United States Patent [19]

Miller

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[54] **OIL BURNER**

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[52] **U.S. Cl.** **431/183**; 239/405

[51] **Int. Cl.**[2] **F23M 9/08**

[58] **Field of Search** 431/265, 8, 182, 183, 185; 432/222; 239/399, 475, 405

[56] **References Cited**

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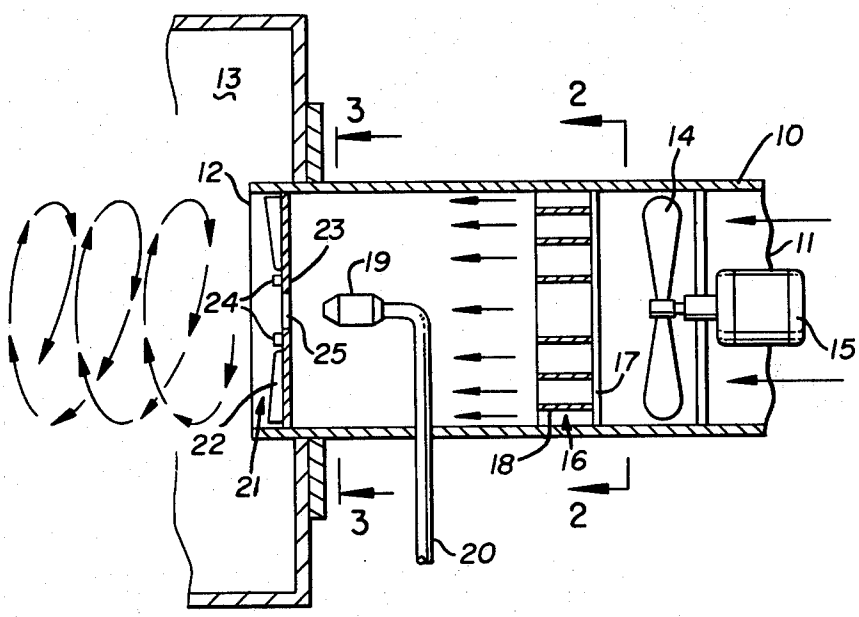
Primary Examiner—Edward G. Favors

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[57] **ABSTRACT**

An oil burner comprises a burner tube with an atomizing nozzle disposed axially thereof and between a pair of directional baffles, one downstream and the other upstream with respect to the nozzle, the upstream baffle controlling and directing combustion air in an axial flow and the downstream baffle imparting a spiral swirl to the air and the atomized fuel. An axial flow blower supplies air to the burner tube.

3 Claims, 4 Drawing Figures



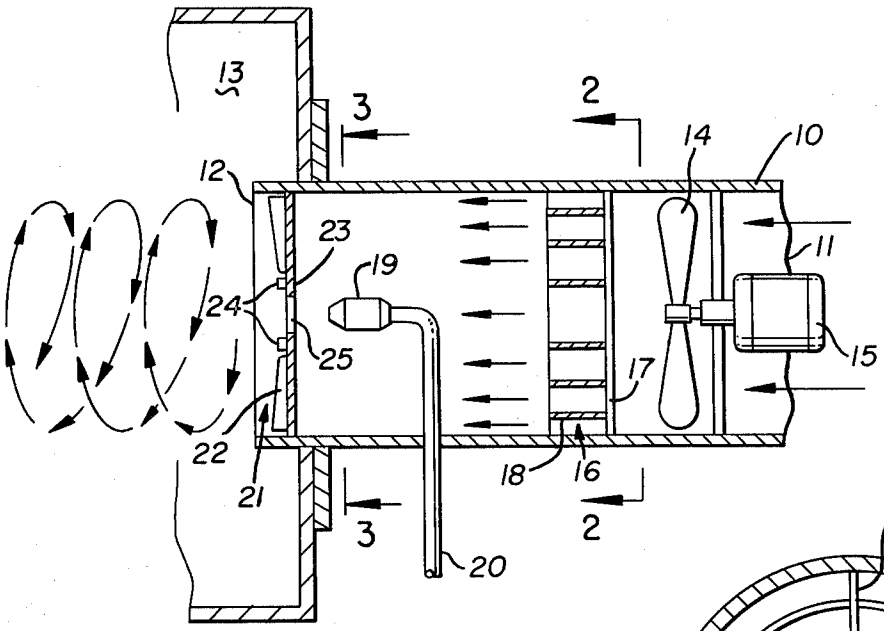


FIG. 1

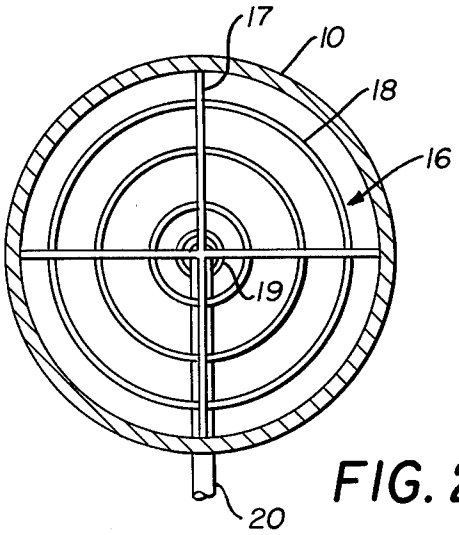


FIG. 2

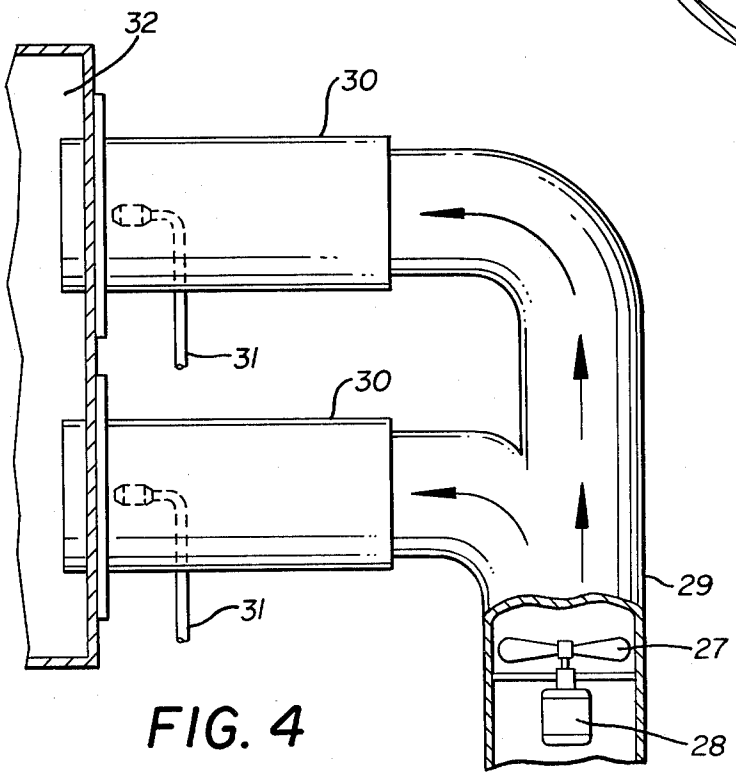


FIG. 4

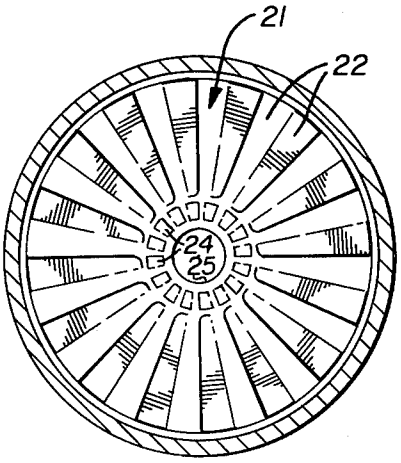


FIG. 3

OIL BURNER

BACKGROUND OF THE INVENTION

1. Field of the Invention:

This invention relates to oil burners of the type used in connection with apparatus such as a rotary drier for drying stone, gravel, sand and the like.

2. Description of the Prior Art:

Prior structures of this type usually employ burner tubes with atomizing nozzles located adjacent their discharge end and a source of combustion air such as a squirrel cage blower or the like which results in an undesirable axial flow pattern of the air in the burner tube. This invention directs the combustion air in the burner tube in a true axial flow providing even flow and volume across the entire burner tube and equally importantly mixes the atomized fuel and the axially flowing air into a highly efficient spiral swirl pattern greatly contributing to efficient combustion of the fuel.

SUMMARY OF THE INVENTION

An oil burner includes a burner tube with means directing combustion air therethrough and means therein regulating and directing the air in an even axial flow and volume and introduces an atomizing nozzle in said directed axial flow air to introduce the fuel and then mixes the axial flowing air and fuel by a downstream baffle having radially positioned members resulting in a spiral swirl mixture of the atomized fuel and combustion air.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side elevation with parts in cross section and parts broken away illustrating the present invention,

FIG. 2 is an enlarged cross sectional detail on line 2—2 of FIG. 1,

FIG. 3 is an enlarged cross sectional detail on line 3—3 of FIG. 1, and

FIG. 4 is a side elevation with parts broken away and parts in cross section illustrating a modified dual oil burner formed in accordance with the invention.

DESCRIPTION OF THE PREFERRED EMBODIMENT

In it's simplest form the oil burner of this invention is comprised of a burner tube **10** having an inlet end **11** and a discharge end **12** such as may be located for example in a fire box **13** or other device in which the products of combustion are utilized. An axial flow fan **14** is positioned in the burner tube **10** adjacent the inlet end **11** thereof and is driven by a motor **15.** An axial flow baffle **16** is located downstream from the fan **14** and includes a support frame **17** and a plurality of circular baffles **18,** see FIG. **2,** which are spaced radially with respect to one another with different degrees of spacing so that the volume and flow of the air delivered by the fan **14** will be even across the interior of the burner tube **10** and as indicated by the arrows **14** in FIG. **1.**

An atomizing nozzle **19** is positioned axially of the burner tube **10** and downstream from the axial flow baffle **16** and is supplied with fuel under pressure through a tubular support **20.** A secondary baffle **21** is located downstream from the atomizing nozzle **19** and is positioned in the burner tube **10** adjacent the discharge end **12** thereof. The secondary baffle as may also be seen in FIG. **3** of the drawings, comprises a plurality of radially positioned angularly disposed blades **22** spaced circumferentially with respect to one another and having a central area inwardly of the inner ends of the blades **22** in which a circumferential pattern of small angularly disposed vanes **24** are located. The vanes **24** are formed of the material of the central area of the secondary baffle **21** and around a central opening **25** therein through which the atomized fuel from the nozzle **19** is directed.

It will be observed that the arrangement of the secondary baffle **21** and particularly the fan-like blades **22** and the vanes **24** are such that a unique spiral swirling action of the air downstream of the secondary baffle **21** is created and is indicated by the arrows in FIG. **1** of the drawings. This action results in converting the uniform flow and volume of the air in the burner tube **10** to a desirable mixing action with the atomized fuel and results in substantially improved combustion in the fire box **13** or the like.

It will occur to those skilled in the art that under some circumstances it may be desirable to use more than one of the burner tubes **10** and the double baffles and atomizing nozzles as for example when the object to be heated is larger, etc.

By referring now to FIG. **4** of the drawings, a dual arrangement of the burner tubes **10** complete with the first and secondary baffles and the atomizing nozzles therein may be seen and it will be observed that they are the same as heretofore described in connection with FIGS. **1,2** and **3** of the drawings with the exception that the source of air comprises a single fan **27** driven by a motor **28** in a duct **29** common to both the burner tubes **30,** each of which is supplied with fuel through supply pipes **31** and each of which is directed into a fire box or similar device **32.**

It will occur to those skilled in the art that rather than the axial flow fans **14** and **27** referred to herein, various types of blowers or air propulsion means may be employed with the oil burner of the invention and that regardless of the source of air the first baffle **16** will establish a uniform volume and flow of air in the burner tube and downstream therethrough past the atomizing fuel delivery nozzle and that the secondary baffle will cause a unique spiral swirling action and intermixing of the atomized fuel and the air as it is delivered to the fire box.

It will also occur to those skilled in the art that ignition means, not shown, is necessary as customary in such oil burner installations and may for example comprise an electric spark producing device disposed in an appropriate area of the burner tube adjacent its discharge end **12** as seen in FIG. **1** of the drawings.

The oil burner of the invention is not limited to the application of drying paving material or the like, but may be used with any device in which efficient combustion is desired. It will also occur to those skilled in the art that gas may be used as a fuel rather than oil and burned efficiently due to the unusual mixing spiral swirling action of the combustion air with the fuel as occasioned by the structure of the device of the invention.

Although but one embodiment of the present invention has been illustrated and described, it will be apparent to those skilled in the art that various changes and

modifications may be made therein without departing from the spirit of the invention.

Having thus described my invention what I claim is:

1. An oil burner comprising a burner tube having inlet and outlet ends, means for supplying combustion air to said inlet end of said burner tube, a first baffle disposed in said burner tube inwardly from said inlet end, said first baffle comprising a plurality of thin relatively wide circular vanes spaced radially with respect to the axis of said burner tube to direct said combustion air axially of said burner tube and a secondary baffle in said burner tube adjacent said discharge end thereof and having a central opening therein, a fuel delivering nozzle disposed in said burner tube between said first and secondary baffles and directed toward said opening in said secondary baffle and means for supplying fuel to said nozzle, a plurality of radially extending fan-like blades positioned circumferentially in said secondary baffle and arranged to impart a spiral swirl to the axial flowing air in the burner tube so as to mix the same thoroughly with fuel delivered by said nozzle.

2. The oil burner of claim **1** and wherein each of said plurality of circular vanes is disposed at a small angle with respect to one another and with respect to the axis of said burner tube so as to direct said combustion air into a flowing column of uniform velocity and volume.

3. The oil burner of claim **1** and wherein said secondary baffle has a central area about said opening therein and inwardly of the inner ends of said fan-like blades and a plurality of circumferentially positioned angularly disposed vanes formed in said central area on the same plane as said fan-like blades and arranged to provide swirling turbulence in the combustion air and fuel flowing through said opening.

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