Jan. 17, 1950 C. O. MEYERS 2,494,893

ROTARY BURNER WITH INTERRUPTED ANNULAR FINNED COVER PLATE

Filed Sept. 11, 1945

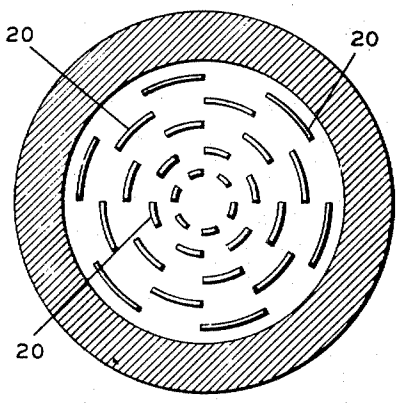


FIG. 2.

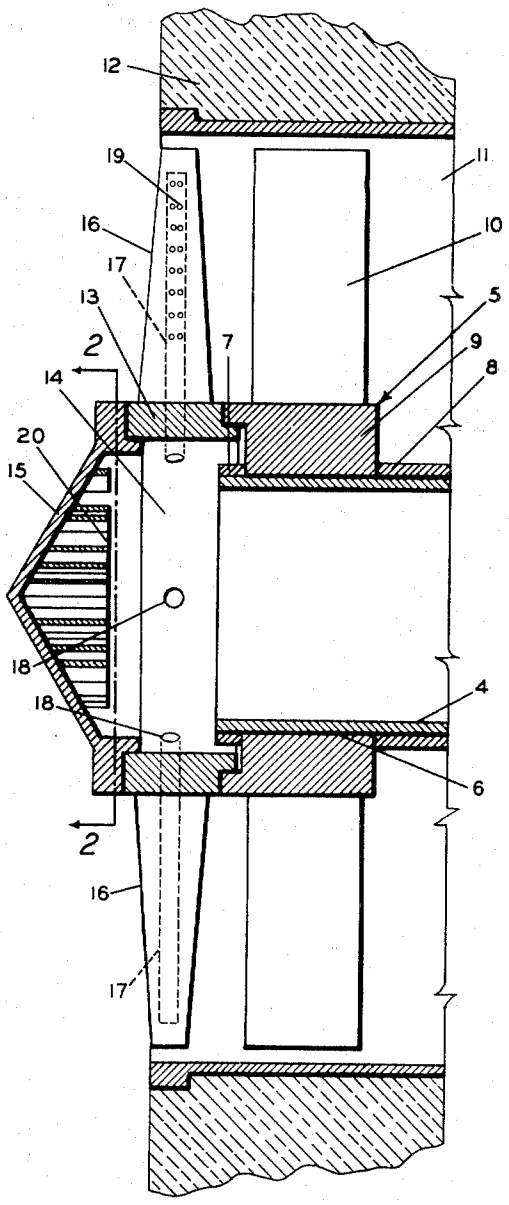


FIG. 1.

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Patented Jan. 17, 1950 2,494,893

UNITED STATES PATENT OFFICE

2,494,893

ROTARY BURNER WITH INTERRUPTED ANNULAR FINNED COVER PLATE

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Application September 11, 1945, Serial No. 615,609

2 Claims. (Cl. 158—118)

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The present invention relates to rotary burners. In a more specific aspect, it relates to rotary burners of the type known as "Fanmix" burners made by Coppus Engineering Corporation. In another specific aspect, it relates to cooling the nose plate, or cover plate, of a rotary burner.

Rotary burners having a chamber with radially disposed fuel spraying arms and a cover plate for the chamber are old in the prior art and are highly successful. The cover plate is the weak point, however, as it is exposed to radiant heat. Generally, the cover plate does not overheat unless the fuel contains material which will carbonize and deposit on the hot surface of the cover plate. When such is the case, carbon deposits on the hot inner surface of the nose plate, or cover plate, and reduces the rate of heat transferred from the cover plate. As a result, the cover plate becomes overheated and melts or burns out. Obviously, when the cover plate has burned away, the fuel will escape through the hole in the cover plate and will not feed properly through the radial arms.

I have provided a rotary burner of the class described which has a cover plate so designed as to be free from burning out.

The principal object of the present invention is to eliminate the burning out of nose plates, or cover plates, of rotary burners.

Another object is to provide means for suitably dissipating heat from such cover plates.

Another object is to direct the fuel onto the cover plate and provide a cover plate with a series of baffles which act as heat transfer means and retain the fuel adjacent the cover plate a suitable period of time for heat transfer.

Numerous other objects and advantages will be apparent to those skilled in the art upon reading the accompanying specification, claims and drawings.

In the drawings:

Figure 1 is a cross sectional, elevational view of a rotary burner embodying the present invention.

Figure 2 is a cross sectional view of the structure shown in Figure 1 taken along the line 2—2, looking in the direction indicated by the arrows.

In Figure 2, fuel (generally gas) is supplied through a stationary fuel supply pipe 4. Rotatably mounted on pipe 4 is a rotary burner, generally designated as 5. Burner 5 may be provided with any suitable bearing such as 6 which may be an anti-friction bearing and is

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retained in place by any suitable retaining means 7 and 8.

The body 9 of burner 5 may be provided with fan blades 10 to move air through opening 11 in furnace wall 12. The rotation of body 9 may be accomplished by a belt or chain drive or gear drive from a motor, or the rotation of body 9 may be entirely by jet reaction, as will be explained later. Body 9 has a chamber 13 attached thereto by any suitable means. Chamber 13 contains a central space 14, covered by a cover plate 15. Cover plate 15 is often called a nose plate. Extending radially out from chamber 13 are arms 16. The number of arms 16 is immaterial; however, obviously, it is better to have arms 16 dynamically balanced so as to reduce vibration. Such dynamical balance may be achieved with any number of arms.

Leading out into arms 16 are passages 17 which communicate through holes 18 with chamber 13. Passages 17 lead to holes 19 in the arms 16. Holes 19 form jets for the fuel.

Cover plate 15 is provided with concentrically disposed annular interrupted cooling fins 20 on its inner side as shown in Figure 2.

Operation

The fuel gas to be burned enters the burner through pipe 4 where it impinges directly on fins 20. The fuel gas cools fins 20 and then passes out of chamber 13 through holes 18, passages 17, and jet holes 19. Jet holes 19 may act to rotate body 5 due to jet reaction which is well known. If desired, the rotation of 5 may be supplemented by a motor (not shown). Arms 16 may be shaped as blades of a fan or propeller to draw air through opening 11 from right to left in Figure 1. However, fan blades 10 may be eliminated and arms 16 need not be shaped as fan blades provided a suitable means for forcing air through passage 11 is provided. Arms 16 alone may be enough to force air through passage 11 when formed as fan blades.

In all cases, the fine efficiency of these type rotary burners is due to the gas coming out of jet holes 19 as fine jets which thoroughly mixes with the air passing from right to left through opening 11, the fuel and air burning in a big ball of flame to the left of Figure 1.

Radiant heat from this flame is directed partly on cover plate 15 which may become overheated. When cover plate 15 becomes overheated, certain elements in the gas flowing through pipe 4 (such as higher molecular weight hydrocarbons) will carbonize by dehydrogenation or other

reaction and deposit carbon on the surface of 15. Such carbon deposits immediately cut down heat transfer from 15 to the gas in space 14 and, as a result, 15 may burn or melt away. However, when the present invention is applied, fins 20 carry away the heat from nose 15 and it will not burn out even though carboned up on the inside.

The fins provide additional heat dispersing surface thereby eliminating the burning. With the finned plate, carbon deposition may occur, but the additional dispersion surface will prevent burning of the plate.

The fin design may be varied according to the type of fuel being burned. If the gas contains entrained matter, a non-continuous fin as shown in Figure 2 is preferable as it prevents the building up of a continuous insulating layer of carbon. If the gas is relatively clean and contains a smaller amount of entrained oil or other impurities, the fins are interrupted at less frequent intervals.

Formal changes may be made in the specific embodiment of the invention disclosed without departing from the spirit and substance of the broad invention, the scope of which is commensurate with the appended claims.

Having described my invention, I claim:

1. A burner of the class described comprising in combination a stationary fuel supply pipe; a fuel spray head rotatably mounted on the outlet end of said pipe, said head forming a central fuel chamber; fuel spraying arms radially disposed relative to said chamber; a cover plate closing the end of said chamber opposite said pipe outlet; and co-axially disposed annular interrupted cooling fins on said cover plate and in said chamber, whereby fuel flowing from said supply pipe contacts said fins in heat exchange relation thereby cooling said cover plate and maintains it at a temperature below its melting point.

2. A burner of the class described comprising in combination a stationary fuel supply pipe; a fuel spray head rotatably mounted on the outlet end of said pipe, said head forming a central fuel chamber; fuel spraying arms radially disposed relative to said chamber; a cover plate closing the end of said chamber opposite said pipe outlet; and annular interrupted cooling fins on said cover plate and in said chamber, whereby fuel flowing from said supply pipe contacts said fins in heat exchange relation thereby cooling said cover plate and maintains it at a temperature below its melting point.

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