Nov. 22, 1938. R. M. VIDALIE 2,137,960

OIL BURNER

Filed April 1, 1936

Fig. 1.

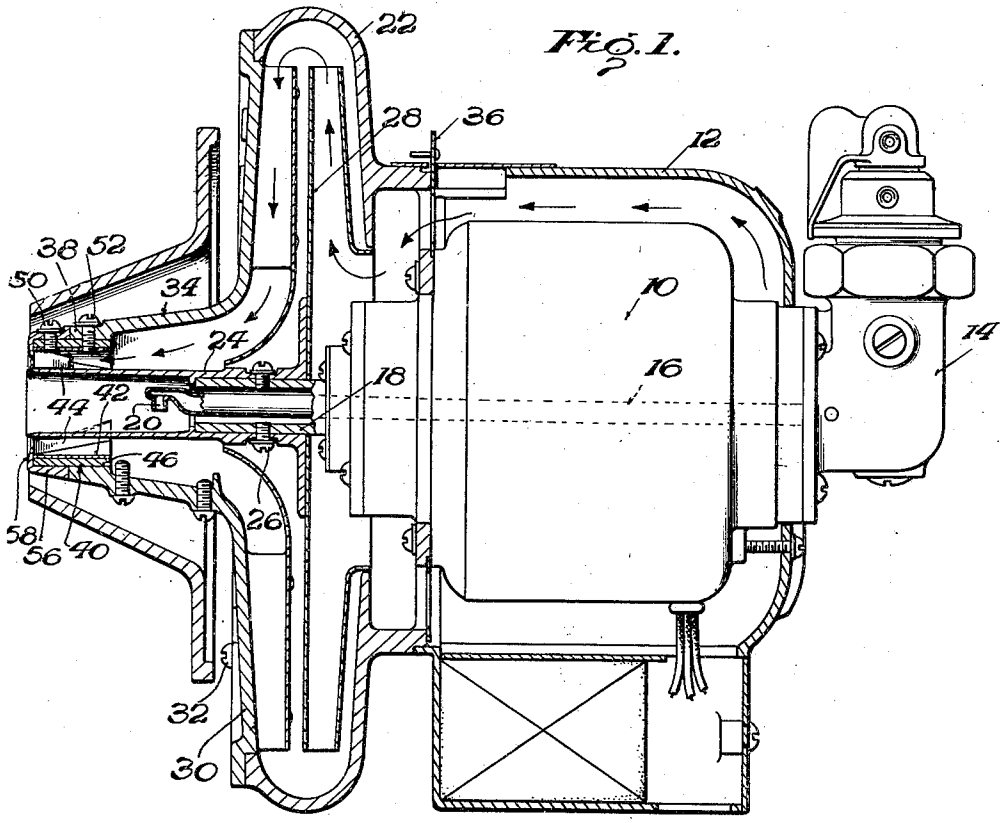
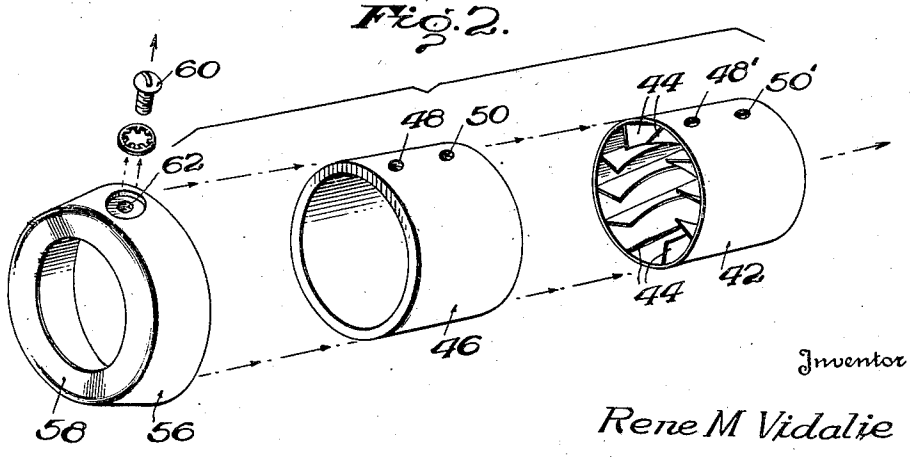


Fig. 2.



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OIL BURNER

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4 Claims. (Cl. 158—77)

This invention relates to oil burners and has particular reference to structure for the atomization of fuel in a horizontal rotary cup type burner.

An object of the invention is to facilitate the ease and rapidity with which the air flow impinging upon the mist of oil centrifuged from the rotating oil atomizer cup may be varied to control the type and shape of flame produced.

Fireboxes of varying dimensions must be associated with standard burners and for that reason it is necessary to provide readily controllable means for varying the flame produced. A long, narrow flame must be used for a long, narrow firebox, while the flame must be shortened and widened if the standard burner is to be adapted to a short, wide firebox.

A further object of this invention is to provide improved means for obtaining such control of the burner flame with a minimum number of parts so constructed and interrelated as to entail little expense in cost of manufacturing. By reducing the number of parts usually required to obtain the varied types of flame necessitated by different conditions encountered in commercial burner use, the number of parts necessarily kept in stock by dealers is likewise reduced and the entire cost of production and upkeep from manufacturer to consumer is accordingly decreased.

Still another object of the invention is to provide a minimum of parts interchangeable to obtain the varied results desired, each part being of simple and rugged design to substantially eliminate the need of replacement except for flame control purposes.

Various other objects and meritorious features of the invention will be apparent from the following description taken in conjunction with the drawing wherein like numerals refer to like parts throughout the several figures, and wherein:

Figure 1 is a sectional elevation through a horizontal rotary oil burner having associated therewith my improved composite atomizing nozzle, and

Figure 2 shows the component parts of the nozzle in detached position.

Numeral 10 represents an electric motor disposed in suitable fashion within a casing 12 so arranged and constructed as to permit the passage of air through the motor casing and around the motor as indicated by the arrows. An oil metering valve 14 is secured to the rear of the motor and provided with an outlet port opening into an oil feed tube 16 which extends through the hollow motor armature shaft 18 and is provided at its outer extremity with an oil emission opening 20.

The front of the motor casing is enlarged radially as indicated at 22 to provide a partial housing for a fan assembly. This fan assembly may be integral and includes an atomizer cup 24 which is secured to the armature shaft 18, as by means of screws 26, the tube functioning as a hub for the fan 28.

A cover plate 30 is secured to the housing 22, as indicated at 32. This cover plate tapers outwardly and radially inwardly as indicated at 34 to form an open ended casing surrounding the atomizer cup 24 in concentric relation thereto.

Oil metered through valve 14 is emitted through opening 20 into the rotating atomizer cup 24. When the atomizer cup is rotating at high speed a thin oil film forms which adheres to the walls of the cup and travels toward the end where it is discharged in a very fine mist. This mist is in the shape of a cone. The air admitted into the motor casing 12 passes around the motor, through openings in an annular air valve 35, is admitted through the fan 28, and is then discharged through the annular air passage provided by the atomizer cup 24 and its surrounding casing 34.

It has hitherto been customary to secure to the opening of this air passage a nozzle provided internally with spirally arranged angular vanes for the purpose of discharging the air into the oil mist cone in a twisting or swirling path. The direction in which the vanes extend is opposite to the direction of rotation of the atomizer cup. As this swirling column of air strikes the cone of oil mist a turbulent condition resulting in a highly combustible mixture of oil and air is produced.

In order to vary the type of flame produced at the nozzle so that a standard burner may be accommodated to various sized and shaped fireboxes, it has been customary in the past to provide nozzles of different sizes and nozzles containing angular vanes arranged at varying degrees of angularity. To meet most conditions encountered it has been found that at least three sizes of nozzle and three degrees of angularity for the vanes is essential. Thus it has been necessary to provide nine independent nozzles.

To reduce the number of parts, while at the same time providing the same range of flame variance, I have devised a composite nozzle comprising one component element which functions as the nozzle proper and a second component

element having the angular vanes associated therewith. This second element I shall term a "rifled bushing" and the other a "nozzle." It will therefore be apparent that I am enabled to take care of all field conditions by providing three different sized nozzles, with any one of which may be associated a rifled bushing of any desired degree of angularity.

For this purpose I have made the interior of the end of casing **34** a true cylinder, as indicated at **38**. This casing terminates short of the end of the atomizer cup **24** and is adapted to telescopically receive an internally rifled cylindrical bushing broadly indicated by the numeral **40**. The structure of this bushing is more clearly illustrated in Figure 2 and may comprise a cylinder **42** of thin sheet metal within which are positioned, as by means of soldering or otherwise, a series of spirally arranged vanes **44**. A cylindrical cover **46** of heavier metal may be press fitted over cylinder **42** and the walls of the two cylinders are provided with registering spaced and alined threaded apertures **48**, **48'**, **50**, and **50'**. The composite nature of the bushing herein illustrated is advantageous from a manufacturing standpoint, but it will be understood that the angular vanes forming the rifling may be associated with a single heavy cylinder.

The cylindrical bushing is detachably positioned within the cylindrical end of casing **34** as by means of a screw **52** which passes through a threaded aperture in the wall of said casing alined with aperture **50** in the bushing. The nozzle **56** may be tapered externally to conform with the taper of casing **34** and its interior is cylindrical so that it may be telescoped over the projecting end of the rifled bushing into abutting engagement with the end of the casing. An annular flange **58** extends radially inwardly around the outer end of the nozzle. Nozzles with flanges of varying width provide the varied sizes of nozzle opening necessary for field adjustment.

After the nozzle **56** is telescoped over the projecting end of the rifled bushing **46**, the two are detachably secured together by means of a screw **60** extending through a threaded aperture **62** in the wall of the nozzle, which aperture is alined with aperture **48** in the rifled bushing.

Thus it will be seen that the ready interchangeability of component parts of the nozzle and their association with the casing **34** provides for variation in the type of air discharge, whereby the burner flame may be varied, either by varying the size of the nozzle opening or varying the angularity of the vanes, for which latter operation it is only necessary to substitute in any given nozzle **56** a bushing **40** provided with vanes or riflings arranged at the desired angle. Or, conversely, any sized nozzle may be readily associated with a bushing of given vane angularity. This latter operation may be performed, as is apparent, without removing the rifled bushing from the casing.

Having described one form of my improved atomizing arrangement, others may be apparent to those skilled in the art, and for that reason I wish to limit myself only within the scope of the appended claims.

What I claim is:

1. In an oil burner the combination of a centrally disposed rotary atomizing cup, means for feeding oil to the interior of said cup, an open ended casing surrounding said cup and forming therewith an annular air passage surrounding the same but terminating short of the oil discharge end of the cup, an internally rifled bushing detachably secured to said casing adjacent the air discharge end thereof and extending therebeyond, and a nozzle detachably secured to the extending part of said bushing.

2. In an oil burner the combination of a centrally disposed rotary atomizing cup, means for feeding oil to the interior of said cup, an open ended casing surrounding said cup and forming therewith an annular air passage surrounding the same, said casing being generally tapered toward its air discharge end and provided with an internal cylindrical portion at said end, an internally rifled cylindrical bushing, detachably positioned within the cylindrical portion of said casing, said bushing projecting beyond the air discharge end of said casing, and a nozzle secured to said bushing in externally telescoping relation thereto, the outer end of said nozzle terminating in substantial alinement with the open end of said atomizing cup.

3. In an oil burner the combination of a centrally disposed rotary atomizing cup, means for feeding oil to the interior of said cup, an open ended casing surrounding said cup and forming therewith an annular air passage surrounding the same, the wall of said casing having a threaded aperture extending therethrough adjacent the air discharge end thereof, an internally rifled bushing seated within said end of the casing, the wall of said bushing being provided with spaced internally threaded apertures one of which is adapted to aline with the aperture in said casing wall, a screw engaging said alined apertures to retain said bushing within said casing, and a nozzle having a threadedly apertured wall cooperable with another aperture in said bushing to receive a screw securing said nozzle about the end of said bushing.

4. In an oil burner the combination of a centrally disposed rotary atomizing cup, means for feeding oil to the interior of said cup, an open ended casing surrounding said cup in coaxial relation thereto and forming therewith an annular air passage decreasing in cross-sectional area toward the air discharge end of the casing, said casing being internally cylindrical adjacent said end, an internally rifled cylindrical bushing of greater axial length than the internally cylindrical portion of said casing, detachably positioned within said casing in telescoping relation thereto and projecting therebeyond, and an internally cylindrical nozzle detachably positioned over the projecting end of said bushing in telescoping relation thereto, said nozzle including a flange at its outer end extending radially inwardly toward the centrally disposed atomizing cup.

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