March 19, 1935. F. E. HERR 1,995,099

BURNER

Original Filed March 10, 1930

Fig. 1.

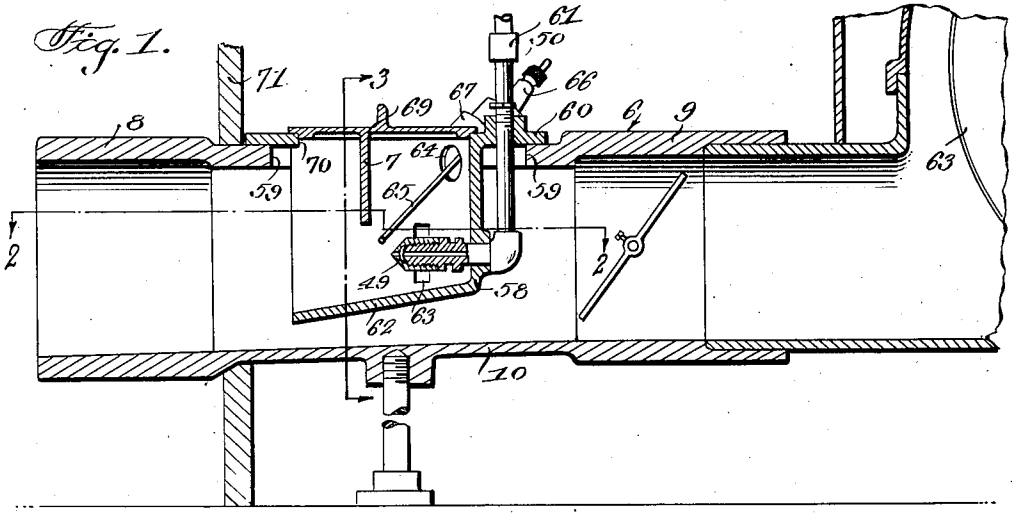
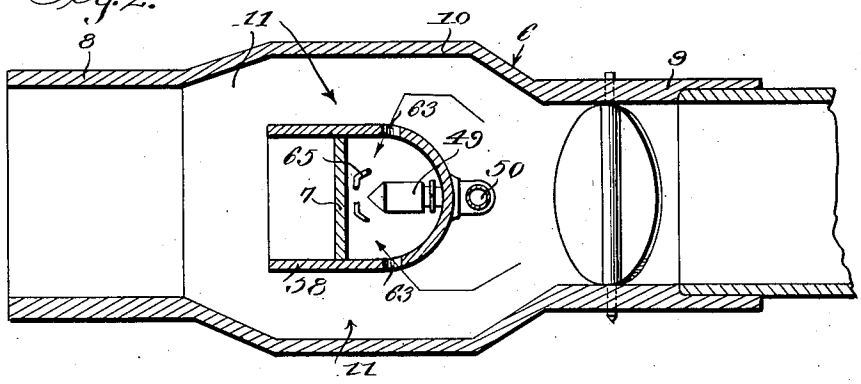


Fig. 2.



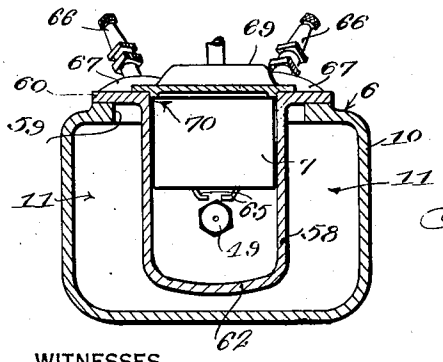


Fig. 3.

WITNESSES

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BURNER

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Application March 10, 1930, Serial No. 434,642
Renewed January 28, 1935

6 Claims. (Cl. 158—76)

This invention is an improvement in burners, and it consists of the constructions, combinations and arrangements herein described and claimed.

An object of the invention is to provide a burner especially adaptable to oil but which can be used for burning other substances, so arranged that the ignition point is readily accessible and visible, thus enabling any defect either in the electrodes or nozzle to be remedied.

Another object of the invention is to equip the firing or ignition chamber with a shield for the purpose of guarding the electrodes so that these will not be exposed to the intense heat of the flame and thus burnt off, nor laid liable to becoming covered with partly distilled oil and thus fouled and clogged.

Other objects and advantages will appear in the following specification, reference being had to the accompanying drawing in which

Figure 1 is a longitudinal section of the improved burner.

Figure 2 is a horizontal section taken on the line 2—2 of Figure 1.

Figure 3 is a cross section taken on the line 3—3 of Figure 1.

This application is a continuation in part of an application for patent for oil burners, filed by Frank E. Herr, August 9, 1928, Serial No. 298,568. The burner 6 is substantially the same as the corresponding burner in the foregoing application but embodies an improvement which resides in a shield 7 (Figs. 1, 2 and 3), the primary purpose of which is to guard the electrodes against the intense heat of the flame.

The burner 6 may be generally described as an irregularly shaped tubular housing. This has cylindrical ends 8, 9 and a connecting central section 10 which is flat on top and at the bottom but made with bulging sides (Fig. 2) to define side air passages 11.

A nozzle 49 is arranged to spray a combustible fluid consisting of a mixture of oil and air in the present instance. This fluid is supplied by a pipe 50. The nozzle occupies a position in a cup-shaped device 58 herein known as the firing or ignition chamber. A portion of the supply pipe 50 is situated within the burner housing 6 and is subjected to the heat thereof.

This chamber is inserted through an opening 59 in the top of the burner housing 6. It has a surrounding flange 60 which not only limits the insertion of the chamber 58 but also makes a complete closure of the opening 59. The flange will be secured in any suitable way.

In practice there will be a coupling 61 in the pipe 50 and by loosening this as well as removing the securing means by which the flange 60 is held in place it becomes possible to lift the entire firing chamber 58 out of the burner housing for any purpose whatsoever.

The firing chamber 58 has parallel straight sides (Fig. 2) but the bottom 62 is sloping toward the cylindrical outlet end 8 so as to compress beneath it the air delivered by a blower 63 to the cylindrical inlet end 9, the effect of the compressed stream in confluence with the lateral streams in the side passages 11 (Fig. 2) being to produce a thorough mixture with the fuel spray at a place immediately in front of the open end of the firing chamber 58.

A pair of side slots 63 is in proximity to the nozzle 49 so as to deliver diagonal streams of air in the direction of the tip of the nozzle 49 (see arrows Fig. 2). Holes 64 higher up in the sides of the firing chamber 58 also deliver streams of air into the firing chamber and provide places where the electrodes 65 of a pair of spark plugs 66 are admitted.

These spark plugs are screwed into bosses 67 on the flange 60 of the firing chamber. The spark plugs are thus carried by the firing chamber and are removable with it. However, it is unnecessary to remove the entire firing chamber for a mere inspection of the electrodes, nor in fact is it necessary to remove the spark plugs 66 for that purpose, it only being necessary to remove a cover 69 which normally closes an opening 70 in the flange 60 from which the firing chamber 58 depends.

It is to the cover 69 that the shield 7 is attached. The removal of the cover 69 enables a thorough inspection of the ignition point which occurs at the terminals of the electrodes near the end of the nozzle 49. This ability to inspect the ignition point is regarded as a distinct feature of advantage over the so-called gun-type burner according to which the atomized oil is ignited within the combustion chamber of the furnace or boiler 71.

This type of burner is entirely inaccessible for inspection of either the spray nozzle or spark plug electrodes. These electrodes are not protected in any way, hence are subjected to a very high degree of temperature as well as a deposit of partly distilled oil. They become crystallized, fouled, clogged and burned off. In this type of burner it is the wasteful practice of forcing cold air directly into the combustion chamber of the furnace and the formation of cold air currents

therein which tends to lower the efficiency of the heating apparatus.

In the operation of the improved burner in which these defects are overcome, two air currents enter the round or otherwise shaped holes 64 and are deflected by the shield 7 down over the electrodes 65 and nozzle 49 where they meet the diagonal air currents entering at the side slots 63. The latter air currents tend to straighten out the former, resulting in a solid current of air which is carried out under the shield 7 to the front of the firing chamber 58, the effect of the commingling air currents behind the shield being to avoid the formation of dead eddies of air.

As the ignition takes place the spray, expanding burning gases and flame are immediately carried away. Neither flame nor reflected heat can reach the electrodes 65. Nor will they become covered with oil spray or sediment. They will be protected from over heating and burning off. To prevent these occurrences is the function of the shield 7.

The introduction of the firing chamber 58 in the burner housing at the place shown locates this part well outside of the furnace where it is readily gotten at for any desired purpose. The cylindrical outlet end 8 immediately beyond the firing chamber 58 will be filled with flame, the whole arrangement being such that nothing but flame is discharged into the furnace 71. The interior will not be cooled by unwarmed air currents. There is thus no chance of any diminution in the heat.

As the blast of air from the blower 63 strikes the rear end of the firing chamber 58 the formerly solid current of air is divided into seven separate currents. Four of these pass through the openings 63, 64 in the chamber 58, the remaining three flowing through the side air passages 11 (Fig. 2) and at the place beneath the bottom 62 (Fig. 1). The resulting swirling action of the air currents will produce a thorough mixture therewith of the fuel spray, which mixture, when ignited, produces the solid flame already referred to.

Thus it will be understood that the purpose of the shield 7 is to keep the flame out of the back of the firing chamber 58. The nozzle 49 and electrodes 65 will be kept relatively cool. The cross currents of air occurring within the ignition chamber will blow away any settlement likely to occur on either the electrodes or nozzle so that these parts are not likely to become destroyed.

While the construction and arrangement of the improved burner is that of a generally preferred form, obviously modifications and changes may be made without departing from the spirit of the invention or the scope of the claims.

I claim:—

1. A burner comprising a housing having an opening, an ignition chamber inserted in the opening, fuel feeding and igniter means extending into said chamber, and a cover for the ignition chamber which can be taken off to inspect the interior of the ignition chamber without abstracting the ignition chamber from the housing opening or disturbing said fuel feeding and igniter means.

2. A burner comprising a housing through which an air current is movable, means at which a combustion fluid is introduced, means to ignite said fluid and produce a flame, and imperforate means to deflect said current over the ignition means and solely around the edge of the imperforate means to guard the ignition means from the flame.

3. A burner for liquid-fuel heating apparatus comprising a housing having an outlet to be directed into a furnace, means to introduce a blast of air to support combustion, a nozzle to discharge a fuel spray to commingle with the air, electrodes adjacent to the nozzle for igniting the spray and causing a flame in said outlet, and an imperforate shield situated adjacent to the ends of the electrodes and nozzle to deflect the air blast theretoward and keep the flame away from the electrodes and to prevent burning them off.

4. A burner comprising a housing with a flame outlet and an opening, cup-shaped means introduced at the opening defining an ignition chamber having the open end adjacent to the outlet, said chamber having an inspection opening, a nozzle extending into the chamber and directed toward the outlet, electrodes also extended into the chamber to a point adjacent to the end of the nozzle, and a cover for the inspection opening having a shield extending to guard the electrodes from the effects of a flame in the outlet and open end of the ignition chamber.

5. A burner comprising a housing having a flame outlet and an opening on one side, a separable ignition chamber seated in the opening, in turn having an open end and having an inspection opening, fuel feeding and igniter means attached to and introduced into the ignition chamber, and a separate and removable cover for the inspection opening, said cover having a shield extending into proximity with the fuel feeding and igniter means.

6. A burner comprising a housing with a flame outlet and an opening, cup-shaped means introduced at the opening defining an ignition chamber having the open end adjacent to the outlet, said chamber having an inspection opening, a nozzle extending into the chamber and directed toward the outlet, said nozzle having a connected feed pipe, electrodes also extended into the chamber to a point adjacent to the nozzle, a cover for the inspection opening having a shield extending to guard the electrodes from the effects of a flame in the outlet and open end of the ignition chamber, and a flange on the cup-shaped means, said flange limiting the introduction of said means into the housing opening and providing a support for said feed pipe and electrodes.

FRANK E. HERR.