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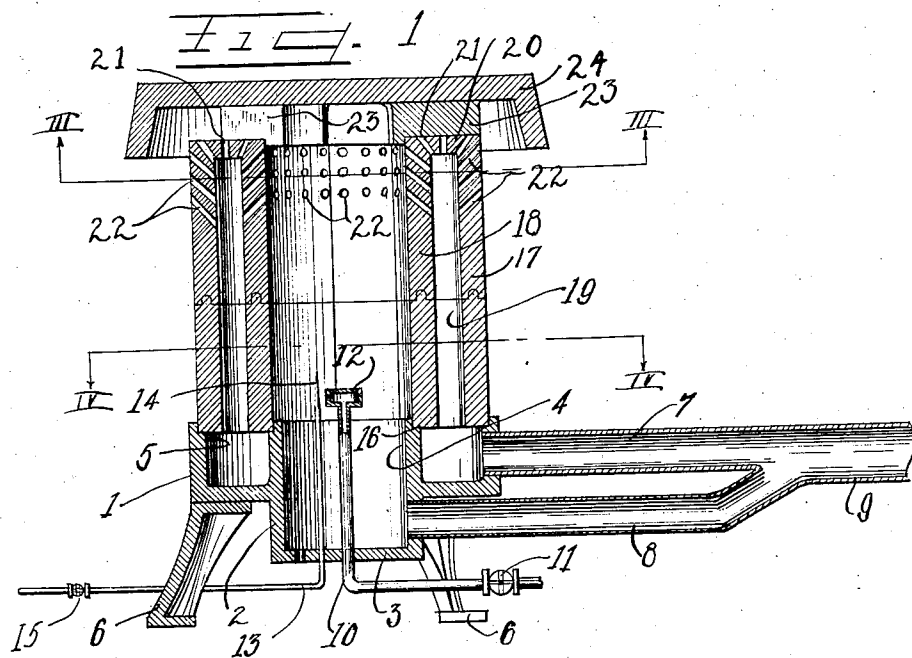
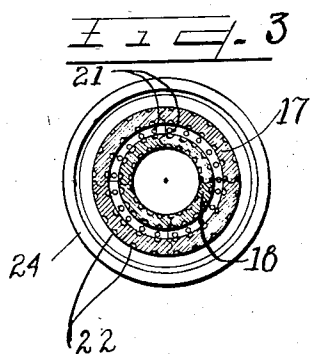
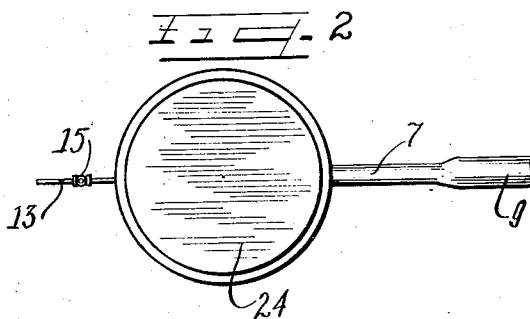
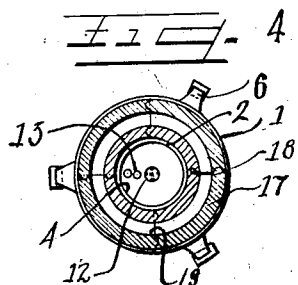
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1,637,064

OIL BURNER

Filed Nov. 5, 1925

2 Sheets-Sheet 1



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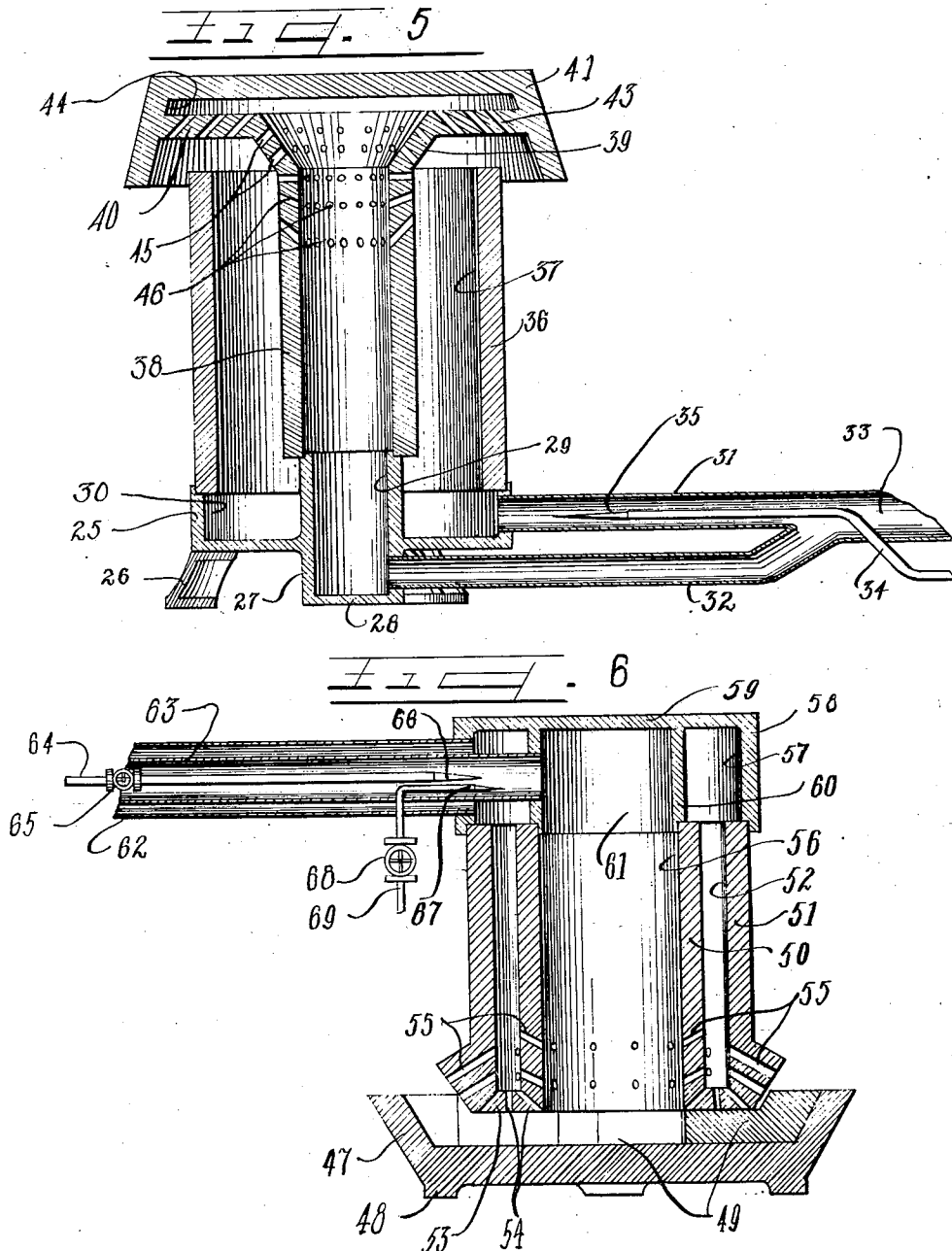
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1,637,064

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE.

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OIL BURNER.

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This invention relates to an improved type of oil burner and particularly to a burner constructed of a carborundum product adapted to be used in the fire box of a boiler to heat the same by oil which is carbureted with air in a combustion chamber into which an auxiliary supply of air is admitted to increase the supply of oxygen to the oil flames for the purpose of producing intense heat within the boiler fire box.

It is an object of this invention to provide an improved oil burner adapted to be used within a boiler and having chambered apertured portions constructed of a refractory material which will withstand the great heat to which they are subjected.

It is also an object of this invention to provide an oil burner wherein a base member is connected with an air supply arrangement to admit air into a plurality of chambers within an apertured hollow housing provided with baffle means for directing the flames into the boiler fire box.

It is an important object of this invention to provide a boiler fire box with an improved oil burner so constructed that a supply of air is admitted into a fuel chamber and carbureted with oil after which the carbureted mixture is further augmented with an additional supply of oxygen from a plurality of apertures provided in a housing or casing constructed of a carborundum product adapted to withstand the great heat generated within the oil burner.

Other and further important objects of this invention will be apparent from the disclosures in the specification and accompanying drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a vertical section partly in elevation covering an improved oil burner embodying the principles of this invention.

Figure 2 is a reduced top plan view of the oil burner.

Figure 3 is a reduced transverse section of the oil burner on the line III—III of Figure 1.

Figure 4 is a reduced transverse section taken on line IV—IV of Figure 1.

Figure 5 is a vertical central section of a modified form of oil burner.

Figure 6 is a vertical central section of another modified form of oil burner.

As shown on the drawings:

The reference numeral 1 indicates a metal cylindrical base having integrally formed centrally therein a sleeve 2 which projects through the bottom of the base and is closed by the bottom wall 3. The sleeve 2 affords an inner chamber 4 and an outer chamber 5. The base member 1 is supported on legs 6 or other suitable means. The base section 1 is provided with an opening in one wall thereof to receive one end of an air supply pipe 7 while another air supply pipe 8 projects into an opening in the base sleeve 2 for the purpose of admitting air into the chamber 4. The two branch pipes 7 and 8 are connected with a main air supply pipe 9. It will thus be seen that air from the pipe 9 is admitted into the chamber 5 through the pipe 7 and that air from the pipe 8 enters the sleeve chamber 4. Projecting upwardly through an opening in the bottom 3 of the sleeve 2 is an oil supply pipe 10 provided with a control valve 11. Mounted on the upper, inner end of the oil supply pipe 10 is an oil nozzle 12. Also projecting through the floor 3 of the base section sleeve 2 is a gas pipe 13 having a pilot tip 14 mounted on the upper end thereof adjacent the oil nozzle 12. The gas pipe 13 is provided with a control valve 15.

The upper edge of the outer wall of the base section 1 and the upper edge of the base section sleeve 2 are each provided with a circular groove to afford a seat or recess 16 for the purpose of receiving the lower end of a sectional cylindrical casing or housing constructed of a carborundum product such as a chemically, electrically or electro-chemically fused silicon carbide. The casing comprises an outer cylindrical wall 17 and an inner cylindrical wall 18 separated from one another to afford a cylindrical air chamber 19 between said walls. The lower end of the casing is open to permit the casing chamber 19 to communicate with the chamber 5 of the base section. The two walls 17 and 18 of the casing are integrally connected at their upper end by a top wall 20 having a plurality of apertures 21 therein. The upper portions of the side walls 17 and 18 are also provided with a plurality of apertures 22

to permit the air from the pipe 7 and the chamber 5 to pass upwardly through the chamber 19 and out of the casing through the apertures 21 and 22. Seated at spaced intervals on the top wall 20 of the carborundum casing are a plurality of webs or flanges 23 which are radially formed within the baffle hood or cover 24 constructed of a carborundum product or of fused silicon carbide. The hood 24 is of greater diameter than the casing 17-18 and serves as a baffle for the heat flames issuing from the oil burner.

Figure 5 illustrates a modified form of oil burner which comprises a cylindrical base section 25 supported on legs 26. Integrally formed centrally within the base section 25 is a cylindrical sleeve 27 the lower end of which projects through the floor of the base section 25 and is closed by means of a bottom wall 28. The sleeve 27 projects through the base section a short distance above the upper edge of the outer wall of said base section. The sleeve 27 affords an inner chamber 29 and an outer chamber 30. Connected to the base section 25 is an air supply pipe 31 which projects through an opening in the base section 1. An air supply pipe 32 projects through an opening in the base section sleeve 27. The two auxiliary air supply pipes 31 and 32 are connected with a main air supply pipe 33. Projecting into the main air supply pipe 33 is an oil supply pipe 34 which is deflected and is directed into the auxiliary air supply pipe 31. An oil distributing nozzle 35 is provided on the end of the oil supply pipe 34 within the auxiliary air supply pipe 31.

The upper edge of the outer wall of the base section 25 is grooved to afford a seat for the lower end of a cylindrical casing 36 constructed of a carborundum product or fused silicon carbide. The outer casing 36 affords a combustion chamber 37 above the base section 25.

The upper end of the base section sleeve 27 is also grooved to afford a seat for the bottom end of a cylindrical sleeve or shank 38 the upper end of which is integrally connected by means of a funnel-shaped neck 39 with a partition wall 40. The partition wall 40 is integrally formed within an inverted cover or hood 41. The hood 41, the partition wall 40 and the shank 38 are all constructed of a carborundum product or of fused silicon carbide. The partition 40 is provided with a plurality of air apertures 43 which communicate with a chamber 44 formed within the hood 41 by the apertured partition 40. The funnel-shaped neck 39 is also provided with a plurality of air apertures 45. The upper portion of the sleeve or shank 38 of the hood member is provided with a plurality of air apertures 46. The apertures 43, 45 and 46 are provided within

the hood member for the purpose of permitting an auxiliary supply of air and oxygen from the pipe 32 and the shank 38 to be fed to the oil flames passing upwardly through the casing 36 and out of the upper end of said casing the baffle 40 of which acts to deflect the flames downwardly out of the oil burner and into the fire box of a boiler within which the improved oil burner is mounted.

Figure 6 illustrates another modified form of oil burner comprising a dish-shaped base section 47 supported by legs 48 or other suitable means, said base section having a plurality of radially directed webs or ribs 49 formed therein to afford a seat for the lower end of a hollow casing or housing comprising a cylindrical inner wall 50 and a cylindrical outer wall 51 spaced therefrom to afford a cylindrical chamber 52 between said walls. The lower ends of the walls 50 and 51 are connected by means of a bottom wall 53 having a plurality of air apertures 54 therein communicating with the space within the base section 47. The lower portions of the casing walls 50 and 51 are provided with a plurality of air apertures 55 to permit air from the casing chamber 52 to pass into the middle chamber 56 of the casing and out of the lower end of the outer wall 51 as well as through the apertures 54 leading from the chamber 52 into the chamber formed within the base section 47. The upper end of the chamber 52 is open and connects with an outer circular chamber 57 formed within a top member, cap or hood 58 closed by a top wall 59. Integrally formed centrally within the hood 58 is a cylindrical sleeve 60 having a chamber 61 therein which communicates with the upper end of the inner chamber 56 of the casing 50-51. Projecting into an opening in the wall of the hood 57 is an outer air supply pipe 62 adapted to supply air to the hood chamber 57 and casing chamber 52. Projecting longitudinally through the outer air pipe 62 is an inner air pipe 63 which projects through one side of the hood 57 and has the end thereof engaged in an opening in the inner sleeve 60 of said hood. Projecting into the inner air pipe 63 is an oil fuel supply pipe 64 having a control valve 65 therein. A burner nozzle 66 is provided on the inner end of the oil supply pipe 64 to carburet the air within the pipe 63 with oil before the air and oil mixture is admitted into the inner chamber 61 of the hood 58. A gas pilot 67 is provided within the inner air pipe 63 adjacent the oil nozzle 66. A gas control valve 68 is provided in a gas supply pipe 69 connected with the pilot 67. The dish-shaped base section 47 acts as a baffle or deflecting means for the oil flames passing downwardly through the chambers 61 and 56 and into the chamber of the base section 47 to then pass upwardly into the fire

box of a boiler as the flames are augmented with an additional supply of oxygen from the auxiliary supply of air of the casing chamber 52. The auxiliary supply of air is furnished through the casing apertures 54 and 55 in the lower portion of the casing or housing 50—51. The casing 50—51 and the base section 47 together with the hood or cover 58 are constructed of a carborundum product or of fused silicon carbide in order that the various parts of the oil burner may withstand the great heat to which they are subjected. If preferred the hood or top section 58 may be formed of metal or other suitable material.

The operation is as follows:

With an improved oil burner of the type illustrated in Figure 1 mounted in position upon the grate of a boiler fire box or in any other suitable position within a boiler, fuel oil from any suitable source of supply is admitted through the oil supply pipe 10, when the valve 11 is open, and is forced out of the oil nozzle 12 into the inner chamber of the casing 17—18. With the gas pilot light 14 lighted the fuel mixture within the inner chamber of the casing is ignited to provide the heat producing flames. The air is supplied from the main air pipe 9 and the auxiliary supply pipe 8 into the lower portion of the inner chamber 4 of the base section 1. This primary supply of air passes upwardly through the chamber 4 and the inner chamber of the casing 17—18 and is carbureted with the oil issuing from the nozzle 12. A fuel mixture is thus produced in the mixing chamber and is ignited by the burning gas pilot 14. The resulting flames pass upwardly through the inner chamber of the casing and strike against the baffle member 24 which diverts said flames between the hood webs 23 downwardly out of said hood and into the fire box of the boiler. As the flames pass upwardly through the inner chamber of the casing an auxiliary supply of air from the auxiliary air supply pipe 7 passes through the base chamber 5 and into the casing chamber 19 and then passes into the upper apertured portion of said hollow casing. The air in the chamber 19 is thus permitted to escape through the apertures 22 in the casing walls 17—18 and through the end apertures 21 so that the flames moving toward and through the baffle hood 24 are supplied with an additional quantity of oxygen from the auxiliary supply of air. This arrangement produces flames of intense heat which are permitted to circulate through the fire box housing to heat the boiler.

The operation of the modified form of device illustrated in Figure 5 is similar to that set forth in connection with the oil burner illustrated in Figure 1. In this case, however, the oil is fed through the nozzle 35

within the main air supply pipe 31 to carburet the air entering the chamber 30 to produce a suitable fuel mixture which, when ignited, produces flames which pass forwardly through the chamber 37 of the outer casing 36 and strike the partition walls of the baffle hood 41 which cause the flames to be directed downwardly into the boiler fire box. The auxiliary supply of air from the pipe 32 passes upwardly through the inner chamber 29 and through the sleeve 38 of the hood 41. The auxiliary supply of air passing upwardly through the sleeve 38 is permitted to escape through the apertures 46 and 45 and through the apertures 43 to augment the supply of oxygen to the flames passing upwardly over the top of the casing 36 before the flames enter the fire box of the boiler.

In the modified form of the device shown in Figure 6 the device is substantially an inverted form of that illustrated in Figure 1. In this case the main supply of air enters the chamber 61 of the hood 58 through the main air supply pipe 63 and then passes downwardly through the casing chamber 56. As the air from the pipe 63 passes into the chamber 61 said air is carbureted with fuel oil from the fuel nozzle 60 to produce a fuel mixture which is ignited by the gas pilot 67. The resultant flames pass downwardly through the inner casing chamber 56 and enter the base section 47 which acts as a baffle means to deflect the flames upwardly into the fire box of the boiler. The auxiliary supply of air from the auxiliary pipe 62 enters the outer chamber 57 of the hood 58 and passes downwardly through the casing chamber 52 and escapes through the apertures 54 and 55 formed in the lower portion of the casing section. It will thus be seen that the flames passing through the lower end of the casing section and through the base section are provided with an additional supply of oxygen from the auxiliary supply of air to produce flames of intense heat for the purpose of heating the boiler.

By referring to Figures 1 to 4 it will be noted that the hollow casing 17—18 is constructed of a plurality of interfitting sections made of a refractory material such as fused silicon carbide. If desired the hollow casing may of course be constructed of but a single section. The casings illustrated in Figures 5 and 6 may be constructed of a plurality of interfitting sections.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. An oil burner comprising a chambered

end section, fuel supply means connected therewith, air supply pipes connected with said end section to supply air to the chambers of said end section, a hollow apertured casing section connected with said end section to receive the air from said end section chambers, and a closed baffle end section adjacent the apertured end of said casing section to direct the flames issuing from said casing section downwardly around the exterior of said casing section.

2. An oil burner comprising a chambered air supply section, air supply pipes connected therewith, a fuel oil supply nozzle associated with said chambered air supply section, a baffle end section, and an intermediate casing section positioned between said air supply section and said baffle end section, said baffle end section adapted to divert flames around the exterior of said intermediate casing section.

3. An oil burner comprising a section having a plurality of concentric chambers therein, air supply means connected with said chambers, a hollow apertured intermediate section contacting said air supply section and having concentric chambers communicating with the respective chambers of said air supply section, a baffle end section and webs formed thereon for spacing the same from said intermediate section.

4. An oil burner comprising an integral base section having a plurality of concentric chambers therein, air supply pipes connected with said chambers to independently supply air thereto, a hollow casing section open at one end and having a plurality of apertures in the other end thereof, said casing section being connected with said chambered air supply section and a baffle section positioned at the apertured end of said casing section adapted to direct flames back toward said casing section to permit the flames to pass around the hood.

5. An oil burner comprising a base section having concentric air chambers therein, means for supporting the base section, air supply pipes connected with said base section to supply air to the chambers thereof, a hollow intermediate double walled section open at one end and having the double walls connected at the other end, said closed end having a plurality of air outlet apertures therein, and a closed baffle section contacting the closed apertured end of said hollow intermediate section.

6. An oil burner comprising a base section, a sleeve integrally formed therein to afford concentric air chambers, air supply pipes connected with said base section and sleeve to supply air to the chambers thereof, a hollow apertured intermediate section supported on said base section and on said sleeve, and a hood supported on said apertured intermediate section and spaced there-

from to afford a means for diverting flames from said apertured intermediate section downwardly to receive additional air therefrom before passing upwardly around the hood.

7. An oil burner comprising a base section, an air supply pipe connected therewith, a sleeve formed in said base section affording an inner chamber, an air supply pipe connected with said sleeve to supply air to said inner chamber, an oil supply nozzle and a gas pilot mounted within said inner chamber, pipes for supplying oil to said oil nozzle and gas to said gas pilot, a hollow intermediate section open at one end and having a plurality of apertures in the other end thereof, said hollow apertured intermediate section having the open end thereof seated on said base section, a hood positioned above the apertured end of said intermediate section, and supporting webs formed in said hood resting on the upper apertured end of said intermediate section to hold the hood spaced therefrom.

8. An oil burner comprising a chambered air supply section, air supply pipes connected with each of the chambers of said air supply section, oil supply means connected with one of the chambers of said air supply section, an apertured section engaging said chambered air supply section and baffle means connected with said apertured section to divert flames passing through said apertured section to cause the flames to pass around the exterior of the apertured section and then around the exterior of the baffle means.

9. An oil burner comprising a unitary base section formed to afford concentric air chambers, an apertured hollow intermediate section positioned on said base section to receive air from one of said chambers, a solid baffle means, radial webs formed therein resting on said hollow apertured intermediate section, and means integrally formed on said baffle means for directing flames around the exterior of said intermediate section.

10. An oil burner comprising a base section having concentric chambers therein, legs for supporting the same, air supply pipes connected with said chambered base section, an oil supply pipe projecting into one of the chambers of said base section, an oil distributing nozzle on said pipe, a pilot for lighting said nozzle, a hollow casing open at one end having a plurality of apertures in the walls of the other end of said casing, said casing having the open end thereof seated on said chambered base section, a closed baffle hood positioned above the apertured end of said casing, and supporting webs formed in said baffle hood and resting on the apertured end of said casing to hold the baffle hood spaced therefrom.

11. An oil burner comprising a concentrically chambered metal base section, air supply pipes connected therewith, a concentrically chambered hollow casing section
5 open at one end and supported on said base section, said hollow casing section having a plurality of apertures in the closed end thereof and constructed of a refractory material, and a refractory baffle hood supported on the apertured end of said casing. 10

In testimony whereof I have hereunto subscribed my name.

OLOF A. TOFFTEEN.