Oct. 7, 1930. W. R. KIEFER 1,777,524

OIL BURNER

Original Filed Nov. 18, 1926

Fig. 1.

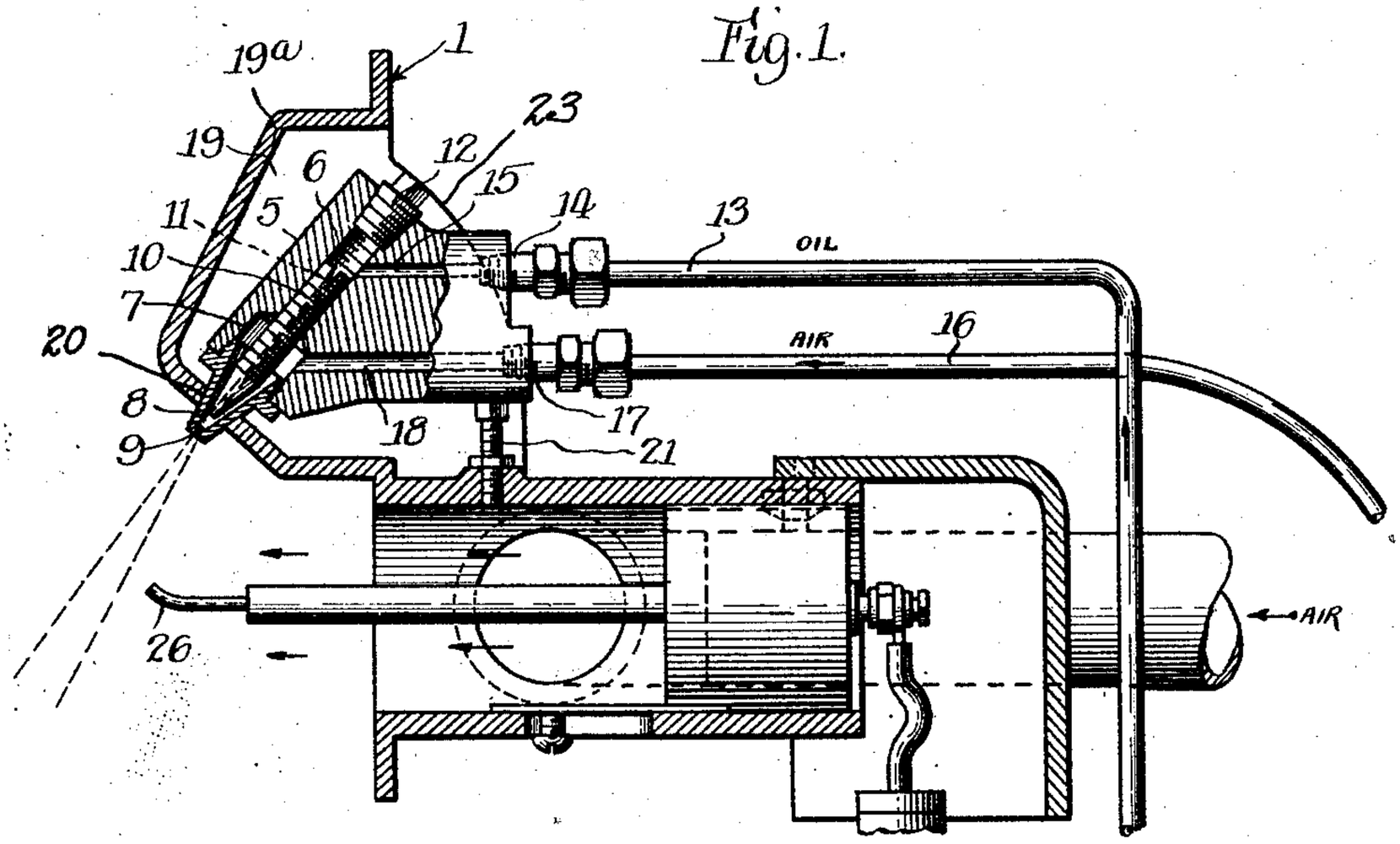
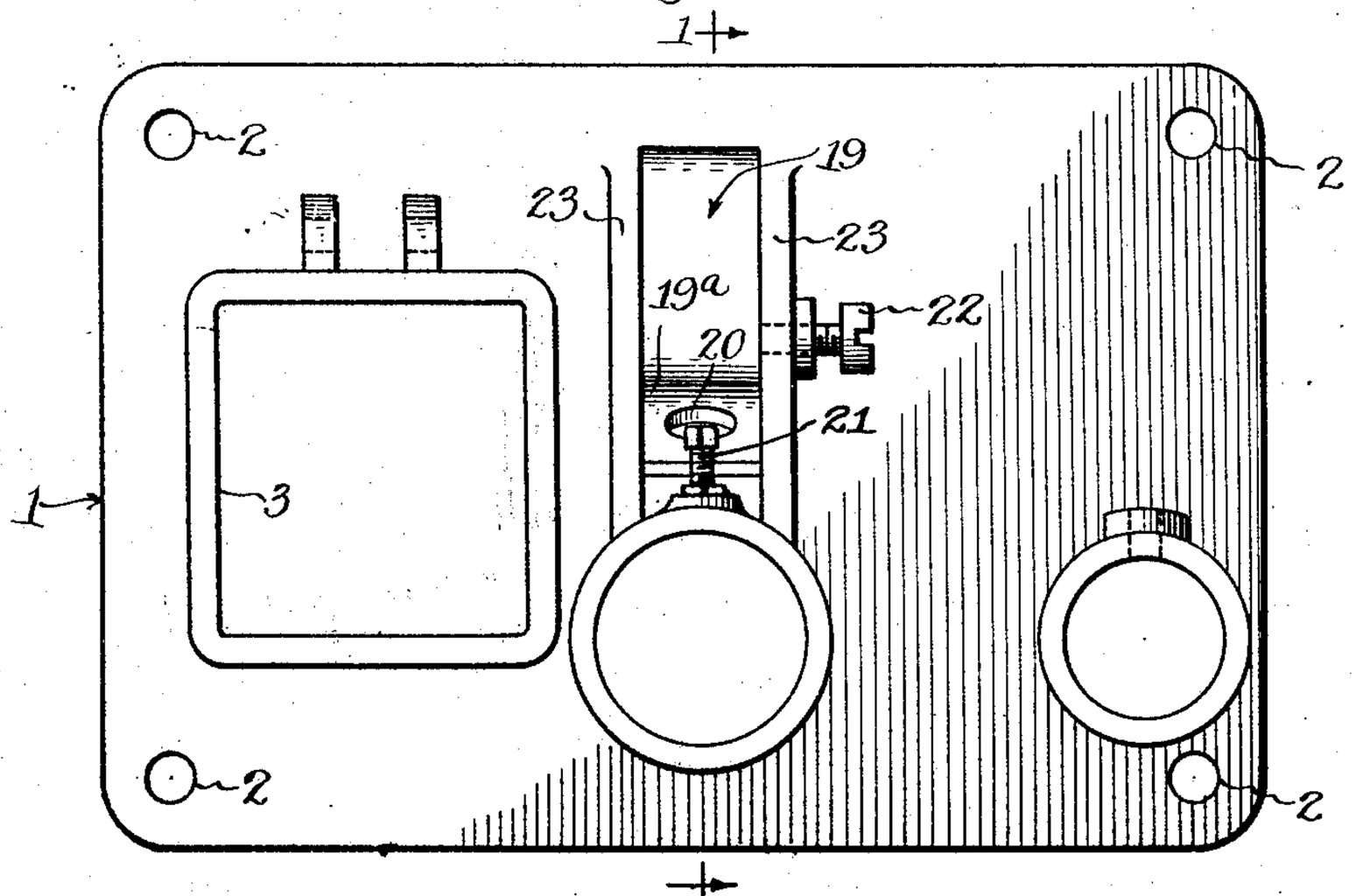


Fig. 2.



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UNITED STATES PATENT OFFICE

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OIL BURNER

Original application filed November 18, 1926, Serial No. 149,042. Divided and this application filed June 4, 1928. Serial No. 282,521.

The invention relates particularly to a spray nozzle construction and mounting for oil burners of the type in which the combustible mixture is sprayed into a combustion chamber.

This application is a division of my application Serial No. 149,042, filed November 18, 1926, covering an oil burner. For a disclosure of one form of oil burner in which the nozzle construction herein shown may be used reference may be had to application Serial No. 90,452, filed February 25, 1926, by Gustaf David Sundstrand.

The primary object of the present invention is to provide a new and improved oil burner having a nozzle structure and mounting therefor arranged to provide an air jacket about the nozzle so as to prevent the nozzle from becoming excessively heated and thereby avoid clogging of the nozzle due to the carbonizing of the oil therein.

Other objects and advantages will become apparent from the following description taken in connection with the accompanying drawings in which:

Figure 1 is a vertical sectional view of an apparatus embodying the preferred form of the invention, the view being taken approximately on the line 1—1 of Fig. 2.

Fig. 2 is a detail front view of a plate or casting which is adapted to close the opening through which coal is ordinarily introduced into the ordinary house-heating furnace.

The invention will be herein described as it is customarily applied to an ordinary domestic furnace originally intended to burn coal or other solid fuel, but it will be understood that the invention is not limited in all its aspects to such use.

In the drawings the invention is embodied in means adapted to spray a combustible mixture of oil and air into a combustion chamber (not shown), said spraying means comprising a nozzle which is supported just inside the furnace by means of a rectangular plate or casting which is substituted for the door that normally closes the opening through which coal is introduced into the furnace. The plate or casting referred to is shown in Fig. 2 and is designated 1. It is rigidly secured in position by means of bolts extending through openings 2. In said plate is an inspection opening 3 which is normally closed by a hinged door (not shown).

The nozzle structure comprises a body 5 having a bore 6, the lower portion of the bore being enlarged to form a chamber 7. To the lower portion of the body 5 is secured a nozzle or funnel 8 which has a screw-thread engagement with the lower portion of the walls of the chamber 7. In the inner end of the funnel 8 is a discharge orifice 9. The walls of the bore 6 are screw-threaded to receive an adjusting screw 10, the lower end of which is tapered to correspond with the interior taper of the nozzle 8. The screw 10 is adjusted so as to leave an annular space between the conical end of the screw and the nozzle 8. An axial duct 11 extends from one end to the other of the screw 10. The upper end of the bore 6 is normally closed by means of a screw plug 12, which plug may be removed when it is desirable to adjust the screw 10 or clean out the parts.

Fuel oil under pressure is supplied through a tube 13 which is connected to the body 5 at 14 and communicates with a passage 15 which communicates with the bore 6 at a point between the adjusting screw 10 and the screw plug 12.

Compressed air is supplied through a tube 16 which is connected to the body 5 at 17 and communicates with a passage 18 that extends to the chamber 7.

It will be seen that oil supplied through the pipe 13 will enter the bore 6 and thence flow through the duct 11 and out through the nozzle 8; and that the compressed air admitted through the pipe 16 will flow through the annular space between the nozzle 8 and the screw 10 and, mingling with the oil, will be discharged through the orifice 9.

The nozzle structure just described is supported and protected from excessive heat by means including an air jacket comprising a chamber 19 formed by walls 19ª which are preferably formed integral with the plate 1 and project from the inner side of said plate.

The outer side of the chamber 19 is open to the atmosphere, as indicated in Fig. 2. The body 5 is adapted to extend into the chamber 19, there being a "foundry fit" between the vertical sides of the body 5 and the vertical side walls of said chamber. (By "foundry fit" is meant a fairly close fit such as is obtainable between unmachined castings.) The funnel 8 extends into an opening 20 in the lower wall 19ª of the chamber 19. The body 5 is supported within the chamber 19 by means of the funnel 8 which engages the sides of the opening 20 and by an adjusting screw 21 on which the outer end of the body rests. In adjusting the body 5 so that the spray of fuel will be so discharged at the proper angle, the body 5 is simply drawn back far enough to allow it to fulcrum on some portion of the walls of the opening 20. It will be understood that there need not be a tight fit at all points between the nozzle and the walls of the opening 20. After the body 5 has been set in position to direct the spray to the proper point in the combustion chamber (not shown), the body 5 is secured in such position by means of a set screw 22 (Fig. 2) extending through a web 23 which forms a forward extension of the side walls 19ª of the chamber 19. The tubes 13 and 16 are sufficiently flexible to permit of the described adjustment of the nozzle structure 5.

As shown in Fig. 1, the nozzle body 5 does not completely fill the chamber 19, there being a space below, behind and above the nozzle body so as to permit air to flow by convection from the lower portion of the chamber 19 up and out through the upper portion thereof. The flow of air thus obtained serves to protect the nozzle structure from the intense heat within the combustion chamber.

In the form herein illustrated, an electric spark ignition means is shown which has a pair of spark terminals 26 positioned adjacent the path of a spray of fuel from the nozzle 8.

Further description of the ignition device is not deemed to be necessary since it is described in detail and claimed in my copending application Serial No. 149,042 filed November 18, 1926.

From the foregoing description it will be apparent that the invention provides a structure which will serve effectively to increase the efficiency of the oil burner since the provision of the air jacket about the nozzle 8 will prevent the nozzle from becoming excessively heated and will prevent clogging of the nozzle which would ordinarily be caused by such excessive heat.

It will also be apparent that the invention provides a fuel nozzle mounting wherein the fuel nozzle is readily accessible for adjustment or cleaning from the outside of the plate.

I claim as my invention:

1. In an oil burner, a plate adapted to close the fuel opening of a furnace, a chamber on the inner side of said plate, the forward side of said chamber being open, a nozzle structure within said chamber and comprising a nozzle projecting through an opening in the lower portion of said chamber, said nozzle structure being accessible for adjustment or cleaning from the outer side of said plate, an adjustable support carried by the plate for the outer portion of the nozzle structure whereby the nozzle structure may be tilted to proper angle, said nozzle serving as a fulcrum in such adjustment, and means for securing the nozzle structure in adjusted position in said chamber.

2. In an oil burner, a plate adapted to close the fuel opening of a furnace, a chamber on the inner side of said plate, a nozzle structure within said chamber and comprising a nozzle projecting through an opening in the lower portion of said chamber, an adjustable support carried by the plate for the outer portion of the nozzle structure whereby the nozzle structure may be tilted to proper angle, said nozzle serving as a fulcrum in such adjustment, and means for securing the nozzle structure in adjusted position in said chamber.

3. In an oil burner, a plate adapted to close the fuel opening of a furnace, a chamber on the inner side of said plate, the forward side of said chamber being open, a nozzle structure within said chamber and comprising a nozzle projecting through an opening in said chamber, an adjustable support carried by the plate for the outer portion of the nozzle structure whereby the nozzle structure may be tilted to proper angle, said nozzle serving as a fulcrum in such adjustment, and means for securing the nozzle structure in adjusted position in said chamber.

4. In an oil burner, a plate adapted to close the fuel opening of a furnace, a chamber on the inner side of said plate, the forward side of said chamber being open on the outer side of said plate, two webs forming forward extensions of the side walls of said chamber, a nozzle structure within said chamber and between said webs, said structure comprising a nozzle projecting through an opening in the lower portion of said chamber, said nozzle structure being accessible for adjustment or cleaning from the outer side of said plate, an adjustable support carried by the plate on which the outer portion of the nozzle structure rests whereby the nozzle structure may be supported at the proper angle, said nozzle serving as a fulcrum in such adjustment, and means carried by one of said webs for clamping the nozzle structure against the other web.

In testimony whereof, I have hereunto affixed my signature.

WILLIAM RAY KIEFER.