Nov. 26, 1935. G. BLUEMEL 2,022,024

BURNER

Filed Feb. 12, 1934

Fig. 1.

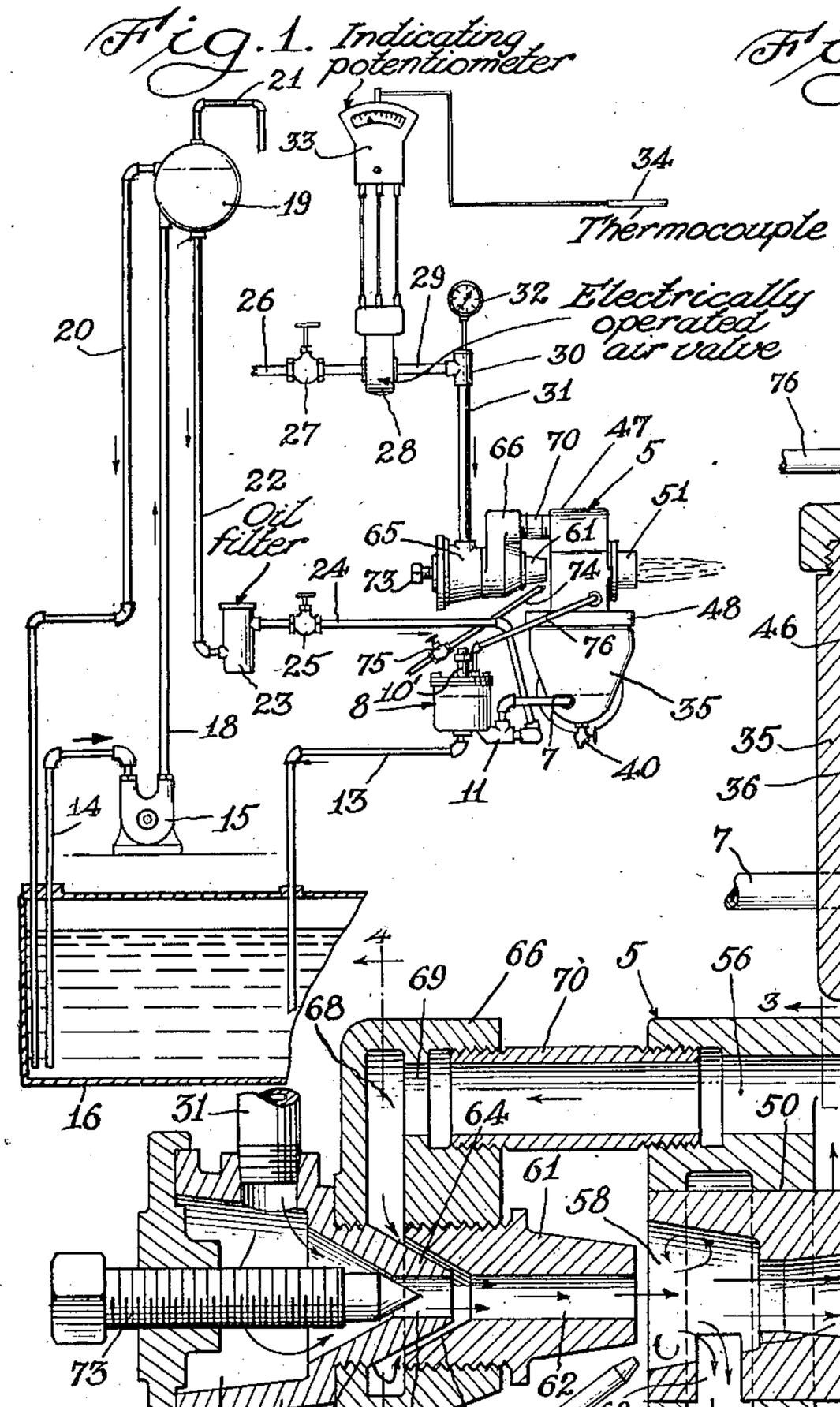


Fig. 2.

Fig. 2a

Fig. 3.

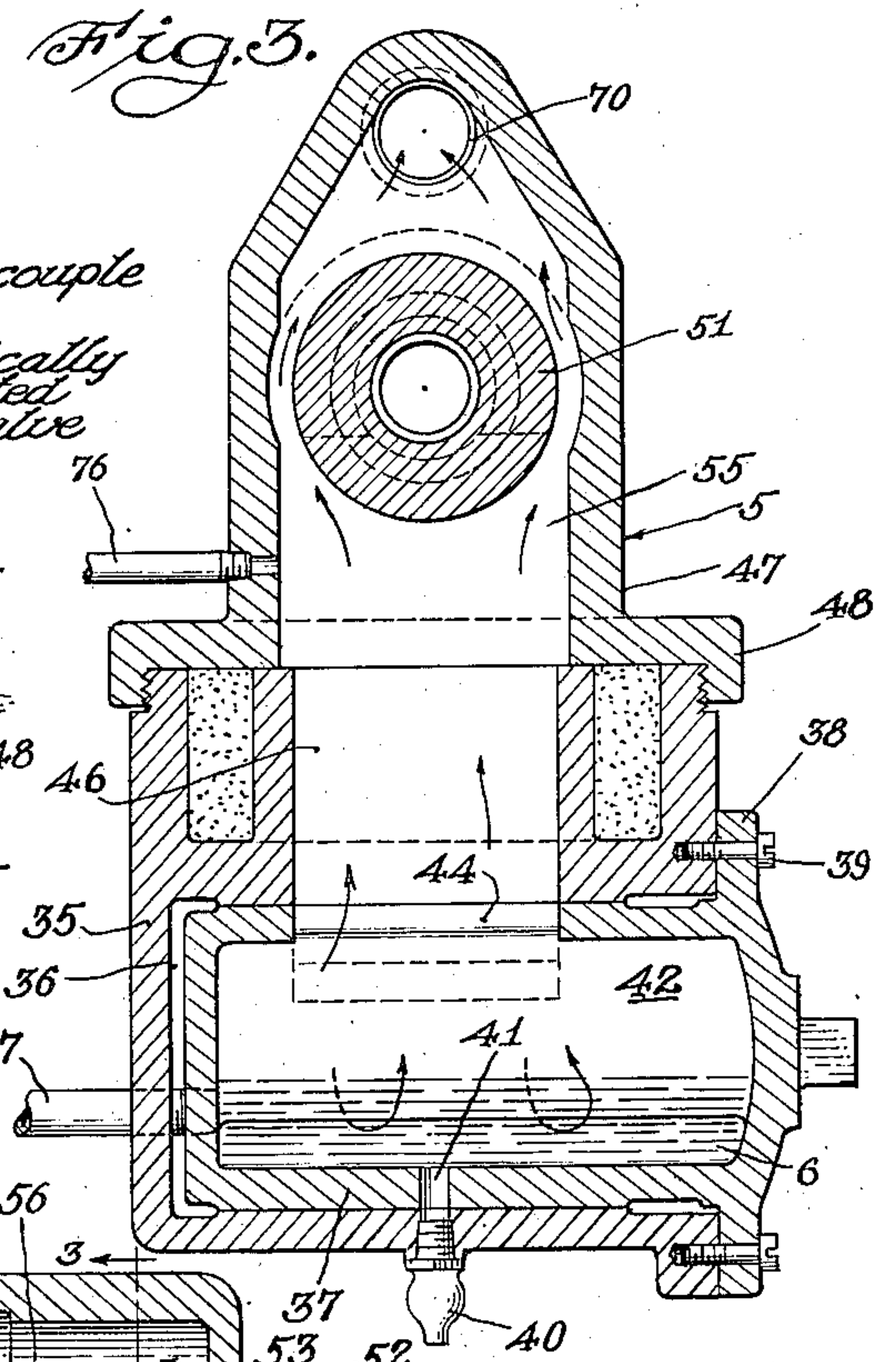
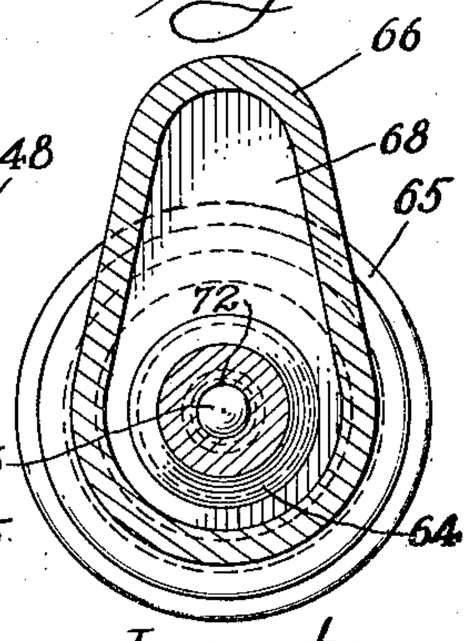


Fig. 4.



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UNITED STATES PATENT OFFICE

2,022,024

BURNER

Gustave Bluemel, Chicago, Ill.

Application February 12, 1934, Serial No. 710,776

19 Claims. (Cl. 158—53)

This invention relates to burners of the kind particularly adapted for the combustion of liquid petroleum products and such as are commonly referred to as oil burners and where the term oil is used herein it is intended to include combustible products from whatever source they may originate whether natural or artificial insofar as they are effective in producing the results herein set forth.

The primary object of my invention is to effect efficient combustion of oil by converting it into a vapor and consequently mixing the vapor with air and igniting the mixture.

Another object is to effect vaporization of the oil by heat and to carry out this vaporization in the operation of the burner by utilizing heat resulting from the combustion of previously vaporized oil.

Further objects of the invention are to divert a part of the burner flame to effect vaporization; to raise the temperature of vaporized oil prior to its mixture with air to effect more efficient combustion; to create a difference in pressure between communicating passages in the burner to effect circulation therein; to utilize the air supply to draw vaporized oil to the point of combustion for admixture with the air; to control the amount of air flowing to the burner; to automatically maintain a constant level of oil in the burner at the place of vaporization; and to provide a novel burner of simple and economical construction and efficient and positive operation.

A selected embodiment of my invention is illustrated in the accompanying drawing wherein

Fig. 1 is an elevational view illustrating a typical installation for my novel burner;

Fig. 2 is a vertical longitudinal sectional view of my burner;

Fig. 2*a* is a vertical sectional view of an overflow device used with the burner and showing the device in operative relation to the burner as illustrated in Fig. 2;

Fig. 3 is a transverse sectional view taken substantially on the line 3—3 of Fig. 2; and

Fig. 4 is a transverse sectional detail view taken substantially on the line 4—4 on Fig. 2.

In the accompanying drawing the main housing of my novel burner is generally indicated by 5 and includes an oil sump 6 to be described in detail hereinafter and in which a constant level of oil is adapted to be maintained. A pipe 7 leads to this oil sump from an overflow device generally indicated by 8 and which includes a cup 9 closed at its upper end by a removable plate 10 and which has a passage 11 at the lower end thereof with which the pipe 7 communicates. A removable plug 10′ is provided in the plate 10. An overflow pipe 12 is provided in the cup 9 and the overflow device 8 is mounted in juxtaposition to the burner housing 5 with the upper end of the overflow pipe 12 in the plane of the oil level desired to be maintained in the sump 6. A return pipe 13 leads from the overflow pipe 12 to the supply tank 16 mounted at the lower level then to the overflow device 8. The supply pipe 14 leads from the supply tank to the inlet of the pump 15. An outlet pipe 18 leads from the pump to a gravity tank 19 mounted at a higher level than the pump 15. An overflow pipe 20 is connected to the tank 19 near the top thereof so that when more than a predetermined quantity of oil is forced into the tank 19 the oil may flow through the pipe 20 back to the supply tank 16. The tank 19 is provided with a breather pipe 21 to prevent the entrapment of air therein. A pipe 22 leads from the tank 19 to an oil filter 23 mounted at a lower level than the tank 19. A pipe 24 leads from the oil filter 23 to the passage 11. By reason of the head of oil maintained in the tank 19 oil may flow from the tank through the pipe 22, filter 23 and pipe 24 into the cup 9 and a valve 25 is provided in the pipe 24 to control this oil flow.

A pipe 26 having a valve 27 therein leads from a suitable source of air under pressure to an automatic electrically operated regulating valve 28 equipped with a by-pass, and this valve serves to regulate air flow through the pipe 29 to the fitting 30 to which a pipe 31 is connected and which is also connected to the burner housing 5 as will be explained more fully hereinafter. A pressure gauge 32 may be connected to the fitting 30 to indicate the air pressure in the pipe 31. The valve 28 may be regulated by suitable means such as an indicating potentiometer 33 which is in turn regulated by a temperature responsive means 34 such as a thermocouple arranged within the area to be heated by the burner. These devices function to regulate the operation of the burner as will be explained more fully hereinafter but the particular construction and specific operation thereof are no part of my invention.

The burner housing 5 includes a body 35 having a circular pocket 36 at the lower end thereof into which a sleeve 37 is adapted to be fitted. The sleeve includes a flange 38 which rests against one end of the body 35 and machine screws 39 or the like are passed through this flange and joined in the body to secure the sleeve 37 therein. The interior of the sleeve 37 provides the sump 6 and the pipe 7 communicates with the interior of said sleeve. A drain cock 40 is provided at the lower

end of the body 35 and an opening 41 in the bottom of the sleeve 37 communicates with this drain cock to permit drainage of the sump 6. An axially extending tapered rib 42 projects diametrically across the sleeve 37 and terminates in spaced relation with that part of the sleeve 37 in which the opening 41 is provided, and this rib is adapted to extend below the liquid level to be maintained in the sump 6. Slots 43 and 44 are provided in the sleeve on each side of the rib 42 and respectively communicate with vertically extending passages 45 and 46 in the body 35.

The body 47 of the burner housing 5 includes a flange 48 which is screw-threaded or otherwise joined to the top of the body 35 and in the body 47 is a passage 49 which communicates with the passage 45. An opening 50 extends transversely through the body 47 and the burner nozzle 51 is adapted to be mounted therein. The burner nozzle 51 includes a flange 52 and a gasket 53 is interposed between this flange and the adjacent part of the body 47 and bolts 54 are provided for tightly clamping the flange 52 against the gasket 53 to thereby tightly connect the nozzle 51 to the body 47. This construction permits the nozzle to be removed and another substituted therefor for different shapes of nozzles will be provided for different usages to which my burner may be put. The nozzle 51 extends across the passage 49 and likewise extends across a chamber 55 provided in the body 47 and the lower part of the chamber 55 communicates with the passage 46 and the upper end of this chamber opens into a passage 56 which extends through the body 47 in alignment with the nozzle 51.

The nozzle 51 includes a tapered passage 57 through which the flame resulting from the combustion in the burner passes. At the inner or restricted end of this passage there is a pocket 58 which is tapered in a direction opposite to the taper of the passage 57 and which opens through the rear wall of the body 47. The inner end of the pocket 58 is larger than the inner end of the passage 57 whereby a shoulder 59 is defined. The lower part of the passage 57 at the pocket 58 and aligned with the passage 49 is cut away as indicated at 60 for a purpose to be made apparent presently. The combustion occurs initially in this pocket 58 and a pressure is built up in this pocket as a result of such combustion.

My novel burner includes a mixing nozzle 61 which opens into the pocket 58 and which has a bore 62 therein aligned with the tapered passage 57. The forward end of the nozzle 61 is slightly spaced from the outer end of the pocket 58. At the rear end of the bore 62 is an outwardly tapered pocket 63 and a tapered air nozzle 64 on the body 65 projects into this tapered pocket and is spaced from the wall thereof. The nozzle 61 is screwed into a threaded opening in a coupling 66 and the body 65 includes a threaded portion 67 which is also fitted in a screw-threaded opening in the coupling 66, there being a chamber 68 in the coupling 66 intermediate the parts of the coupling in which the nozzle 61 and the body 65 are secured. A passage 69 in the coupling 66 communicates with the upper end of the chamber 68. A pipe 70 interconnects the passages 56 and 69 and the ends of this pipe are screw-threaded into the ends of these passages.

In the body 65 is a chamber 71 into which the pipe 31 leads and the outlet of this chamber is provided by a bore 72 in the nozzle 64. A needle valve 73 projects across the chamber 71 and cooperates with the inner end of the bore 72 and by adjusting this needle valve relative to the end of the bore the volume of air permitted to flow from the chamber 71 through the bore 72 and into the bore 62 is regulated. There is a gap at the bottom of the pocket 63 between the inner end of the bore 62 and the adjacent end of the nozzle 64 and there is a space between the wall of the pocket 63 and the periphery of the nozzle 64. Air flowing from the bore 72 into the bore 62 past the gap creates a Venturi effect in the space for a purpose to be made apparent presently. By running the nozzle 61 in or out of the coupling 66, the Venturi effect may be controlled because of the space between the wall of the pocket 63 and the wall of the nozzle 61 may be thus varied.

A pilot light 74 controlled by a valve 75 is positioned adjacent the outer end of the pocket 58 and when the burner is to be set in operation this pilot light is lighted to burn with a long flame.

After the pilot light has been lit the valve 27 is opened and air under pressure flows freely through the regulating valve 28, pipe 29, fitting 30 and pipe 31 into the chamber 71. The air then flows out through the bore 72 and is emitted from the end of the bore 62 whereat this blast of air strikes the flame from the pilot light 74 and has the effect of deflecting this flame through the opening 60 down into the passages 49 and 45, and this deflection is aided by the fact that the blast of air and the flame strike the shoulder 59. When my burner is used under conditions requiring a high capacity, the pocket 58 and the tapered bore 57 may be omitted and a straight bore will be provided in the nozzle 51. However, a suction is created in the passages 49 and 45, as will be explained, and the flame from the pilot light 74 always passes into the passages 49 and 45. The flame flowing into the passages 49 and 45 and the heat therefrom passes through the slot 43 and vaporizes oil in the sump 6. The Venturi effect created as described above tends to create a vacuum in the sump 6, slot 44, passage 46, chamber 55, passage 56, pipe 70, pipe 69 and chamber 68 and consequently as soon as any oil is vaporized the vapor will be drawn through the path just described to be intermixed with air passing through the bore 62. Moreover, this suction is effective into the passages 49 and 45. As soon as the mixed air and vapor are emitted from the bore 62 and contact the flame from the pilot light 74, the mixture is ignited in the pocket 58 and a pressure is built up which combined with the suction effect causes a part of the flame to flow through the opening 60 and into the passages 49 and 45 and cooperate with the flame from the pilot light 74 to effect further vaporization of oil. Of course, the effect of the air blast flowing through bore 62 is to force most of the flame through the bore 57. The flame in passages 49 and 45 tends to raise the temperature in the sump 6 and increase the vaporization and as more oil is vaporized and drawn up to be intermixed with the air a greater flame is built up and as this occurs the valve 75 is manipulated to cut down the size of the flame from the pilot light 74. The flame from the pilot light 74 is gradually reduced as the flame resulting from the ignition of oil vapor and air increases until the burner is operating as desired when the valve 75 is closed off. The flame flowing through the nozzle 51 raises the temperature thereof and con-

sequently vapor passing through the chamber 55 about the nozzle is heated as it flows over the heated nozzle which increases the efficiency of the combustion.

The needle valve 73 is adjusted to regulate the amount of air emitted through the bore 72 and this determines the maximum operation of the burner. The thermocouple 34 in the area heated by the burner responds to the temperature in the area, and as the temperature varies this thermocouple varies the potentiometer which in turn controls the electrically operated valve 28 to increase or diminish the quantity of air admitted into the chamber 75 as the temperature in the area heated by the burner drops or rises. When the quantity of air is diminished the Venturi effect is likewise diminished and consequently less vapor is drawn from the sump 6 for intermixture with the air which reduces the size of the flame. Thus by controlling the air supply the operation of the burner may be regulated for as more or less air flows through the bore 72 more or less oil vapor is withdrawn from the sump 6 by the Venturi effect and the quantity of oil vapor withdrawn determines the flame size and the heating effect of the burner.

As oil is vaporized and withdrawn from the sump 6 additional oil is admitted into the sump from the overflow device 8. It is, of course, essential that uniform pressure be maintained in the sump 6 and overflow device 8 so that equal levels may be maintained therein and for this reason a pressure equalizing pipe 76 is provided which establishes communication between the chamber 55 and the cup 9. Hence since the top of the overflow pipe 12 is in the plane of the level of oil desired to be maintained in the sump 6 a uniform level of oil may be maintained in said sump so long as there is an oil supply in the cup 9, more oil being supplied to the sump as vaporization occurs.

My novel oil burner is particularly adapted for commercial usages such as the heating of furnaces, boilers and the like but, of course, the invention is not limited to such usages. In the burner vaporization of the oil is effected by heat and the vapor is drawn toward the point of combustion by the air supply and is thoroughly intermixed with the air prior to ignition. The burner is self-maintaining since a part of the flame is utilized to effect vaporization and this is accomplished by directing a part of the flame into an oil vaporizing chamber. Moreover, the burner may be regulated by merely controlling the volume of air supply which simplifies control of the burner and enables temperatures to be accurately maintained. The burner is free of moving parts and inasmuch as vapor is burned and since this vapor is heated prior to combustion the formation of carbon and other deposits is reduced to a minimum. In the foregoing description I have described a preferred embodiment of my invention but it is to be understood that this is capable of variation and modification and I therefore do not wish to be limited to the precise details set forth but desire to avail myself of such changes and alterations as fall within the purview of the following claims:

I claim:

1. In an oil burner, a burner nozzle, means for directing a blast of air toward said burner nozzle, an oil vaporizing chamber, means providing a continuous passage interconnecting said chamber and said nozzle, a chamber in said nozzle adjacent said passage and into which said air blast is directed and from which a part of the flame may be deflected into said passage and toward said vaporizing chamber to heat oil therein to effect vaporization thereof, and means for directing oil vaporized in said chamber to said means directing an air blast toward said nozzle to thereby intermix the vapor and air prior to flow into and ignition in said burner nozzle.

2. An oil burner including a tapered burner nozzle and having a pocket at the inlet end thereof tapered oppositely to the taper of the outlet of the burner nozzle, a mixing nozzle discharging into the pocket in said burner nozzle, said mixing nozzle having a vapor inlet and an air passage leading past said vapor inlet whereby air flowing through said passage creates a suction in said vapor inlet, said mixing nozzle including an adjustable part for varying the size of said vapor inlet whereby the flow of vapor through said inlet may be adjusted proportionately to air flowing through the air passage in said mixing nozzle, casing means including a passage having an oil vaporizing chamber therein and an outlet leading to the vapor inlet in said mixing nozzle and an inlet communicating with said pocket whereby a part of the flame in said pocket is deflected into said inlet and toward the vaporizing chamber to heat the oil therein and effect vaporization thereof, and means supplying air under pressure to the air passage of said mixing nozzle whereby air flowing through said air passage withdraws oil vapor from said vaporizing chamber to be mixed with the air flowing through said air passage, the air and vapor mixture being ignited in said burner nozzle.

3. An oil burner including a tapered burner nozzle and having a pocket at the inlet end thereof tapered oppositely to the taper of the outlet of the burner nozzle, a mixing nozzle discharging into the pocket in said burner nozzle, said mixing nozzle having a vapor inlet and an air passage leading past said vapor inlet whereby air flowing through said passage creates a suction in said vapor inlet, casing means including a passage having an oil vaporizing chamber therein and an outlet leading to the vapor inlet in said mixing nozzle and an inlet communicating with said pocket whereby a part of the flame in said pocket is deflected into said inlet and toward the vaporizing chamber to heat the oil therein and effect vaporization thereof, means supplying air under pressure to the air passage of said mixing nozzle whereby air flowing through said air passage withdraws oil vapor from said vaporizing chamber to be mixed with the air flowing through said air passage, the air and vapor mixture being ignited in said burner nozzle, and means for regulating the air supply to the air passage in said mixing nozzle whereby variation of the air supply varies the suction in said vapor inlet to vary the oil vapor and air mixture in said mixing nozzle and thereby regulate the ignition of said mixture in said burner nozzle.

4. An oil burner including a tapered burner nozzle and having a pocket at the inlet end thereof tapered oppositely to the taper of the outlet of the burner nozzle, a mixing nozzle discharging into the pocket in said burner nozzle, said mixing nozzle having a vapor inlet and an air passage leading past said vapor inlet whereby air flowing through said passage creates a suction in said vapor inlet, said mixing nozzle including an adjustable part for varying the size

of said vapor inlet whereby the flow of vapor through said inlet may be adjusted proportionately to air flowing through the air passage in said mixing nozzle, casing means including a passage having an oil vaporizing chamber therein and an outlet leading to the vapor inlet in said mixing nozzle and an inlet communicating with said pocket whereby a part of the flame in said pocket is deflected into said inlet and toward the vaporizing chamber to heat the oil therein and effect vaporization thereof, means supplying air under pressure to the air passage of said mixing nozzle whereby air flowing through said air passage withdraws oil vapor from said vaporizing chamber to be mixed with the air flowing through said air passage, the air and vapor mixture being ignited in said burner nozzle, and means for regulating the air supply to the air passage in said mixing nozzle whereby variation of the air supply varies the suction in said vapor inlet to vary the oil vapor and air mixing in said mixture nozzle and thereby regulate the ignition of said mixture in said burner nozzle.

5. An oil burner including a tapered burner nozzle and having a pocket at the inlet end thereof tapered oppositely to the taper of the outlet of the burner nozzle, said pocket being open at the larger end thereof, a mixing nozzle having the outlet end thereof opening into the open side of said pocket whereby a mixture emitted from said mixing nozzle flows into said pocket to be ignited in said burner nozzle, said mixing nozzle having a vapor inlet and an air inlet leading past said vapor inlet whereby air flowing through said passage creates a suction in said vapor inlet, casing means including an oil vaporizing chamber and having an inlet passage leading from said pocket to said vaporizing chamber and an outlet passage leading from said vaporizing chamber to the vapor inlet in said mixing nozzle, a part of the flame in the pocket of said burner nozzle being deflected through said inlet passage and toward said vaporizing chamber to heat the oil therein and effect vaporization thereof, means supplying air under pressure to the air passage of said mixing nozzle whereby air flowing through said air passage withdraws oil vapor through said vapor inlet from said vaporizing chamber to be mixed with the air flowing through said air passage, and valve means at the inlet of said air passage for regulating the air supply thereto to vary the suction created in said vapor inlet and thereby vary the mixture in said mixing nozzle whereby the ignition of the mixture in the burner nozzle is controlled.

6. An oil burner including a burner nozzle, a mixing nozzle discharging into said burner nozzle, casing means providing an oil vaporizing chamber in which a supply of oil is maintained, said chamber being located below said mixing nozzle to prevent gravity flow of oil from said chamber to said burner nozzle, means in said chamber and projecting into the oil therein and dividing the chamber into an inlet and an outlet side, said casing means including an outlet leading from the outlet side of said vaporizing chamber to said mixing nozzle and an inlet leading from the inlet side of said vaporizing chamber and through which a part of the flame in said burner is deflected toward said vaporizing chamber to heat the oil therein and effect vaporization of the oil, means supplying air under pressure to said mixing nozzle to create a suction in said outlet whereby oil vapor may be drawn past the means in said chamber to said mixing nozzle for mixture with air flowing through said mixing nozzle, the air and vapor mixture being ignited in said burner nozzle, and means for regulating the air supply to said mixing nozzle to thereby regulate the withdrawal of oil vapor from said vaporizing chamber and control the ignition of the mixture in said burner nozzle.

7. An oil burner including a burner nozzle, a mixing nozzle discharging into said burner nozzle, casing means providing an oil vaporizing chamber in which a supply of oil is maintained, said chamber being located below said mixing nozzle to prevent gravity flow of oil from said chamber to said burner nozzle, means in said chamber and projecting into the oil therein and dividing the chamber into an inlet and an outlet side, said casing means including an outlet leading from the outlet side of said vaporizing chamber to said mixing nozzle and an inlet leading from the inlet side of said vaporizing chamber to said burner nozzle, and means supplying air under pressure to said mixing nozzle to create a suction in said outlet and the outlet side of said vaporizing chamber whereby a suction is created past the means in said chamber in said inlet to thereby deflect a part of the flame in said burner nozzle into said inlet and toward the oil in said chamber and effect vaporization of the oil whereby the oil vapor thus created is withdrawn through said outlet to said mixing nozzle for mixture with air flowing through said mixing nozzle, the air and vapor mixture being ignited in said burner nozzle, and means for regulating the air supply to said mixing nozzle to thereby regulate the withdrawal of oil vapor from said vaporizing chamber and control the ignition of the mixture in said burner nozzle.

8. An oil burner including a burner nozzle, a mixing nozzle discharging into said burner nozzle, casing means providing an oil vaporizing chamber in which a supply of oil is maintained, said chamber being located below said mixing nozzle to prevent gravity flow of oil from said chamber to said burner nozzle, means in said chamber and projecting into the oil therein and dividing the chamber into an inlet and an outlet side, said casing means including an outlet leading from the outlet side of said vaporizing chamber to said mixing nozzle and an inlet leading from the inlet side of said vaporizing chamber to said burner nozzle, means for deflecting a part of said flame in said burner nozzle into the inlet and toward the vaporizing chamber to heat the oil in said chamber and effect vaporization of the oil, means supplying air under pressure to said mixing nozzle to create a suction in said outlet and the outlet side of said vaporizing chamber whereby a suction is created past the means in said chamber and in said inlet to thereby cooperate with the means deflecting a part of the flame to insure vaporization of the oil, the suction in said outlet withdrawing oil vapor from said vaporizing chamber to said mixing nozzle for mixture with air flowing through the mixing nozzle, the oil and vapor mixture being ignited in said burner nozzle, and means for regulating the air supply to said mixing nozzle to thereby regulate the withdrawal of oil vapor from said vaporizing chamber and control the ignition of the mixture in said burner nozzle.

9. An oil burner including a burner nozzle embodying a pocket having an opening in the wall thereof, a mixing nozzle discharging into said burner nozzle, casing means providing an oil vaporizing chamber in which a supply of oil is

maintained, said chamber being located below said mixing nozzle to prevent gravity flow of oil from said chamber to said burner nozzle, a rib in said chamber and projecting into the oil therein and dividing the chamber into an inlet and an outlet side, said casing means including an outlet leading from the outlet side of said vaporizing chamber to said mixing nozzle and an inlet leading from the inlet side of said vaporizing chamber to the opening in the wall of said pocket whereby a part of the flame in said burner nozzle is deflected through said opening and said inlet into the inlet side of said vaporizing chamber to effect vaporization of the oil therein, means supplying air under pressure to said mixing nozzle to create a suction in said outlet and the outlet side of said vaporizing chamber whereby a suction is created past the rib in said chamber and in said inlet whereby a flame deflected through the opening in the wall of said pocket is drawn toward the oil in said vaporizing chamber to insure vaporization of the oil therein, the suction in said outlet withdrawing oil vapor from said vaporizing chamber to said mixing nozzle for mixture with air flowing through the mixing nozzle, the oil and vapor mixture being ignited in said burner nozzle, and means for regulating the air supply to said mixing nozzle to thereby regulate the withdrawal of oil vapor from said vaporizing chamber and control the ignition of the mixture in said burner nozzle.

10. An oil burner including a burner nozzle, a mixing nozzle discharging into said burner nozzle, casing means providing an oil vaporizing chamber, said chamber being located below said mixing nozzle to prevent gravity flow of oil from said chamber to said burner nozzle, means for maintaining a predetermined level of oil in said vaporizing chamber, means in said chamber and projecting into the oil therein and dividing the chamber into an inlet and an outlet side, said casing means including an outlet leading from the outlet side of said vaporizing chamber to said mixing nozzle and an inlet leading from the inlet side of said vaporizing chamber and through which a part of the flame in said burner nozzle is deflected toward said vaporizing chamber to heat the oil therein and effect vaporization of the oil, means supplying air under pressure to said mixing nozzle to create a suction in said outlet whereby oil vapor may be drawn past the means in said chamber to said mixing nozzle for mixture with air flowing through said mixing nozzle, the air and vapor mixture being ignited in said burner nozzle, and means for regulating the air supply to said mixing nozzle to thereby regulate the withdrawal of oil vapor from said vaporizing chamber and control the ignition of the mixture in said burner nozzle.

11. An oil burner including a burner nozzle, a mixing nozzle discharging into said burner nozzle, casing means providing an oil vaporizing chamber, said chamber being located below said mixing nozzle to prevent gravity flow of oil from said chamber to said burner nozzle, a member communicating with said oil vaporizing chamber and having means therein for maintaining a predetermined level of oil in said vaporizing chamber, means for equalizing the pressure in said chamber and said member, means in said chamber and projecting into the oil therein and dividing the chamber into an inlet and an outlet side, said casing means including an outlet leading from the outlet side of said vaporizing chamber to said mixing nozzle and an inlet leading from the inlet side of said vaporizing chamber and through which a part of the flame in said burner is deflected toward said vaporizing chamber to heat the oil therein and effect vaporization of the oil, means supplying air under pressure to said mixing nozzle to create a suction in said outlet whereby oil vapor may be drawn past the means in said chamber to said mixing nozzle for mixture with air flowing through said mixing nozzle, the air and vapor mixture being ignited in said burner nozzle, and means for regulating the air supply to said mixing nozzle to thereby regulate the withdrawal of oil vapor from said vaporizing chamber and control the ignition of the mixture in said burner nozzle.

12. An oil burner including a burner nozzle, a mixing nozzle discharging into said burner nozzle, casing means providing an oil vaporizing chamber, said chamber being located below said mixing nozzle to prevent gravity flow of oil from said chamber to said burner nozzle, said casing means including an outlet directed to said mixing nozzle and an inlet through which a part of the flame in said burner nozzle is deflected toward said vaporizing chamber to heat oil therein and effect vaporization of the oil, means supplying air under pressure to said mixing nozzle to create a suction in said outlet to withdraw oil vapor from said chamber for mixing with air flowing through the mixture nozzle, the air and vapor mixture being ignited in said burner nozzle whereby said burner nozzle is heated, said burner nozzle extending across said outlet whereby oil vapor flowing through said outlet contacts with the heated burner nozzle to be heated thereby prior to mixture with the air, and means for regulating the air supply to said mixing nozzle to thereby regulate the withdrawal of oil vapor from said vaporizing chamber and control the ignition of the mixture in said burner nozzle.

13. An oil burner including a burner nozzle, a mixing nozzle discharging into said burner nozzle, casing means providing an oil vaporizing chamber, said chamber being located below said mixing nozzle to prevent gravity flow of oil from said chamber to said burner nozzle, said casing means including an outlet directed into said mixing nozzle and an inlet arranged adjacent said burner nozzle, means for deflecting a part of the flame in said burner nozzle into said inlet and toward the vaporizing chamber to heat the oil in said chamber and effect vaporization of the oil, means supplying air under pressure to said mixing nozzle to create a suction in said outlet to withdraw oil vapor from said chamber for mixture with air flowing through the mixing nozzle, the air and vapor mixture being ignited in said burner nozzle whereby said burner nozzle is heated, said burner nozzle extending across said outlet whereby oil vapor flowing through said outlet contacts with the heated burner nozzle to be heated thereby prior to mixture with the air, and means for regulating the air supply to said mixing nozzle to thereby regulate the withdrawal of oil vapor from said vaporizing chamber and control the ignition of the mixture in said burner nozzle.

14. An oil burner including a burner nozzle, a mixing nozzle discharging into said burner nozzle, casing means including a passage having an oil vaporizing chamber therein and an outlet directed to the mixing nozzle and an inlet through which a part of the flame in the burner nozzle is deflected toward said vaporizing chamber to heat oil therein and effect vaporization of

the oil, the chamber being located below the mixing nozzle to prevent gravity flow of oil from said chamber to the burner nozzle, means supplying air under pressure to the mixing nozzle to create a suction in the outlet and withdraw oil vapor from the chamber for mixture with air flowing through the mixing nozzle, and means controlling air flow to said mixing nozzle, the withdrawal of oil vapor from said vaporizing chamber and the combustion of the air and vapor mixture in said burner nozzle being controlled by the air flow to said mixing nozzle.

15. An oil burner including a burner nozzle, a mixing nozzle discharging into said burner nozzle, casing means including a passage having an oil vaporizing chamber therein and an outlet directed to the mixing nozzle and an inlet arranged adjacent the inlet of the burner nozzle, means for deflecting a part of the flame in the burner nozzle into the inlet of said passage and toward the vaporizing chamber to heat oil in said chamber and effect vaporization of the oil, the chamber being located below the mixing nozzle to prevent gravity flow of oil from said chamber to the burner nozzle, means supplying air under pressure to the mixing nozzle to create a suction in the outlet and withdraw oil vapor from the chamber for mixture with air flowing through the mixing nozzle, and means controlling air flow to said mixing nozzle, the withdrawal of oil vapor from said vaporizing chamber and the combustion of the air and vapor mixture in said burner nozzle being controlled by the air flow to said mixing nozzle.

16. An oil burner including a burner nozzle having a pocket at the inlet end thereof, a mixing nozzle discharging into the burner nozzle, casing means including a passage having an oil vaporizing chamber therein and an outlet directed to the mixing nozzle and an inlet communicating with the pocket in the burner nozzle whereby a part of the flame in the pocket is deflected into the inlet of said passage and toward the vaporizing chamber to heat oil therein and effect vaporization of the oil, the chamber being located below the mixing nozzle to prevent gravity flow of oil from said chamber to the burner nozzle, means supplying air under pressure to the mixing nozzle to create a suction in the outlet and withdraw oil vapor from the chamber for mixture with air flowing through the mixing nozzle, and means controlling air flow to said mixing nozzle, the withdrawal of oil vapor from said vaporizing chamber and the combustion of the air and vapor mixture in said burner nozzle being controlled by the air flow to said mixing nozzle.

17. An oil burner including a burner nozzle embodying a pocket having an opening in the wall thereof, said pocket being located adjacent the inlet end of said burner nozzle, a mixing nozzle discharging into the burner nozzle, casing means including a passage having an oil vaporizing chamber therein, and an outlet directed to the mixing nozzle and an inlet communicating with the opening in the wall of said pocket whereby a part of the flame in said pocket is deflected through the opening into the inlet of said passage and toward the vaporizing chamber to heat oil therein and effect vaporization of the oil, the chamber being located below the mixing nozzle to prevent gravity flow of oil from said chamber to the burner nozzle, means supplying air under pressure to the mixing nozzle to create a suction in the outlet and withdraw oil vapor from the chamber for mixture with the air flowing through the mixing nozzle, and means controlling air flow to said mixing nozzle, the withdrawal of oil vapor from said vaporizing chamber and the combustion of the air and vapor mixture in said burner nozzle being controlled by the air flow to said mixing nozzle.

18. An oil burner including a burner nozzle embodying a pocket having a shoulder therein, said pocket being located adjacent the inlet end of said burner nozzle, a mixing nozzle discharging into the burner nozzle, casing means including a passage having an oil vaporizing chamber therein and an outlet directed to the mixing nozzle and an inlet communicating with said pocket, an oil and air mixture admitted from the mixing nozzle being ignited in the burner nozzle and striking the shoulder in the pocket to create a pressure therein whereby a part of the flame is directed through the inlet of said passage and toward the vaporizing chamber to heat oil therein and effect vaporization of the oil, the chamber being located below the mixing nozzle to prevent gravity flow of oil from said chamber to the burner nozzle, means supplying air under pressure to the mixing nozzle to create a suction in the outlet and withdraw oil vapor from the chamber for mixture with air flowing through the mixing nozzle, and means controlling air flow to said mixing nozzle, the withdrawal of oil vapor from said vaporizing chamber and the combustion of the air and vapor mixture in said burner nozzle being controlled by the air flow to said mixing nozzle.

19. An oil burner including a tapered burner nozzle and having a pocket at the inlet end thereof tapered oppositely to the taper of the outlet of the burner nozzle, a mixing nozzle discharging into said burner nozzle, said mixing nozzle having a vapor inlet and an air passage leading past said vapor inlet whereby air flowing through said passage creates a suction in said vapor inlet, casing means including a passage having an oil vaporizing chamber therein and an outlet leading to the vapor inlet in said mixing nozzle and having an inlet communicating with said pocket whereby a part of the flame in said pocket is deflected into the inlet of said passage and toward the vaporizing chamber to heat the oil therein and effect vaporization of the oil, the chamber being located below the mixing nozzle to prevent gravity flow of oil from said chamber to the burner nozzle, means supplying air under pressure to the air passage in said mixing nozzle whereby air flowing through said air passage withdraws oil vapor from the vaporizing chamber to be mixed with the air flowing through said air passage, and means controlling air flow to said mixing nozzle, the withdrawal of oil vapor from said vaporizing chamber and the combustion of the air and vapor mixture in said burner nozzle being controlled by the air flow to the air passage in said mixing nozzle.

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