporizing chamber 2 and in a direction so that the combustion air issuing therefrom hits directly upon the oil vapor issuing from the tangential outlet openings 48, and thus thoroughly intermixes therewith to form a combustible fuel mixture. The inclination of ribs 25 and the provision of guide plates 51 at an angle vertical to ribs 25, as well as the tangential inclination of outlet openings 48 and 49 insure that the combustion will always occur immediately adjacent to the outer wall 14 of vaporizing chamber 2.

Although my invention has been illustrated and described with reference to the preferred embodiments thereof, I wish to have it understood that it is in no way limited to the details of such embodiments, but is capable of numerous modifications within the scope of the appended claims.

Having thus fully disclosed my invention, what I claim is:

1. An oil burner comprising walls forming a substantially closed vaporizing chamber, means connected to said chamber for feeding oil slowly and gradually into said chamber, a portion of said walls forming an inner boundary of a combustion chamber adjacent to said vaporizing chamber, said vaporizing chamber having outlet openings at the upper part thereof leading into said combustion chamber, heating means for heating at least the bottom of said vaporizing chamber to vaporize the oil within said chamber, means within said vaporizing chamber for retarding the flow of oil vapor within said

chamber to thereby additionally heat the vapor therein before passing through said outlet openings into said combustion chamber so as to produce a pressure head within said vaporizing chamber, means for conducting air to different parts of said combustion chamber and for mixing said air with said oil vapor to form a combustible fuel mixture, means within said combustion chamber for igniting said fuel mixture, said vaporizing chamber walls forming an annular casing surrounded by said combustion chamber and substantially coaxial thereto, said outlet openings being disposed adjacent to the outer upper edge of said casing and together forming at least one ring of openings spaced from each other, said means for conducting air to different parts of said combustion chamber comprising a cylinder mounted on and coaxial to said annular casing and substantially closed at its upper side, the outer diameter of said casing being smaller than the diameter of said ring of outlet openings, the side wall of said cylinder being vertically disposed and having a plurality of peripherally equally spaced apertures therein, and a plurality of hollow ribs mounted on and projecting radially outwardly from said cylinder at equal circumferential distances from each other, each of said ribs being disposed over one of said apertures and thus communicating with the inside of said cylinder, each of said ribs having at least two air outlet openings therein above each other and extending in a tangentially inclined direction with respect to said vertically disposed side wall through the outer wall of said rib for conducting the combustion air supplied through said central opening in said casing, and said cylinder and said ribs into said combustion chamber.

2. An oil burner as defined in claim 1, further comprising a guide plate on the outer edge of each of said ribs and extending in a substantially peripheral direction at least within the area in which said air outlet openings are located.

3. An oil burner as defined in claim 2, wherein the axis of each of said ribs is inclined at an angle of about 20 to 25° to the vertical plane so that the combustion air emerging from said air outlet openings will at first flow obliquely downwardly and then ascend in a spiral direction within said combustion chamber.

4. An oil burner as defined in claim 1, wherein the outer wall of said casing is provided directly underneath the upper wall thereof with additional oil-vapor outlet openings, and further comprising a downward extension on the lower end of each of said ribs, said extensions being radially spaced from said outer wall of said casing and each having additional air outlet openings therein directed toward said outer wall of said casing and at substantially the same level as said additional oil-vapor outlet opening so that the combustion air emerging from said last outlet openings will hit directly upon the oil vapor emerging laterally from said casing through said additional oil-vapor outlet openings.

5. An oil burner as defined in claim 4, wherein said additional oil vapor outlet openings in the outer wall of said casing and said additional air outlet openings in said lower extensions of said ribs extend in tangentially inclined directions with respect to the vertically disposed side wall of the cylinder and are inclined toward each

other so that the combustion of the mixture of oil vapor and air emerging from said outlet openings will occur closely adjacent to said outer wall of said casing.

6. An oil burner as defined in claim 4, further comprising a guide plate on the outer edge of each of said ribs and extending in a substantially peripheral direction from the upper end of said ribs to a point closely above said additional air outlet openings, and an additional guide plate on each of said ribs extending at a substantially right angle to said first guide plate and connecting said rib with the adjacent rib at a level between said air outlet openings in the upper part of said ribs and the additional air outlet openings in said lower extensions of said ribs.

7. An oil burner as defined in claim 6, wherein the axis of each of said ribs and the edges of said guide plates are inclined at an angle of about 20 to 25° to the vertical plane so that the combustion air emerging from said air outlet openings will at first flow obliquely downwardly and then ascend in a spiral direction within said combustion chamber, said upper side of said cylinder having a central opening therein, said air-conducting means further comprising a tube closed at its upper end and mounted on said cylinder within said opening, said tube having a plurality of uniformly distributed air outlet openings within its side wall and spaced above each other, the lines connecting the corresponding superimposed air outlet openings within said tube being likewise inclined and disposed at an angle of about 10 to 30° to the vertical plane.

8. An oil burner as defined in claim 7, further comprising at least one laterally projecting wall having a guide surface on said tube at a level above said air-outlet openings in said tube for retarding the ascent of the combustion gases within said combustion chamber.

9. An oil burner as defined in claim 8, wherein the outer wall of said tube is provided with at least one additional ring of air outlet openings above said laterally projecting wall having a guide surface.

10. An oil burner as defined in claim 9, further comprising at least one additional wall having a guide surface and mounted on the surrounding wall of said combustion chamber and projecting toward said guide surface on the wall of said tube but spaced therefrom so as to form a constricted passage between the free ends of said guide surfaces for retarding the ascent of the combustion gases within said combustion chamber to the level in which said additional ring of air outlet openings is located.

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