April 7, 1925. 1,532,733

F. A. DAECHSEL.

OIL BURNING APPARATUS

Filed Oct. 18, 1923 2 Sheets-Sheet 1

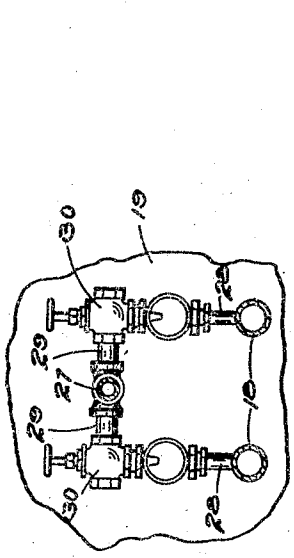


FIG. 4.

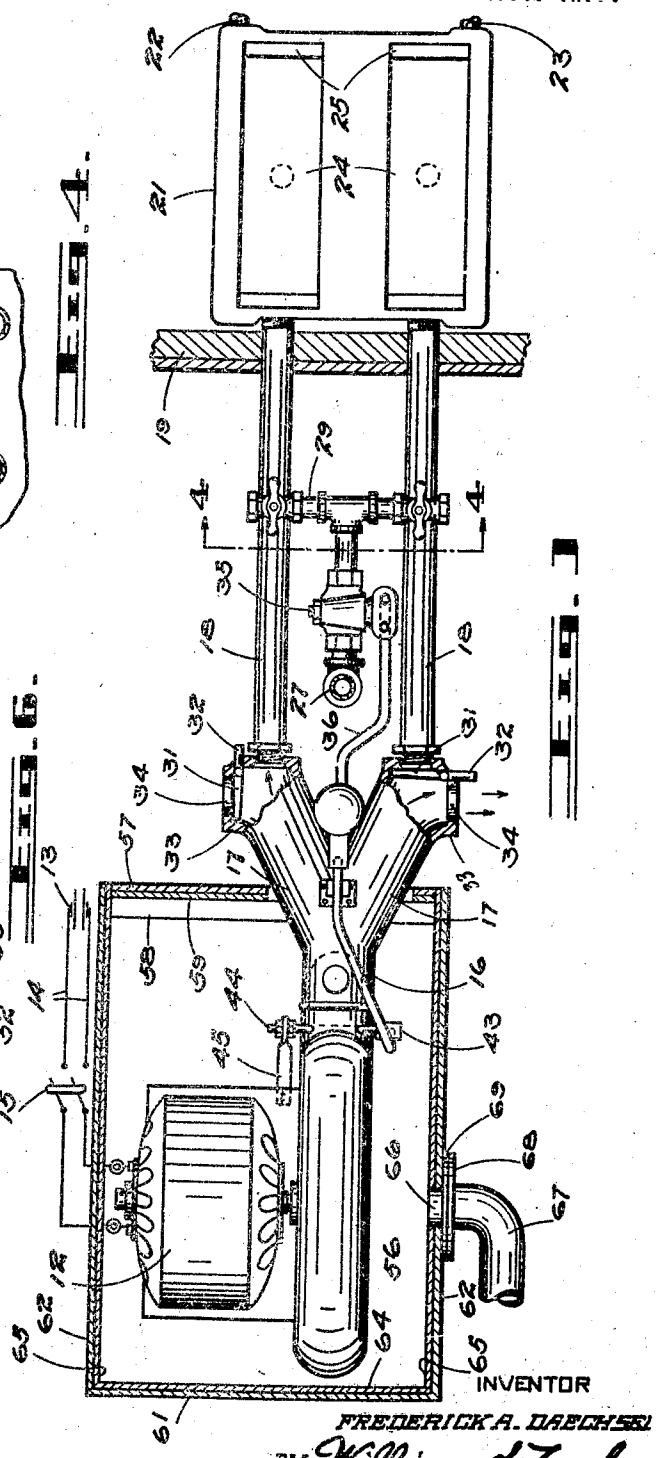


FIG. 1.

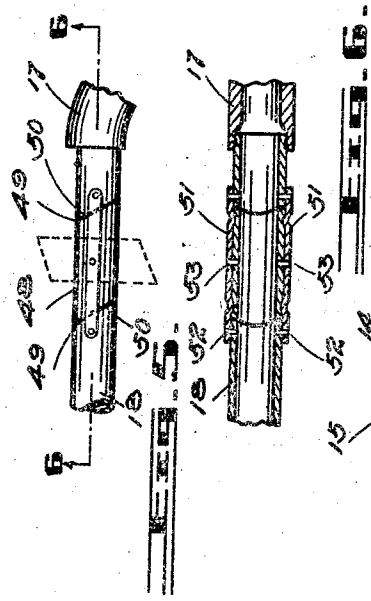


FIG. 6.

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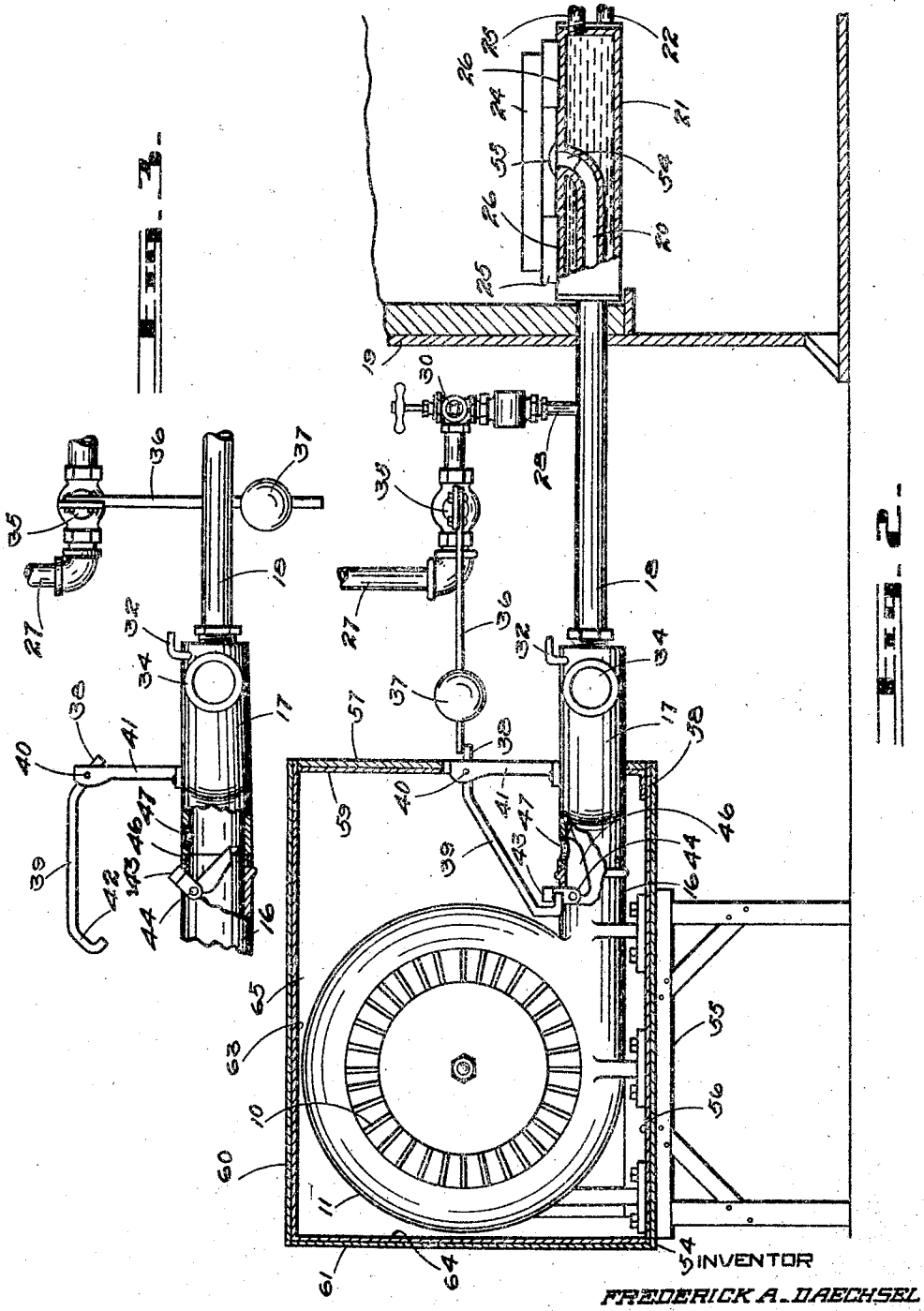
ATTORNEY

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Patented Apr. 7, 1925.

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UNITED STATES PATENT OFFICE.

FREDERICK A. DAECHSEL, OF OTTAWA, ONTARIO, CANADA.

OIL-BURNING APPARATUS.

Application filed October 18, 1923. Serial No. 669,355.

To all whom it may concern:

Be it known that I, FREDERICK A. DAECHSEL, a citizen of the Dominion of Canada, and resident of Ottawa, in the county of Carleton and Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Oil-Burning Apparatus, of which the following is a specification.

This invention has relation to certain new and useful improvements in an oil burning apparatus and has for its primary object the provision of an apparatus which will be of simple and improved construction and operation and arranged with a double burner and automatic cut off means operable automatically in case of cutting off of the air supply, so as to cut off the supply of oil and thereby discontinue operation of the complete apparatus.

The invention has for another object the provision of an oil burning apparatus of the character stated which will be constructed in such a manner that the burner nozzle extends through the water chamber within the casing of the stove or furnace to which the apparatus is applied and discharges on one face of the water chamber, means being carried on the water chamber for deflecting the flame and assuring a thorough heating of the contents of the water chamber during operation of the oil burning apparatus.

A further object of the invention resides in the provision of an oil burning apparatus of the character set forth including an air supply pipe extended from a fan casing having enclosed therein the blower fan, the air supply pipe being forked and having air conducting extension pipes projecting from the branches thereof and extending into the stove or furnace for connection with the burner nozzles of the apparatus suitable valves being employed for controlling the passage of the air into the several air conducting pipes, the fuel oil being delivered to the air conducting pipes at a point exteriorly of the stove or furnace, so that the fuel oil will be vaporized as it is carried into the burner nozzles with the air passing through the air conducting pipes and into the burner nozzles.

The invention has for a still further object the provision of an oil burner apparatus of the character set forth including a mechanically operated automatic cut off for the fuel oil supply and which is operated whenever operation of the blower fan is discontinued.

With the foregoing and other objects in view, as will appear as the description proceeds, the invention consists in the novel construction, combination and arrangement of co-operating elements as hereinafter more specifically set forth, claimed and shown in the accompanying drawings forming a part of the present application, in which:

Fig. 1 is a plan view of the apparatus, showing the same applied to the furnace or stove, of conventional form, parts being broken away on this view for the sake of clearness.

Fig. 2 is a side elevation of the apparatus as shown in Fig. 1.

Fig. 3 is a fragmentary detail elevation, showing the automatic cut off in its operated position.

Fig. 4 is a transverse vertical section substantially on the plane of line 4—4 of Fig. 1, looking in the direction indicated by the arrows.

Fig. 5 is a fragmentary detail elevation, showing a modified form of valve which may be employed in the air conducting pipes.

Fig. 6 is a detail section substantially on the plane of line 6—6 of Fig. 5, looking in the direction indicated by the arrows.

Referring more in detail to the drawings in which similar reference characters designate corresponding parts throughout the several views, it will be noted that the apparatus includes a blower fan 10 enclosed in a blower fan casing 11 and operable by an electric motor 12, as shown in the drawings, or by other suitable means. The electric motor 12 is connected with a suitable source of electric energy 13, by the current conducting wires 14 and an appropriate control swing 15 is located in the path of the current conducting wires 14. This may be readily understood by referring to Fig. 1 of the drawings.

The air discharge pipe 16 from the fan casing 11 is forked into diverging branches 17, to the ends of which are connected the air conducting pipes 18, which are of smaller

diameter than the air discharge pipe 16 and its branches 17, as shown clearly in Figs. 1, 2 and 3. The air conducting pipes 18 are preferably positioned parallel to one another and threaded into the ends of the branches 17, as shown in the drawings. It will also be seen from Figs. 1 and 2 that the air conducting pipes 18 are extended through the wall 19 of a furnace or stove to which the apparatus is applied. After entering the furnace or stove casing, the air conducting pipes 18 are threaded to or otherwise connected with the burner nozzles 20 which extend through a water chamber 21 located in the furnace or stove, as shown in Figs. 1 and 2 and having connected therewith the water supply pipe 22 and the water discharge pipe 23. The burner nozzles 20 extend through a portion of the water chamber 21 from the side of the latter where they connect with the air conducting pipes 18 and each burner nozzle 20 has a curved discharge end opening onto one face of the water chamber 21, preferably the upper face thereof, as shown clearly in Fig. 2. Flame deflecting and heat retaining members 24 are extended over the discharge ends of the burner nozzles 20 and spaced from the same, the ends of the flame deflecting and heat retaining members 24 being supported on the heat retaining members 25 extended at right angles to the flame deflecting and heat retaining members 24 and resting in the recesses or seats 26 provided for this purpose in the upper face of the water chamber 21. It will be seen that by providing the flame deflecting and heat retaining members 25, a thorough and rapid heating of the contents of the water chamber 21 will be assured. A liquid fuel supply pipe 27 is employed in the construction of the apparatus with reduced portions 28 thereof delivering the liquid fuel to the air conducting pipes 18, exteriorly of the furnace or stove. The reduced portions 28 connect with the branches 29 of the liquid fuel supply pipe 27 and sight feed regulating valves 30 are interposed between the reduced portions 28 and the branches 29 of the liquid fuel supply pipe 27, so that feeding of the liquid fuel to the air conducting pipes 18 may be properly regulated at all times to assure a highly combustible mixture of the liquid fuel and the air. The complete mixture will be thoroughly vaporized as it passes through the burner nozzles 20 and previous to discharge of the mixture from the burner nozzles 20.

In order that the passage of the air into either of the air conducting pipes 18 may be readily controlled, the shut off valves 31 are employed at the connection of the air conducting pipes 16 with the branches 17 of the air discharge pipe 16. The shut off valves 31 are in the form of dises which may be readily operated by the valve stems 32 projecting through the branches 17, as shown in Figs. 1 to 3, inclusive. The branches 17 have outwardly turned portions 33 at right angles to the ends thereof and provided with discharge openings 34 which may be closed by the shut off valves 31, as shown in Fig. 1, when the air is permitted to enter the air conducting pipes 18. When the shut off valves 31 are positioned against the ends of the air conducting pipes 18, however, to close the latter, the discharge openings 34 are uncovered and the air from the air discharge pipe 16 is discharged to the surrounding atmosphere. This should be clearly understood by referring to Fig. 1, which shows one of the shut off valves 31 in each of the positions stated. It is therefore evident that either one or both of the burner nozzles 20 may be employed, as desired, by proper regulation of the shut off valves 31 and the sight feed controlling valves 30.

Located in the lower portion of the liquid fuel supply pipe 27 is a cut off valve 35 having an operating rod 36 extended from the head of the cut off valve 35. A weight 37 is adjustably mounted on the operating rod 36 so as to cause actuation of the operating rod 36 and automatic closing of the cut off valve 35, whenever the operating rod 36 is released from the horizontal position shown in the drawings. The free end of the operating rod 36 is normally supported on the short extended end 38 of the lever 39. By referring to Figs. 1 and 2 it will be seen that the lever 39 is in the form of a bar having its short upper end 38 mounted on the pivot pin 40 carried in the upstanding supporting bracket 41, which latter is mounted on the bifurcated portion of the air supply pipe 16. The lever 39 is then extended at an angle downwardly and toward the fan casing 11. The angularly bent lower end 42 of the lever 39 is normally engaged beneath the catch member 43 carried on the horizontal valve rod 44. The horizontal valve rod 44 extends through the upper portion of the air supply pipe 16 at a point near the fan casing 11 and is rotatably mounted in a bracket arm 45 located at one side of the fan casing 11 and air supply pipe 16, as shown clearly in Fig. 1. A transversely curved and longitudinally tapering plate valve 46, in the form of a conventional scoop, is carried on the valve rod 44 and when in raised or closed position within the air supply pipe 16 covers the air escape opening 47 in the upper side of the air supply 16. The lever 39 and the valve operating rod 36 are in set position, as shown in the drawings, when the valve 46 is closed. This valve 46 is retained in closed position by the force of the air passing through the air supply pipe 16 from the fan casing 11 to the branches 17 of the air supply pipe 16

and then through the air conducting pipes 18. Should operation of the blower fan 10 be discontinued from any cause whatsoever, the pressure of air on the under or concave side of the valve 46 would decrease, thereby permitting the valve 46 to swing downwardly on its pivot pin 44 to open position within the air supply pipe 16, uncovering the air escape opening 47 and permitting the air to pass out of the air supply pipe 16 to the surrounding atmosphere, by way of the air escape opening 47. This downward swinging movement of the valve 46 is caused by the atmospheric pressure on the outer or upper side thereof overcoming the decreased pressure on the under or concave side of the valve 46 and the movement of the valve 46 results in withdrawing of the latch member 43 from the angularly extended lower end 42 of the lever 39 and releasing of the latter. As soon as the lever 39 is released, the weight 37 will cause operation of the lever 39 and downward swinging movement of the valve operating rod 36 to close the cut off valve 35, thereby discontinuing the flow of liquid fuel through the liquid fuel supply pipe 27 to the air conducting pipes 18. This result is automatic discontinuance of operation of the complete apparatus, owing to complete cutting off of the supplies of air and liquid fuel. This automatic cutting off of the supplies of air and liquid fuel is desirable, as something may happen to the blower fan 10 even though the remainder of the electrically controlled parts of the apparatus may be operating properly and the circuit may be complete through the blower fan operating mechanism.

In Figs. 5 and 6 a modified form of valve is disclosed which may be substituted for the valves 31 with a slight alteration in the construction and arrangement of the branches 17 of the air supply pipe 16 and the air conducting pipes 18. In this modified form, the valves 48 are located in the air conducting pipes 17 and consist of pipe sections having their opposite ends cut on an angle and parallel to one another, rubber closure members 49 being carried on the opposite ends of the valves 48 so as to engage the angularly cut walls 50 of the main sections of the air conducting pipes 18 when the valves 48 are closed in alignment with the main sections of the air conducting pipes so as to complete the same, as shown clearly in Figs. 5 and 6. The valves 48 are pivotally mounted between the supporting strips 51 extended longitudinally of the air conducting pipes 18 and having their opposite ends secured thereto by rivets 52 or other suitable means. Pivot members 53 extend through the central portions of the strips 51 and through the central portions of the valves 48, so that the latter may be readily moved to closed or open position, as desired. When moved to open position, the valves 48 extend at an angle to the main sections of the air conducting pipes 18 and the opposite ends of the valves 48 as well as the ends of the main sections of the air conducting pipes 18 (between which the valves 48 are positioned) are open to the atmosphere, thereby permitting escape of the air supplied to the air conducting pipes 18 and preventing the usual feeding of the air under pressure to the burner nozzles 20 of the apparatus. The open position of the valve 48 shown in Fig. 5 is indicated by dotted lines and this may be readily understood by referring to this view.

From Figs. 1 and 2 it will be seen that a casing is provided for enclosing the blower fan 10, the lower fan casing 11, the motor 12 and a portion of the branches 17, as well as the main part of the air discharge pipe 16. This casing includes a bottom member 54 resting on the stand 55 and having an insulating bottom plate 56 on its upper face, composed of asbestos or other suitable material. The front or forward plate 57 of the casing has its lower edge 58 turned and secured upon the bottom plate 54, as shown clearly in the drawings. A lining or inner plate 59 of asbestos or the like is carried on the inner face of the front or forward plate 57 and suitable openings are provided in the plates 57 and 59 to accommodate the branches 17 of the air discharge pipe 16 and the upstanding supporting bracket 41. This may also be readily understood by referring to the drawings. The top plate 60, rear plate 61 and side plates 62 are preferably formed together so that they may be readily mounted on the bottom plate 54 and the front or forward plate 57 or removed therefrom, as desired. It is also to be understood that suitable lining plates 63, 64 and 65 are provided for the top plate 60, the rear plate 61 and the side plates 62, respectively. Registering openings 66 are provided in one of the side plates 60 and its lining plate 65, opposite the open side of the blower fan casing 11 and a turned pipe 67 is employed for obtaining air from the exterior of the building in which the apparatus is located. The turned end of the pipe 67 has an annular outstanding flange 68 with an insulating washer 69 secured to the face thereof for engagement with the outer face of the side plate 62, around the opening 66 thereof. It is, therefore, evident that the efficiency of the apparatus is considerably increased by providing the casing just described and obtaining the air for the blower fan 10 from the exterior of the building instead of simply depending upon gathering air from immediately around the blower fan casing 11 for operation of the apparatus. The unlimited supply of fuel and fresh air for use

as part of the fuel assures the highest degree of efficiency and proper and thorough combustion of the mixture of air and gas or vaporized oil.

It is believed the completed construction and operation of the apparatus may now be apparent from the foregoing paragraphs taken in connection with the accompanying drawings without further detailed description. It may be briefly stated, however, that the valve 46, lever 39 and valve 35 with the valve operating rod 36, may be readily set and the valves 30 and 31 regulated to cause the proper feeding of the air under pressure and the liquid fuel to the air conducting pipes 18 and thereby assure feeding of the fuel in vaporized form to the burner nozzles 20 with the mixture of liquid fuel and air properly proportioned and vaporized to assure ready combustion of the mixture as it is discharged from the burner nozzles 20. One or more of the burner nozzles 20 may be employed, by proper manipulation of the valves 30 and 31. Continued operation of the complete apparatus is assured until release of the valve 46 when operation of the blower fan 10 is discontinued either purposely or accidentally and the supplies of air and liquid fuel thereby automatically cut off. It is also apparent that when the apparatus is in operation, the contents of the water chamber 21 will be constantly heated and the burner nozzles 20 will be, in turn, kept to the proper temperature to assure thorough vaporizing of the fuel as the fuel mixture passes through the burner nozzles 20. Furthermore, the complete apparatus may be employed in connection with various types of furnaces, stoves and the like. When the modified form of valves 48 is substituted for the valves 31, the valves 48 may be operated in the same manner as described in connection with the valves 31.

The burner nozzles 20 may be closed by removable plugs 54 conforming to the curved discharge ends of the burner nozzles 20 and having heads 55 resting on the upper face of the water chamber 21 as shown in Fig. 2 of the drawings. This may be desirable when discontinuing operation of the oil burning apparatus and permitting the water chamber 21 to serve as a grate for supporting coal or other fuel employed in the furnace or stove.

While the preferred embodiment of the invention has been disclosed, it is to be understood that minor changes in the details of construction, combination and arrangement of co-operating elements may be resorted to within the scope of what is claimed without departing from the spirit of the invention.

What I claim as new is:

1. In an oil burning apparatus, a blower casing, a blower therein, a forked air discharge pipe from said casing, air conducting pipes communicating therewith and of less diameter than said pipe and its branches, a water chamber, burner nozzles therein on said pipes, flame-deflecting and heat-retaining means extended over said nozzles, and out-turned portions on said branches, with means for controlling the admission of air into said conducting pipes.

2. An oil burning apparatus including a chamber mounted in an enclosure; burner nozzles extended through said chamber and opening on one face thereof; heat deflecting and retaining members mounted on said chamber opposite said burner nozzles; heat retaining members supporting said heat deflecting and retaining members; liquid supply and discharge pipes connected with said chamber; air conducting pipes connected with said burner nozzles; means for forcing air through said air conducting pipes; means for closing said air conducting pipes independently and permitting escape of the air to the surrounding atmosphere; means for feeding liquid fuel to the said air conducting pipes at an appropriate point with respect to said enclosures; means for regulating the feeding of the liquid fuel to said air conducting pipes; and an air supply pipe connected with said air conducting pipes and having discharge valve openings adjacent the air conducting pipes; the means for closing the air conducting pipes comprising valves which are adapted when in open position to cover the discharge valve openings of the air supply pipe and permit free passage of the air into said air conducting pipes; the last mentioned valves serving when in closed position to cover the ends of the air conducting pipes and permit escape of the air from the air supply pipe to the surrounding atmosphere by way of said discharge valve openings.

3. An oil burning apparatus including a closed liquid chamber mounted in an enclosure; burner nozzles extended through said closed liquid chamber; heat retaining members mounted on said closed liquid chamber with certain of said members opposite the discharge end of said burner nozzles; supply and discharge pipes connected with said closed liquid chamber; air conducting pipes connecting said burner nozzles; an air supply pipe having extended portions connecting with said air conducting pipes; means for controlling passage of air into said air conducting pipes independently; means for forcing air into the air supply pipe; means for feeding the liquid fuel to said air conducting pipes; means for regulating the feed for the liquid to said air conducting pipes; the air supply pipe having discharge valve openings adjacent the air conducting pipes; the means for closing the air conducting pipes

comprising valves which are adapted when in open position to cover the discharge valve openings of the air supply pipe and permit free passage of the air into said air conducting pipes; the last mentioned valves serving when in closed position to cover the ends of the air conducting pipes and permit escape of the air from the air supply pipe to the surrounding atmosphere by way of said air escape valve openings.

In testimony whereof, I affix my signature.

FREDERICK A. DAECHSEL.