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OIL BURNER AIR DIFFUSER

Charles G. Sigwald, Minneapolis, Minn., assignor
to Oil-Electric Engineering Corporation, Min-
neapolis, Minn., a corporation of Delaware

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4 Claims. (Cl. 158-76)

This invention relates to an oil burner of the type used to supply the heat in furnaces such as used for heating residences and other buildings. As is well known, such oil burners are now being installed in large numbers in connection with furnaces originally designed to burn solid fuel.

It is an object of this invention to provide a simple, compact and extremely reliable burner adapted to be used for heating a furnace.

It is another object of the invention to provide an oil burner comprising a novel and very efficient air diffusing means.

It is a further object of the invention to provide an oil burner comprising a conduit through which air is blown, an oil pipe disposed in said conduit and terminating in a nozzle adjacent the end of said conduit, together with an air diffusing means comprising a ring held in said conduit and having helical ribs surrounding said nozzle, the outer end of said ring being contracted adjacent the end of said conduit.

It is also an object of the invention to provide an oil burner comprising a conduit through which air is blown by a fan, an oil supply pipe disposed substantially axially of said conduit and terminating in a discharge nozzle adjacent the end of said conduit, a pair of electrodes disposed adjacent said nozzle, and a cylindrical ring substantially fitting in said conduit and having helical ribs surrounding said nozzle and electrodes, said ring converging at its outer end and the inner surfaces of said ribs sloping toward the outer end of said conduit.

These and other objects and advantages of the invention will be fully set forth in the following description made in connection with the accompanying drawing, in which like reference characters refer to similar parts throughout the several views and in which:—

Fig. 1 is a view partly in plan and partly in horizontal section of the essential parts of an oil burner;

Fig. 2 is a vertical section taken substantially on line 2—2 of Fig. 1 as indicated by the arrows;

Fig. 3 is a vertical section taken on line 3—3 of Fig. 1 as indicated by the arrows;

Fig. 4 is an end view as indicated by line 4—4 looking in the direction of the arrows; and

Fig. 5 is a vertical section of an air diffusing element taken substantially on line 2—2 of Fig. 1.

This application is a division of my copending application S. N. 392,582, filed Sept. 14, 1929.

Referring to the drawing, an oil burner is

shown comprising a frame member including a fan housing 10 within which is disposed a suitable fan (not shown), said frame having a shelf 11 extending at one side of the fan housing 10. A conduit 12 leads substantially tangentially from the lower front portion of the fan housing 10, said conduit having an outer open end. A motor 13 is supported upon the shelf 11 of the frame and has its armature shaft connected to the fan in fan housing 10 and also extending to the driving shaft of the pump 14 adapted to supply oil to the oil burner. The frame is supported upon a plurality of screws 15 shown as three in number, which are received in legs or feet 16, nuts 17 being disposed on said screws at the top of the feet 16. An oil supply pipe 18 extends into conduit 12 at one side thereof and then extends at right angles and is disposed substantially axially with the conduit 12. Pipe 18 is shown as having a right and left coupling 19 thereon and is supported in a pair of brackets 20 which are cast integral with conduit 12 and have a semi-cylindrical groove in the sides thereof, in which pipe 18 is disposed. Cap members 21 are also provided with semi-cylindrical grooves fitting over pipe 18, said cap members being bolted to the brackets 20 by the bolts 22. Conduit 12 is shown as having a removable section 12a at the side closing an opening through which access may be had to the caps 21 and coupling 19.

A transformer 23 is mounted upon the plate or bracket 24 secured on top of conduit 12 and a pair of conductors 25 respectively lead from the transformer 23 to a pair of electrodes 26, the same being mounted in tubes 27 carried in a cap bracket 28 secured to the tube 18. An oil discharging nozzle 29 is mounted on the end of pipe 18, the end thereof being substantially in the same plane as the ends of electrodes 20 and both being a slight distance within the end of conduit 12.

An air diffusing member 30 is mounted in conduit 12 adjacent the end thereof and the same comprises a cylindrical ring having an outer diameter substantially fitting within conduit 12 and held therein by one or more set screws 31 extending through the wall of conduit 12. The member 30 has its outer end converging as shown in 30a so that its outer end is of smaller diameter than its inner end. Said member also has a plurality of helical ribs 30b extending about its inner side as shown in Figs. 1, 2 and 5 and the inner sides of these ribs incline outwardly or toward the open end of con-

duit 12 as clearly shown in Fig. 5 ribs 30b extend transversely to the axis of conduit 12 and at a small angle to a plane perpendicular to said axis. The ribs 30b at the upper part of member 30 have grooves 30c cut therein to accommodate the tubes 27.

In operation motor 13 will be driven and the fan in housing 10 and pump 14 will be operated. Oil will be forced through pipe 18 and discharged under considerable pressure from nozzle 29. Nozzle 29 is of special construction so that oil is sprayed outwardly in finely divided condition through the aperture in said nozzle. Current is supplied to transformer 23 when the burner is initially operated, so that sparks pass between the electrodes 26 and the mixture of oil and air at the end of conduit 12 is ignited. The air passing through conduit 12 must pass through member 30. The air is given a whirling motion by the ribs 30b and is simultaneously directed inwardly toward nozzle 29 by these ribs. This inward direction is given by the outwardly inclined sides of ribs 30b as well as by the inturned or contracted end of member 30. The air thus whirling about is effectively directed into the spray of oil discharged from nozzle 29 and a very effective mixing of the oil and air is secured. It will also be noted that the circle defined by the inner edges of ribs 30b is smaller than the circle defined by the inner edge of the contracted portion 30a.

From the above description it is seen that I have provided a simple and very efficient structure of burner comprising the novel air mixer or diffuser 30. The member 30 can be readily made and is easily and quickly installed in conduit 12. It acts to very efficiently diffuse the air and a combustible mixture is formed which is readily ignited. A greatly improved combustion result has been obtained by the use of mixer 30. The same has been amply demonstrated in actual practice, and found to be very successful and efficient.

It will, of course, be understood that various changes may be made in the form, details, arrangement and proportions of the parts, without departing from the scope of my invention, which generally stated, consists in a device capable of carrying out the objects above set

forth in the parts and combinations of parts disclosed and defined in the appended claims.

What is claimed is:—

1. The combination in an oil burner having an air discharge conduit and an oil discharge pipe of a much smaller diameter extending axially of said conduit and a discharge nozzle at the end of said conduit and in close proximity to the end of said conduit, said conduit constituting the outer end of said burner, of an air diffuser comprising a cylindrical shell fitting in and held in said conduit, said shell having helical ribs extending inwardly therefrom and at a small angle to a plane at right angles to the axis of said conduit, said ribs surrounding said pipe and their inner edges defining an opening through which said pipe passes, said edges being spaced an appreciable distance from said pipe whereby air forced through said conduit is given a whirling motion and moves toward the center of said conduit to pass through said opening.

2. The structure set forth in claim 1, the inner sides of said ribs inclining toward said end of said conduit to direct said air toward the center of said conduit.

3. The combination in an oil burner having an air discharge conduit and an oil discharge pipe of a much smaller diameter extending axially of said conduit and a discharge nozzle at the end of said pipe and in close proximity to the end of said conduit, said conduit constituting the outer end of said burner, of an air diffuser comprising a cylindrical shell fitting in and held in said conduit, said shell having a contracted outer end and having helical ribs extending inwardly and disposed in planes making a small angle with a plane at right angles to the axis of said conduit, the inner edges of said ribs defining an opening larger than said pipe through which said pipe centrally passes whereby air forced through said conduit is given a whirling motion and moves toward the center of said conduit to pass through said opening.

4. The structure set forth in claim 3, the inner sides of said ribs sloping toward the end of said conduit thus assisting in directing the air toward the center of said conduit.

CHARLES G. SIGWALD.

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