

May 14, 1940.

T. KINDER

2,200,673

OIL-AIR BURNER

Filed March 18, 1936

Fig. 1

Fig. 2

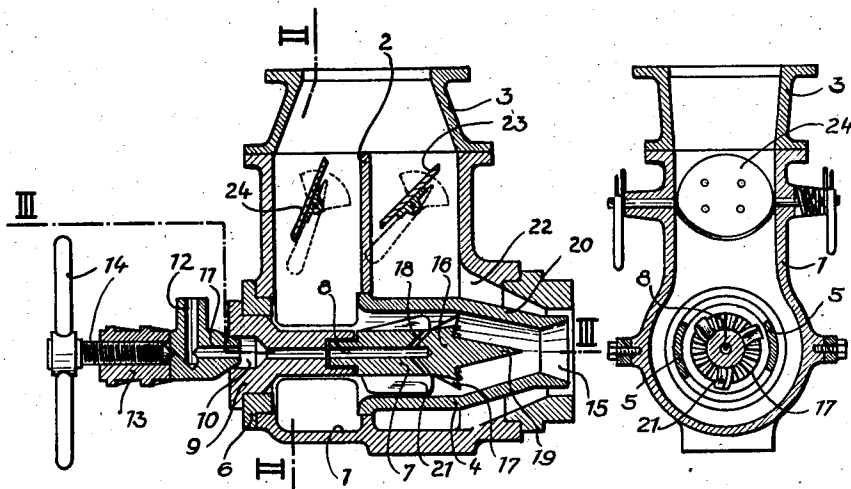
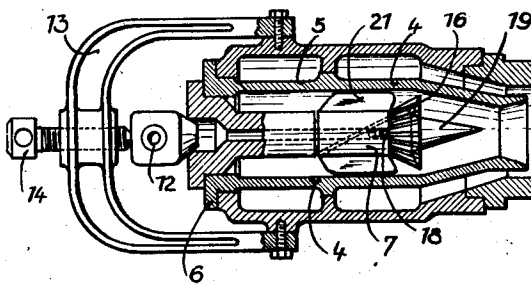


Fig. 3



Inventor:

Thor Kinder

UNITED STATES PATENT OFFICE

2,200,673

OIL-AIR BURNER

Theodor Kinder, Essen, Germany, assignor to
"Wistra", Ofenbau Gesellschaft mit beschränk-
ter Haftung, Essen, Germany

Application March 18, 1936, Serial No. 69,538
In Germany March 18, 1935

5 Claims. (Cl. 299-140)

This invention relates to burners operated with liquid fuel for heating furnaces and the like and in particular to a burner of this type which is operated with air at low pressure, that is, at a pressure equivalent to a 200-500 mm. column of water.

The object of the present invention is to construct an oil-air burner in which the liquid fuel is atomised by means of the air for combustion in such a way that complete atomisation of the fuel takes place in the burner without a pool of oil being formed therein and so that moreover there is complete combustion of the heating oil whilst avoiding a "blow-pipe" flame combustion.

The essential characteristic of the oil-air burner constructed according to the invention lies in the fact that in the atomiser passage of the burner an axially disposed atomiser pin is provided through which the oil is introduced, preferably by gravity in a substantially radial direction in the atomising passage and which carries at the end turned towards the burner mouth a frusto-conical toothed portion, the teeth of which project into the annular part of the atomiser passage serving to supply the air for atomisation.

The invention is moreover extended to the special construction of the enlarged portion of the pin which has a bowl-shaped depression at the side turned towards the burner mouth, whilst a conical extension piece arising from this depression is provided on the atomiser pin.

The invention consists moreover in the use of teeth on the widened portion of the atomiser pin which teeth extend transversely to the direction of the draught in the atomiser passage, whilst helical guiding surfaces, for example, in the form of sheet metal inserts are preferably provided in the draught passage and extend generally axially thereof, but are oblique to the teeth of the pin head.

Finally an essential feature of the oil-air burner according to the invention consists in the radially extending exits for the liquid fuel from the atomizer pin are arranged in the part of the atomiser passage which is traversed by the air in a substantially axial direction.

In the drawing, Figure 1 is a vertical section through an oil-air burner constructed according to the invention.

Figure 2 is a vertical section on the line II-II of Figure 1.

Figure 3 shows a horizontal section on line III-III through the burner shown in Figure 1.

The burner shown in the drawing comprises a housing 1 which has on one side a branch pipe 3, divided by a transverse wall 2, to which the air supply pipe is connected.

The part of the burner housing containing the device for spraying or atomising the liquid fuel extends perpendicularly to the air pipe 3.

This device consists of the atomiser casing 4 which is connected by means of arms 5 with an annular part 6 which is pushed into a corresponding opening of the burner housing 1 as can be seen from Figure 1 of the drawing.

The atomiser pin 7, provided with a longitudinal bore 8, is disposed in the atomiser casing. The pin is supported by a closing cover 9 which is inserted in the central opening of the annular part 6. The oil supply passage widens at the outside of the cover 9. The conical end 11 of the oil pipe 12 can be pressed into this widened portion 10 by means of a pressure screw 14 arranged on a tensioning bracket 13. Moreover by means of this pressure screw 14 the atomiser casing 4 is maintained in the burner housing.

The pin arranged in the atomiser casing carries in its end turned towards the burner opening 15 a frusto-conical head portion 16 which has on its periphery obliquely extending teeth 17 as can be seen from Figure 3. The oil exits 18 of the oil supply passage 8 are arranged behind the pin head 16 and are so disposed that the oil passes out from the pin passage in an essentially radial direction.

The pin head 16 is depressed at the forward end and carries a conical extension piece arising therefrom which projects into the conical constricted part 20 of the burner casing.

Obliquely lying guiding vanes 21 are also provided on the shaft of the atomiser pin 7 and are inclined, as can be seen from Figure 3, but extend with an inclination in the opposite direction to that of the teeth of the pin head 16.

The burner casing 20 is surrounded on the outside by a secondary air passage 22. The entry of the air to the secondary air passage is regulated by means of the throttle valve 23, and the quantity of the air for atomisation by means of the throttle valve 24.

The method of operation of the burner shown in the drawing is as follows:

The oil which preferably enters under gravity through the oil exits 18 in the atomising pin 7 into the atomiser passage is driven by the atomiser air against the teeth 17 of the pin head. It is distributed over a comparatively large area on

the teeth of the pin head and is there split up by the atomiser air into fine particles which remain in the air. Oil which may not have been atomised passes into the depression of the pin head and flows from thence to the pin cone 19 from the point of which it is finally removed in fine particles. By means of the strong turbulence of the air current in the atomiser passage practically complete atomisation of the fuel is already obtained at the pin head.

It may also be mentioned that the special arrangement of the oil exits 18 within the axially traversed part of the atomiser passage may also be used for oil burners which do not have a pin head of the character described. The burner according to the invention can also be used with advantage to atomise liquid fuels in fuel gases or in fuel gas-air mixtures, whereby a flame of extraordinarily high heating power is obtained which is of great advantage for the quick heating of certain types of industrial furnaces.

I claim:

1. An oil-air burner comprising an atomizing chamber, an atomizing pin extending lengthwise of said chamber, an atomizing head on said pin, said atomizing head having sharp pointed peripheral teeth, the walls of said chamber and said pin defining an annular passage therebetween, a plurality of oblique guiding vanes secured to said pin rearwardly of said teeth and extending into said annular passage, means for admitting air into said passage, and means for introducing oil into said passage behind said atomizing head.

2. An oil-air burner comprising an atomizing chamber, an atomizing pin extending lengthwise of said chamber, an atomizing head on said pin, said atomizing head having sharp pointed peripheral teeth and a concave forward face, the walls of said chamber and said pin defining an annular passage therebetween, a plurality of oblique guiding vanes secured to said pin rearwardly of said

teeth and extending into said annular passage, means for admitting air into said passage, and means for introducing oil into said passage behind said atomizing head.

3. An oil-air burner comprising an atomizing chamber, an atomizing pin extending lengthwise of said chamber, an atomizing head on said pin, said atomizing head having sharp pointed peripheral teeth, a concave forward face, and a sharp pointed extension disposed centrally of said concave face, the walls of said chamber and said pin defining an annular passage therebetween, means for admitting air into said passage, and means for introducing oil into said passage behind said atomizing head.

4. An oil-air burner comprising an atomizing chamber, an atomizing pin extending lengthwise of said chamber, an atomizing head on said pin, said atomizing head having sharp pointed peripheral teeth, a concave forward face, and a sharp pointed extension disposed centrally of said concave face, the walls of said chamber and said pin defining an annular passage therebetween, a plurality of oblique guiding vanes secured to said pin rearwardly of said teeth and extending into said annular passage, means for admitting air into said passage, and means for introducing oil into said passage behind said atomizing head.

5. An oil-air burner comprising an atomizing chamber, an atomizing pin extending lengthwise of said chamber, the walls of said chamber and said pin defining an annular passage therebetween, an atomizing head on said pin, said atomizing head being substantially of frusto-conical form with the larger end thereof directed toward the outlet end of said atomizing chamber, and a series of projections on said atomizing head and extending laterally into said annular passage, said projections terminating in sharp points directed toward the outlet end of said chamber.

THEODOR KINDER.