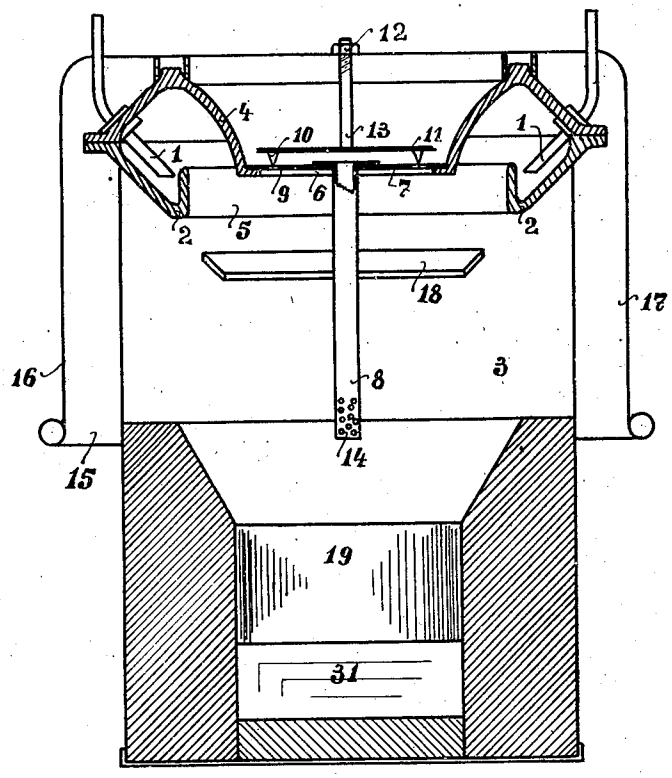
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E. BECKER

BURNER FOR THE THOROUGH COMBUSTION OF LIQUID FUEL

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BURNER FOR THE THOROUGH COMBUSTION OF LIQUID FUEL.

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To all whom it may concern:

Be it known that I, ERICH BECKER, a citizen of the German Republic, residing at Bad Sooden, Germany, have invented certain new and useful Improvements in Burners for the Thorough Combustion of Liquid Fuel, of which the following is a specification.

For the combustion of liquid fuels, besides the deep furnaces and atomizer burners, the so-called gasifying burners have proved to be practical. With this latter type of oil burners a gasification or vaporization of the oil is effected prior to the combustion and separate from the combustion. It has already been proposed for burners of this type to use for the gasification the heat which radiates from the combustion chamber.

The flame produced in the gasifying chamber represents an oil-gas flame upon which the technical principles are applicable which are applicable for the combustion of gases. A special condition for the complete combustion in such burners is to ensure a thorough admixtion of the air with the oil gas with the least possible excess of air.

This invention solves this problem in a manner which will be explained hereinafter with reference to the drawings by giving to a flame, formed of oil gas and previously heated air, a downward direction and to admit more air for combustion to this downwardly directed flame. By the downward direction of the flame a thorough admixing of gas and air is ensured as the specifically lighter gases, in opposition to their natural tendency to ascend in the specifically heavier air, are caught by this air and conducted downward into the combustion chamber under formation of eddies, whereby a slightly checked, waving flame is produced. The formation of a pointed flame is avoided according to this invention in contradistinction to the atomizer burners. A further advantage is that, owing to the gradual preliminary treating of the subdivided current of air for combustion such a generation of heat is ensured which could never be obtained hitherto, this being very favorable for many purposes, specially for metallurgic-carbonic- and cement-ovens.

A form of construction of a device which is specially characteristic for the application of the invention is shown by way of example on the accompanying drawing, wherein:—

Fig. 1 shows in longitudinal section an oil-burner adapted to be used for various heating purposes.

Referring to the drawing the liquid fuel is supplied through the supply pipes 1 from a reservoir, not shown, into a gasifying gutter 2 of angular cross section which is strongly heated by the heat radiating from the combustion chamber 3.

This profile gutter 2 is shown in the drawing as an annular body; it could however be of any other shape. Over said gutter 2 a vaulted cover 4 is arranged so that between the upper edge of the inner end of the gutter 2 and said cover a small passage 5 is formed. The cover 4 has a central opening 6 closed by a disk 7 which carries at the center a downwardly extending tube 8 and which has further apertures 9 arranged in a circle; said apertures 9 are adapted to be closed by cone-shaped obturators 10 which are preferably fixed upon the lower surface of a disk 11 which is adapted to be raised and lowered by means of a nut 12 screwed upon the upper end of a spindle 13 to which said disk 11 is fixed. The upper end of the tube 8 is open and the lower closed end 14 of the same is perforated. Under the gasifying gutter 2 a conical baffling ring 18 is arranged.

The combustion chamber 3 and the escape flue 19 for the hot products of combustion arranged below the combustion chamber 3 are enclosed by an outer wall 16 between which and the outer surface of chamber 3 an annular space 17 is formed into which the fresh air enters at 15.

The combustion takes place in this apparatus in the following manner:—

The oil supplied by the pipes 1 into the gutter 2 is gasified by the heat which radiates from the combustion chamber 3. The oil gases flow through the gap 5 between the vaulted cover 4 and the inner edge of the gutter into the combustion chamber 3, in mixing with the air which has been heated in the annular space 17. The downwardly directed flame is held together by the baffling ring 18 and further owing to the fact that a sudden enlargement of volume of the air for combustion is admitted through the perforated end 14 of tube 8, this air having been heated to a higher degree of temperature than the air which has come from the annular space 17, as the tube 8 projects far down into the combustion chamber and being situated in the center of the flame.

The oil supply can be regulated by a valve, not shown, and the air supply can be regulated by the raising and lowering of plate 11, whereby the apertures 9 in the disk 7 are closed more or less by the cone-shaped bodies 10.

The flame produced in the combustion chamber 3 is pulled downward into the space 19 and from there through the flue 31 by the draught of the furnace heated by the burner.

I claim:—

1. An apparatus for the combustion of liquid fuels comprising in combination a combustion chamber made of refractory material, supply pipes for the liquid fuel above said combustion chamber, a circular gutter-shaped gasifier between said combustion chamber and said supply pipes, and a circular vaulted cover of said gasifying gutter united with the outer edge of said gasifying gutter and designed to conduct along the inner surface of its inner part the gases generated in said gasifying gutter and along the outer surface of its inner part the primary air for combustion, both the gases and the air in downward direction inclined towards the centre of the combustion chamber so that the flame formed by the ignited gases is forced by the inflowing primary air to adopt a downward direction.

2. An apparatus for the combustion of liquid fuels comprising in combination a combustion chamber made of refractory material, supply pipes for the liquid fuel above said combustion chamber, a circular gutter-shaped gasifier between said combustion chamber and said supply pipes, a circular vaulted cover of said gasifying gutter the inner end of which extends downward over and at a short distance from the inner edge of said gutter so that a small passage for the fuel-gases is formed through which said fuel gases flow down into the combustion chamber, a perforated plate in the central opening of said vaulted cover, conical bodies for obturating the perforations of said plate, a disk upon the lower surface of which said conical obturating bodies are fixed, and means for adjusting the position of said disk in vertical direction.

3. An apparatus for the combustion of liquid fuels comprising in combination a combustion chamber made of refractory material, supply pipes for the liquid fuel above said combustion chamber, a circular gutter-shaped gasifier between said combustion chamber and said supply pipes, a circular vaulted cover of said gasifying gutter the inner end of which extends downward over and at a short distance from the inner edge of said gutter so that a small passage for the fuel gases is formed through which said fuel gases flow down into the combustion chamber, a perforated plate in the central opening of said vaulted cover, a tube open at the top extending downward from the centre of said perforated plate into said combustion chamber having holes for the admission of preliminarily heated secondary air to the flame, conical bodies for obturating the perforations of said plate, a disk upon the lower surface of which said conical obturating bodies are fixed, and means for adjusting the position of said disk in vertical direction.

4. An apparatus for the combustion of liquid fuels comprising in combination a combustion chamber made of refractory material, supply pipes for the liquid fuel above said combustion chamber, a circular gutter-shaped gasifier between said combustion chamber and said supply pipes, a circular vaulted cover of said gasifying gutter the inner end of which extends downward over and at a short distance from the inner edge of said gutter so that a small passage for the fuel gases is formed through which said fuel gases flow down into the combustion chamber, a perforated plate in the central opening of said vaulted cover, a tube open at the top extending downward from the centre of said perforated plate into said combustion chamber having holes for the admission of preliminarily heated secondary air to the flame, conical bodies for obturating the perforations of said plate, a disk upon the lower surface of which said conical obturating bodies are fixed, means for adjusting the position of said disk in vertical direction, and a hood of larger diameter than said gasifying gutter placed over the apparatus an annular space being formed between said hood and the outer surface of the combustion chamber said space being designed for the preliminary heating of the air which flows in through the lower end of said annular space.

5. An apparatus for the combustion of liquid fuels comprising in combination a combustion chamber made of refractory material, supply pipes for the liquid fuel above said combustion chamber, a circular gutter-shaped gasifier between said combustion chamber and said supply pipes, a circular vaulted cover of said gasifying gutter the inner end of which extends downward over and at a short distance from the inner edge of said gutter so that a small passage for the fuel gases is formed through which said fuel gases flow down into the combustion chamber, a perforated plate in the central opening of said vaulted cover, a tube open at the top extending downward from the centre of said perforated plate into said combustion chamber having holes for the admission of preliminarily heated secondary air to the flame, conical bodies for obturating the perforations of said plate, a disk upon the lower surface of which said conical obturating bodies are fixed, means for ad-

justing the position of said disk in vertical direction, and a hood of larger diameter than said gasifying gutter placed over the apparatus an annular space being formed between said hood and the outer surface of the combustion chamber said space being designed for the preliminary heating of the air which flows in through the lower end of said annular space, and a conical baffling ring of shorter diameter than said gasifying gutter arranged under said gutter and designed for directing the flames towards the centre of the combustion chamber.

6. An apparatus for the combustion of liquid fuels, comprising a combustion chamber of refractory material, a gutter shaped gasifier having a central opening, a vaulted cover for the gasifying gutter conforming to the configuration of the same and united to the outer edge thereof and arranged to conduct along the inner surface of its inner portion the gases generated in the said gasifying gutter and along the outer surface of its inner portion, the primary air for combustion, both the gases and the air being directed downwardly towards the center of the combustion chamber, means for supplying the gasifying gutter with fuel and a hood arranged over the gasifying gutter and the combustion chamber and arranged to form a passage for the inlet of air.

7. An apparatus for the combustion of liquid fuels, comprising a gutter shaped gasifier having a central opening, a vaulted cover for the said gasifying gutter conforming to the configuration of the same and united with the outer edge thereof and having a downwardly extending inner portion spaced from the inner edge of the said gutter, the said gutter being arranged to conduct along the inner surface of its inner portion the gases generated in the said gutter and along the outer surface of its inner portion the primary air for combustion, both the gases and air being directed downwardly and inwardly towards the center of the combustion chamber so that the flame, formed by the igniting gases, is forced in a downward direction.

In testimony whereof I affix my signature in presence of two witnesses.

ERICH BECKER.

Witnesses:
FERD. RUTHGER,
H. DEIBEL.