

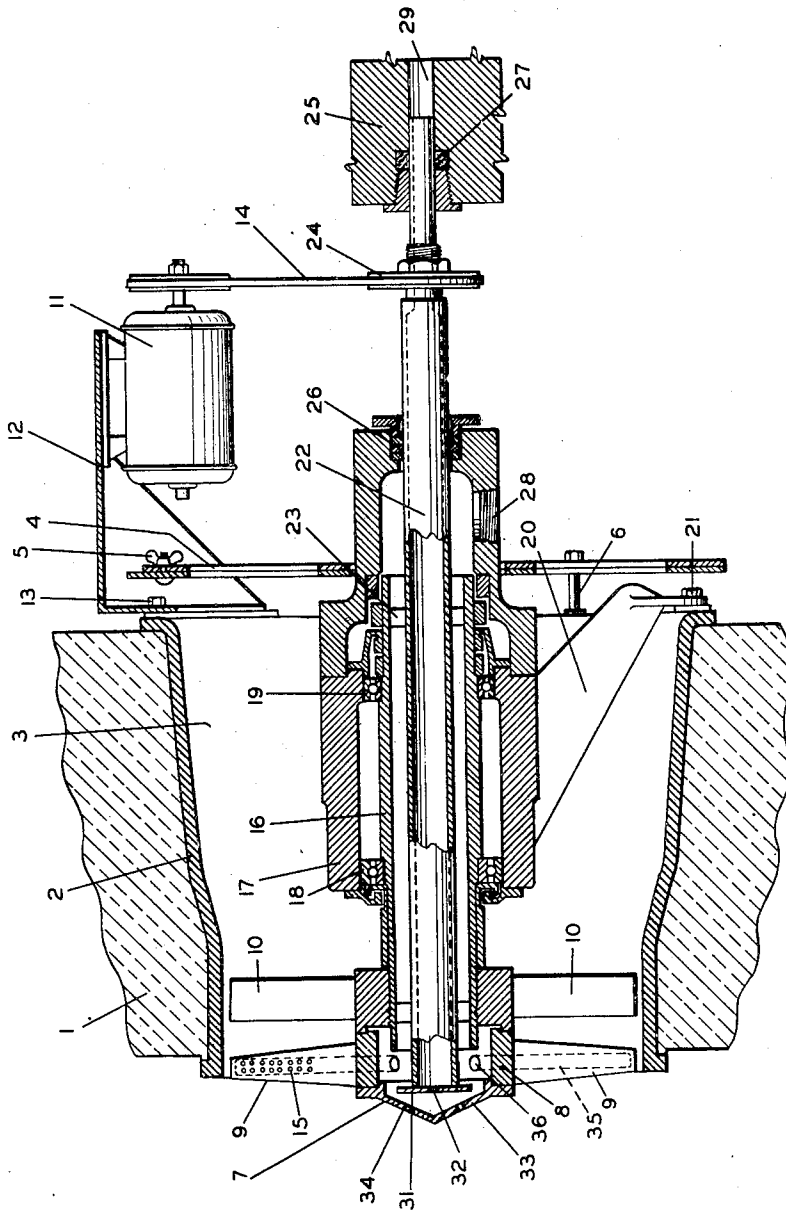
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C. J. MAKI

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ROTARY BURNER

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INVENTOR.
CARL J. MAKI

BY *Hudson & Young*
ATTORNEYS

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ROTARY BURNER

Carl J. Maki, San Tome Terminal, Venezuela,
assignor to Phillips Petroleum Company, a corporation of Delaware

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1 Claim. (Cl. 158—118)

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This invention relates to rotary burners. In one of its more specific aspects it relates to rotary burners in which one of the gases for combustion is ejected in jets from a rotating portion of the burner and in which a chamber for distributing said gas in the burner is protected by a nose plate exposed to radiant heat from the flame of combustion. In another of its more specific aspects it relates to means for preventing the burning out of such nose plate. In a more specific aspect it relates to the injection of steam or other inert gas or vapor for the purpose of cooling parts of rotary burners which tend to overheat.

In the prior art of rotary burners, it has been noted that certain portions of the burner tend to overheat and burn out. This is due partly to deposition of carbonaceous material from the gas passing through the burner upon overheated portions of the burner. Such carbonaceous deposits further reduce the heat transferred from the overheated portion, and the overheated portion melts or burns out and the burner can not operate properly.

I have noted that in rotary burners of the type shown in the accompanying drawing that the nose plate is the portion which overheats and burns out and on which the deposit of carbon forms. It is believed obvious that the present invention prevents such overheating and/or deposit of carbon.

One object of the invention is to prevent overheating of part of a rotary burner.

Another object is to prevent deposits of carbon on an overheated portion of a rotary burner.

Another object is to provide means for supplying a protective fluid to a rotary burner.

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

In the drawings:

The single figure in the drawing is a cross-sectional elevational view of a rotary burner embodying the present invention with parts broken away.

The burner is shown as applied to the wall 1 of a furnace which is shown made of heat insulating material, but which, obviously, could be any desired material. Mounted in wall 1 is an air conduit 2. While shown separable from wall 1, obviously conduit 2 could have been formed in the material of wall 1. However, it is preferred to make wall 1 out of refractory material and conduit 2 out of a metal such as iron. Conduit

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2 has an air passage 3 therethrough, and the flow of air through 3 may be adjusted by shutter 4 secured in adjusted position by butterfly nut 5, shutter 4 being supported by supports 6.

A rotary burner generally designated as 7 is disposed in proper relation to air conduit 3 in order to utilize air coming therethrough. Rotary burner 7 consists of rotating head 8 having gas distribution arms 9 thereon and, if desired, fans 10 thereon. Head 8 may be rotated by motor 11 shown mounted on bracket 12 secured by bolt 13 to wall 1. Motor 11 drives head 8 through belt 14 or any other suitable driving means. However, belt 14 may be removed and rotary head 8 driven entirely by jet reaction of gas emerging through jet orifices 15 in gas distributing arms 9.

Obviously, the rotary burner shown in the drawing may be simplified, but it is preferable to use accepted methods of construction in order to provide a rigid, fool-proof rotary burner.

The burner head 8 has an extension 16 which rotates in a support 17 and suitable anti-friction bearings 18 and 19 may be provided. Support 17 is in turn supported by arms 20 secured by bolts 21 to wall 1.

Cooling fluid inlet tube 22 is secured to extension 16 by radial arms 23 for rotation therewith and, as shown in the drawing, tube 22 has rigidly mounted thereon a driving wheel 24, by which motor 11 rotates the burner when motor 11 is employed.

A support member 25 supports the inlet end of cooling tube 22 and provides communication therethrough by means of conduit 29 between a cooling fluid supply source (not shown) and cooling tube 22. Cooling fluid pressure is provided therethrough and, if desired, suitable stuffing boxes 26 and 27 may be employed to prevent or substantially reduce leakage of fluids.

A suitable fuel gas supply pipe (not shown) is connected to gas inlet 28 and provides fuel gas to head 8 through the annular space formed between tube 22 and extension 16.

Baffle plate 31 may be provided inside burner head 8 on the end of shaft tube 22 to properly distribute the cooling fluid which emerges from tube 22 through orifice 32.

The left hand end of rotary burner head 8 is known as the nose plate 33 and this nose plate is exposed to radiant heat. If desired, nose plate 33 may be supplied with orifices 34 suitably spaced therein, but in other cases orifices 34 may be eliminated completely.

Each of arms 9 has a radial passage 35 receiving gas from head 8 through opening 36 and

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the gas in passage 35 passes out through jets 15 which are usually directed in the direction opposite to the rotation of the rotary head 8 in order to obtain a jet propulsion effect tending to increase or sustain the rotation of rotary head 8.

Operation

The operation of the burner is obvious.

Rotary burner head 8 is rotated either by jet propulsion from jet 15 or by motor 11, or both. Arms 9 may be formed as propeller blades to draw air from right to left through conduit 3 in wall 1 which flow of air may be controlled by shutter 4 if desired. Arms 9 may or may not be shaped as fans or propellers to draw air if fan blades 10 are employed for the purpose. However, fan blades 10 may be eliminated completely if arms 9 are shaped as fan blades.

The gas for distribution enters through inlet 28 and passes between tubes 16 and 22 into head 8 and openings 35 from which it passes through radial tubes 35 and out jet orifices 15. Upon ignition, a large ball of flame is formed about nose plate 33 and radiant heat from that ball of flame tends to overheat nose plate 33 and cause gas coming from 28 into rotary head 8 to deposit carbonaceous material on the inside of nose plate 33. Such carbonaceous material would seriously reduce the heat transfer through nose plate 33 and probably result in the ball of flame melting the nose plate.

However, as provided in the present invention, a cooling fluid, preferably steam, from a source (not shown) enters through conduits 29, 22, and 32 into the space adjacent nose plate 33. This cooling fluid has two functions. The first function is to carry heat away from nose plate 33. The second function is to blanket nose plate 33 so that combustion gases inside rotary head 8 can not reach the nose plate. These two functions are aided by baffle 31 which aids in maintaining a line of demarcation between the gas and the cooling fluid, makes the cooling fluid pass against the inside surface of nose plate 33.

The cooling fluid may escape from the space between baffle plate 31 and nose plate 33 and/or through openings 34. By properly balancing the gas and cooling fluid pressure, it is possible to have the cooling fluid occupy all of the space forward of plate 31 and to escape out holes 34. In some instances it may be preferable however, to have a little of the cooling fluid also escape through jets 15 or to have a little of the gas also escape through holes 34.

In some instances, with suitable cooling fluids, holes 34 may be eliminated and the cooling fluid allowed to escape from the chamber forward of baffle plate 31 so as to mix with the gas and pass entirely out of jet holes 15.

Any suitable non-carbon containing gas or vapor may be employed as the cooling fluid. The term non-carbon containing is meant to contrast with the term hydrocarbon gases, which are carbon containing gases.

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While a specific embodiment of my invention has been described and illustrated for purposes of explanation of the invention, it is obvious that many other embodiments will lie within the scope of the present invention and that many changes in size, proportion, and arrangement of parts, and substitutions of equivalents may be made without departing from the present invention, the scope of which is defined only in the following claim.

Having described my invention, I claim:

A rotary burner comprising in combination a burner head, being hollow in at least its forward end portion; an internally concave cover plate closing the forward end of said burner head; burner arms extending radially from points on said burner head adjacent said cover plate; passage means extending from the hollow portion of said burner head outwardly through said burner arms to substantially the end of each said burner arm; outlet means extending between said passage means and the exterior of each said burner arm through the walls of said arms; a first conduit for gaseous fuel under pressure rotatably mounted in anti-friction bearings, said conduit being rigidly connected to the rear end of said burner head so as to form a gas-tight seal and extending coaxially therethrough to said hollow head portion; a second conduit for non-carbon forming cooling gas under a relatively higher pressure than said fuel, smaller in diameter than said first conduit, extending longitudinally through said first conduit and said hollow head portion into the concavity of said cover plate, said second conduit being rigidly spaced from and secured to the walls of said first conduit so as to form an annular passage therebetween; and an annular baffle member, smaller in diameter than the adjacent diameter of said cover plate, rigidly affixed to the end of said second conduit within said cover plate so as to provide communication between said second conduit and a chamber formed within said cover plate through the central opening in said baffle and so as to provide communication between said chamber within said cover plate and the hollow head portion in back of said baffle only through the annular space between the periphery of said baffle and the wall of said cover plate.

CARL J. MAKI.

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