Oct. 30, 1956 C. H. TRAVER 2,768,677

PILOT BURNER AND IGNITER THEREFOR

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Fig. 2

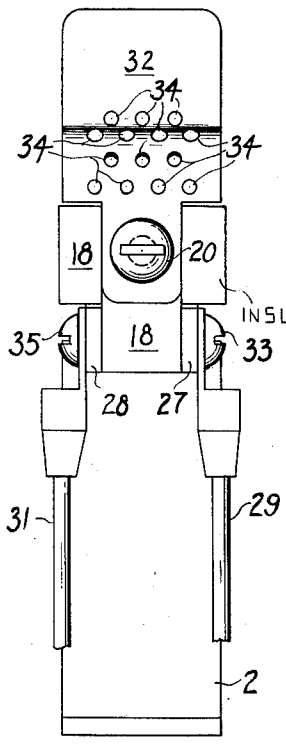


Fig. 1

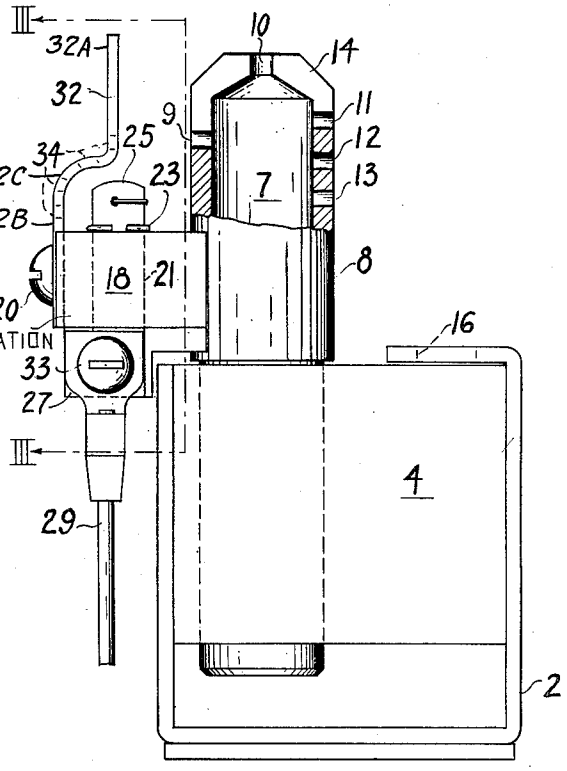


Fig. 3

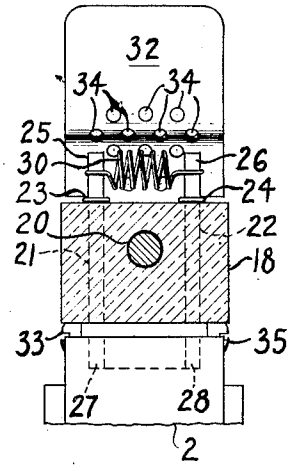
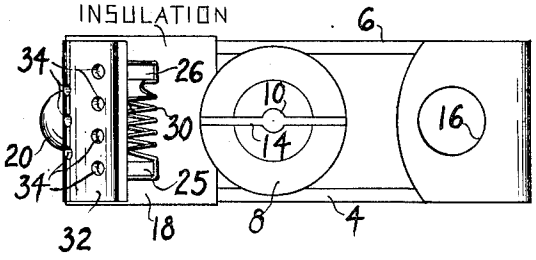


Fig. 4



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PILOT BURNER AND IGNITER THEREFOR

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2 Claims. (Cl. 158—115)

This invention concerns a novel type of pilot igniter for use in conjunction with a pilot burner in a fluid fuel burner system, such as a domestic gas burner or appliance.

The direct flame supplied by a constant burning gas pilot is almost universally employed as a means for igniting gas burners and appliances. Such a pilot is usually located adjacent to the main burner of the appliance or, as in the case of domestic gas ranges, provides a single source of ignition whereby one or more burners can be ignited with the aid of a suitable arrangement of flash tubes. However, a source of ignition for the pilot burner is necessary to effect initial operation or to re-ignite the pilot in the event of flame failure during operation. The igniters used may be of several types, such as spark electrode igniters, resistance wire coil igniters, cold catalyst igniters, etc. This invention concerns an improved type of resistance wire coil igniter that is characterized by a high degree of operating efficiency and longevity.

Resistance wire coil igniters, which become incandescent when electrically energized, are subject to the following requirements for application in gas burner systems: rapid attainment of ignition temperature to prevent dangerous accumulation of gas, long and reliable operating life of components, especially the resistance wire coil, and relative independence of the igniter's operation from ambient pressure and temperature variations prevailing in the igniter environment. Factors such as the type of gas, temperature, composition and size of wire, air-gas ratio and velocity of the mixture will largely determine the speed of response or time lag before actual ignition occurs. Therefore, these factors together with the requirement of longevity of components and isolation from excessive temperature must be considered in the design and utilization of a resistance wire coil igniter. This invention provides a novel igniter having performance characteristics which fulfill the requirements heretofore mentioned.

The resistance wire coil igniter has a limited and relatively short life if subjected to excessive and prolonged heat. Under these conditions the wire coil tends to become oxidized and crystallized. An object of this invention is to provide an igniter isolated from the effects of excessive heat and still capable of successful ignition without requiring mechanical contrivances to bodily move the igniter from the ignition area. This object is accomplished by the utilization of a novel igniter baffle which aids the ignition process and increases the longevity of the coil in a manner to be subsequently described.

These and further objects will be apparent from the following description and more particularly pointed out in the appended claims.

In the drawing, Fig. 1 shows a right side view, partly in section, of a pilot burner assembly;

Figure 2 shows a front view of the pilot burner assembly;

Figure 3 shows a rear view of the igniter assembly, taken along the lines III—III of Figure 1; and

Figure 4 shows a top view of the pilot burner assembly.

Referring now to Figure 1, a U-shaped support and mounting bracket 2 provides a means for positioning and supporting the combined igniter and pilot burner assembly in proximity to a main burner or burners (not shown). Side plates 4 and 6 (Figure 4) are secured to the bracket 2 by spot-welding or some similar means. The pilot burner tip 8 is inserted between the plates 4 and 6 and secured by spot-welding. As shown in Figure 1, the burner tip 8 has a central opening 7 for the admission of a gas-air mixture from a source of supply, and flame ports 9, 10, 11, 12 and 13 for the emission of the inflammable mixture. With the aid of a connecting slot 14 a system of ports is formed which enables the igniter flame at port 9 to be transmitted to the other ports. The purposes of ports 10, 11, 12 and 13 are to ignite a proximate main burner or burners and to heat a temperature responsive element (not shown).

The igniter assembly will now be described. A ceramic block 18 is secured to the burner tip 8 by means of a retaining screw 20. The block 18 serves as a support for the igniter assembly components and as an electrical and thermal insulator. Two electrical conducting strips 21 and 22 are inserted in longitudinal slots through the block 18, and extend beyond the top of block 18. The strips 21 and 22 are retained in position by means of lock wires 23 and 24. The ends 25 and 26 of strips 21 and 22, respectively, project above the top surface of block 18 and support and electrically connect an ignition coil 30. The opposite ends of strips 21 and 22, extending below the block 18 form a pair of electrical terminals 27 and 28, respectively. A source of electrical power may be connected to the leads 29 and 31 which are fastened by screws 33 and 35 to the terminals 27 and 28, respectively. Thus, the ignition coil 30 is electrically connected to a source of power exteriorly of the pilot assembly in a manner that effectively insulates the electrical connections from the source of heat at the pilot but permits the energization of the igniter within the flame area. The coil 30 is composed of turns of a suitable resistance wire, such as "nichrome" or platinum alloy wire, having the desired characteristics. In this respect a wire is chosen that responds rapidly to the passage of electric current to attain incandescence without a significant amount of oxidation. A preferred type of wire is an alloy of 90% platinum and 10% rhodium, but obviously any other material having similar characteristics may be utilized. As shown, the coil 30 is spot-welded at each of its ends to the ends 25 and 26 in a position above the surface of block 18.

An igniter baffle 32, formed of sheet metal, is secured within a slot in block 18 by means of screw 20. As shown, the baffle 32 is chair-shaped and provided with holes 34. The function of baffle 32 will be subsequently pointed out. It is noted that the baffle 32 is formed of sheet stock with a pair of generally parallel extending strips 32A and 32B integrally joined by the arcuate portion 32C and with a series of apertures 34 extending through said arcuate portion 32C, as well as through contiguous portions of the strips 32A and 32B, as shown in Figures 1 and 2. The strip 32A extends slightly above the burner tip but is, as shown, horizontally spaced from the burner tip.

In operation, a gas-air mixture is supplied through the body of the burner tip 8 and simultaneously there is completed a circuit to the coil 30 through leads 29 and 31. Coil 30 rapidly attains igniting temperature and thereupon ignites the gas-air mixture issuing from port 9. The baffle 32 creates a combustion area above the coil 30 and between the baffle 32 and the body of burner

tip 8, which is the locus for ignition. After ignition takes place at port 9, slot 14 causes ignition of the remaining ports.

The effectiveness of the baffle 32, as a means for preventing excessive heat from the flame issuing from the port 9 to affect the coil 30, is probably due to three main factors; the shape of baffle, the location of the baffle, and the baffle holes 34. The purpose and effect of the shape and location of the baffle 32 is readily apparent from a view of the drawing, particularly Figure 1, wherein a semi-confined combustion area for ignition is obtained, and the arcuate portion 32C of the baffle appears to act as a reflector for the coil 30 to direct its radiant heat generally in the region between the port 9 and the coil 30 with some of such radiant heat being directed back to said coil itself for elevating the temperature of the mixture within such region, as well as the temperature of the coil itself, and also permits the escape of flame and heat upwardly. It appears that the holes 34 maintain the baffle 32 and neighboring components, such as the coil 30 and block 18, at relatively low temperatures during the period in which the pilot is burning. This is probably due to the facility with which cooling air is drawn through the holes and circulated past the coil and upwardly towards the flame, and in addition permits a rapid dissipation of heat transferred to the upper portion of the baffle 32 from the flame at the port 9.

In some installations the igniter could be utilized to ignite the main burner and eliminate the need for a pilot burner. Also in the system heretofore described, after ignition of the main burner has been accomplished the pilot valve, which controls the flow of gas to the pilot burner, may be closed by a temperature responsive element, responsive to flame at the main burner. This would result in the extinguishment of the pilot burner during operation of the main burner.

It is intended that this invention be limited only by the scope of the appended claims.

What is claimed is:

1. A combined burner and igniter device comprising a burner body, a baffle of thin strip metallic material facing said burner body and having lower and upper generally parallel extending portions which extend upwardly and are joined by an offset portion, an insulation block positioned in proximity to the burner body, an igniter coil mounted on said block between the lower portion of said baffle and said burner body, said burner body having a port spaced on a horizontal level from said upper portion and arranged to produce a flow of mixture to a region including said coil to effect ignition of a combustible mixture supplied by said burner body port, said offset portion partially overlying said region including said coil, the upper, lower and offset portions of said baffle being perforated, said offset portion having an inwardly concave surface formed about an axis which approximately coincides with or is closely adjacent to the axis of the coil to reflect radiant heat to the region of the coil.

2. An arrangement as set forth in claim 1 in which said burner body has a main flame port above the aforementioned port, said upper portion of said baffle extending upwardly between the horizontal levels of said aforementioned port and said main flame port and spaced horizontally therefrom.

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