April 26, 1938. J. T. MARVIN ET AL 2,115,370

TOP LIGHTER

Filed Feb. 19, 1934 2 Sheets-Sheet 1

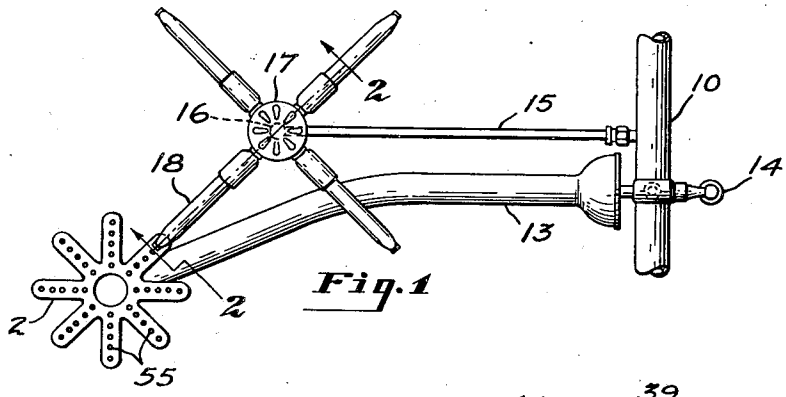


Fig. 1

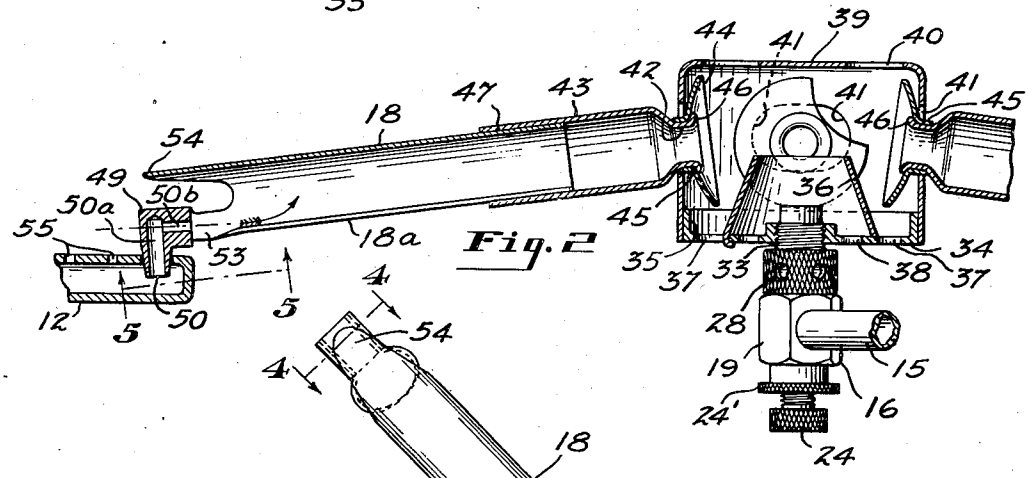


Fig. 2

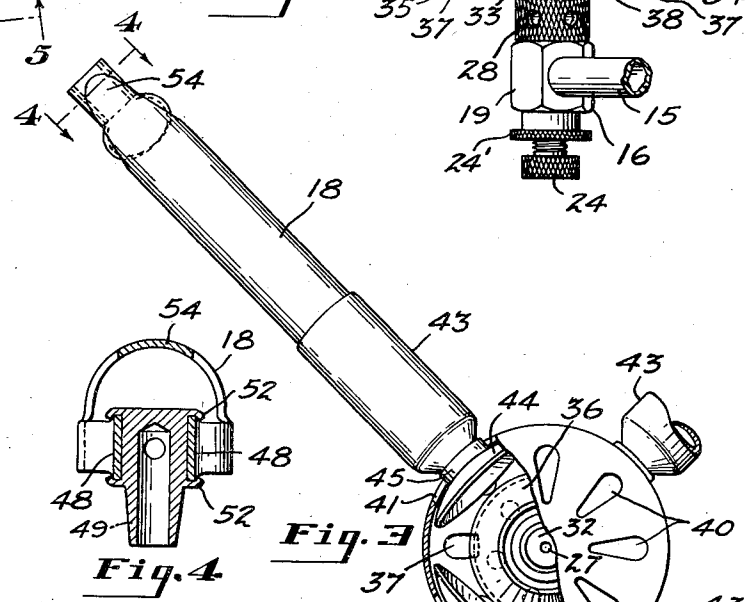


Fig. 4

Fig. 3

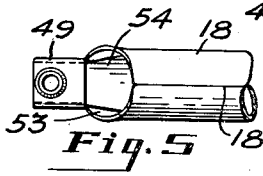


Fig. 5

INVENTORS
Birchard L. Matthews
John T. Marvin
BY
Edmund S. Roger
ATTORNEY

April 26, 1938. J. T. MARVIN ET AL 2,115,370

TOP LIGHTER

Filed Feb. 19, 1934 2 Sheets-Sheet 2

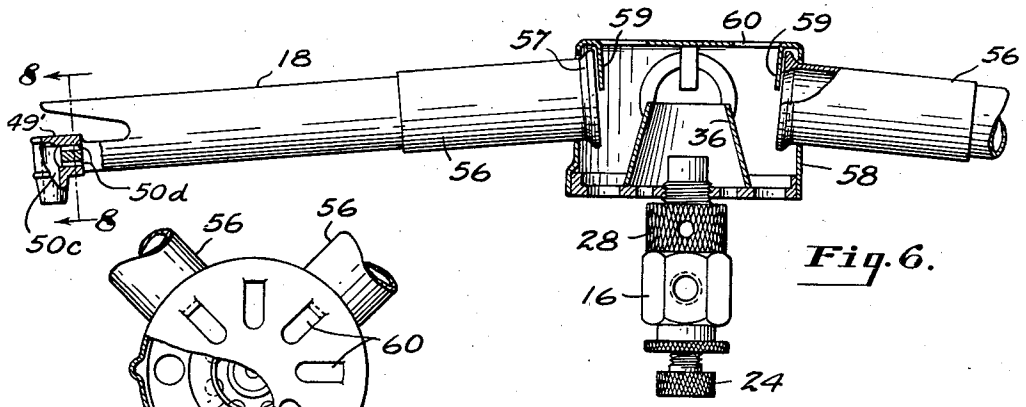


Fig. 6.

Fig. 7.

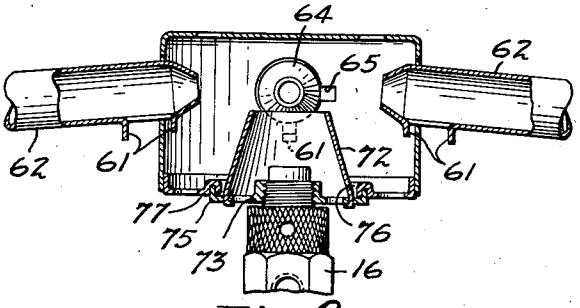


Fig. 9.

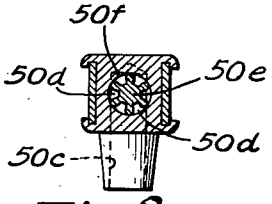


Fig. 8.

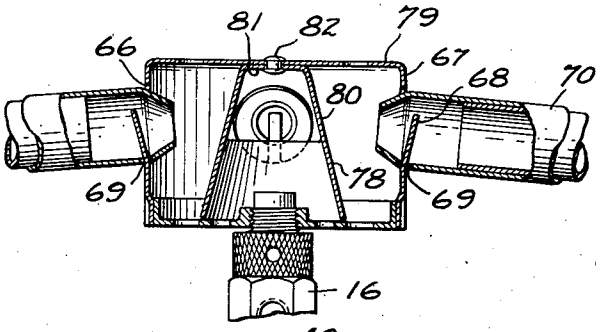


Fig. 10.

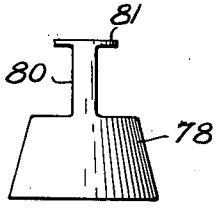


Fig. 11.

INVENTORS
Birchard L. Matthews
John T. Marvin
BY Edmund B. Rogers
ATTORNEY

Patented Apr. 26, 1938 2,115,370

UNITED STATES PATENT OFFICE

2,115,370

TOP LIGHTER

John T. Marvin and Birchard L. Matthews, Cleveland, Ohio, assignors to The Patrol Valve Company, Cleveland, Ohio, a corporation of Ohio

Application February 19, 1934, Serial No. 711,972

6 Claims. (Cl. 158—115)

This invention relates to ignition devices and particularly to ignition devices used for igniting the burners of a gas range from a constantly burning pilot in which the pilot is spaced some distance from the burner or burners to be ignited.

This invention resides in the features of novelty described and claimed herein and disclosed in the accompanying drawings wherein:

Fig. 1 is a plan view of a portion of the top of a gas range showing the ignition device in operative relation to a burner.

Fig. 2 is a vertical elevation partly in section, taken on the line 2—2 of Fig. 1 and showing details of the ignition device.

Fig. 3 is a top plan view of the device shown in Fig. 3, with a portion of the pilot housing broken away.

Fig. 4 is a vertical section taken on the line 4—4 of Fig. 3 and shown on an enlarged scale the construction of the outer tip of the flash tube.

Fig. 5 is a bottom plan view of the outer end of a flash tube taken on line 5—5 of Fig. 2, but with the burner omitted.

Fig. 6 is a view partly in section showing another mounting for the flash tube in the pilot housing.

Fig. 7 is a top plan view partly broken away, of the pilot housing shown in Fig. 6.

Fig. 8 is a view taken on line 8—8 of Fig. 6, showing another tip construction.

Figs. 9 and 10 are vertical views, partly in section through pilot housings showing modified forms of mountings for the inner ends of the flash tubes, and other details of the pilot housing and tube support, and

Fig. 11 is an elevational view of the chimney or guard for the pilot burner shown in Fig. 10.

Referring to the drawings for a detailed description of the invention, in Fig. 1 are shown details of the general set up of the lighter. In this figure, 10 designates the manifold of a gas range, 12 indicates one of the burners and 13 a gas and air mixing tube that mixes the gas from the mains with air, and conducts the mixture from the manifold to the burner. A gas cock 14 controls the flow of gas from the manifold to the burner 12. A tube 15 conducts gas from the manifold to a constant pilot burner 16 enclosed in a housing 17 and this tube 15 also is designed as a support for the pilot burner. A tube 18 connects the burner 12 with the pilot housing for conveying a gas mixture from the burner to the pilot 16 for ignition, as will be more fully explained hereinafter.

The pilot burner 16 illustrated is one of an ordinary blue flame type and comprises a body 19 having a suitable orifice in the gas passage therein through which gas flows from tube 15 to provide a flame at upper end of the burner within the housing 17. Suitable adjusting means, as the needle valve 24 shown, may be provided for regulating this pilot burner. Also, there may be employed an adjustable air shutter 28 to produce the proper mixture of gas and air at the burner. Lock nut 24' illustrated is used to fix the adjustment of the needle valve 24 in the housing 19.

The upper part of the valve body 19 has a reduced portion externally screw-threaded as indicated at 33 for receiving and supporting the circular base plate 34 of the pilot housing. The periphery of the plate 34 is turned upward to provide a flange 35. The plate supports a cone-shaped member 36 disposed around the pilot flame and is provided with a plurality of ports 37 between the cone and its periphery and other ports 38 between the cone and pilot burner. The former ports insure an adequate supply of air to the pilot housing and the latter ports a similar supply to the pilot burner. The primary function of the cone 36 is to serve as a stack or chimney for the pilot burner whereby controlled oxidation and greater burning efficiency are obtained.

The pilot housing comprises an inverted cup-shaped member 39 that engages the flange 35 of the base plate 34 snugly and is supported thereby. The top of the member 39 is provided with a plurality of openings 40 for the free flow of air and the products of combustion therethrough.

The peripheral wall of the member 39 is provided with a plurality of properly spaced horizontally elongated slots 41 here shown as four in number. Each of these slots receives the reduced inner end 42 of a cylindrical sleeve 43, and is adjustably held in place in the slot by means of a dished member 44 disposed inside the pilot housing and which has a central flange 45 slidably mounted over the reduced portion 42 of sleeve 43. After the member 44 has been properly placed, the inner end of the reduced portion 42 is swaged over as indicated at 46, thus maintaining member 44 in fixed position with respect to the sleeve 43. The member 44 is large enough to cover the slot 41 regardless of the horizontal or vertical adjustment of the sleeve 43 with respect to the pilot housing. The slot 41 is considerably larger than the reduced portion 42 of the sleeve 43 which extends therethrough, thereby allowing considerable room for universal adjustment of the sleeve with respect to the housing to take care of various conditions of installation. It will further be seen

that by virtue of this adjustment, the tubes are unrestricted by the position of the pilot housing, and will project radially into same even though it be rotated somewhat about its base. Furthermore, accommodation is thus provided for unequal spacing of the flash tubes.

As has been pointed out, the sleeve 43, or as in other figures, the inner portion of the flash tube is narrowed into a neck. This produces a more concentrated mixture of gas adjacent the pilot flame, and acts to give an improved quality of ignition.

The sleeve 43 receives the inner end of the cylindrical tube 18 with a sliding fit as indicated at 47 thus allowing adjustment of the length of the tube with respect to the burner 12 and the pilot housing 17. This sliding fit also permits insertion of the tubes where the space in which they fit is restricted, such as when they must be inserted from beneath the burner. The tube 18 may be rolled from a single piece of sheet metal with its edges joining at the lower side as indicated at 18a.

The lower part of the outer end of the tube 18 is bifurcated to provide two arms 48 which support the tip 49 carrying the L-shaped gas port 50. The lower end of the tip 49 is cone-shaped and is received in a drilled opening 51 having straight sides provided in the burner 12. The tip is securely retained between the arms 48 by having portions 52 swaged over the edges of the arms. The arms 48 are long enough to leave a space 53 between the tip 49 and the adjacent end of the tube 18 which space serves as a port for admitting air to the tube 18 where it mixes with the gas passing up the tube from the port 50 to the pilot burner. The upper part 54 of the outer end of tube 18 is tapered and overhangs the tip 48 and port 53, serving to produce air currents that direct gas from port 50 into the tube, and to protect the parts from substance that might be spilled on them.

The L-shaped port 50 comprises two communicating passages 50a and 50b, the port 50a extending in a substantially vertical direction and the port 50b in a substantially horizontal direction. The port 50b is preferably of smaller diameter than the port 50a so that the fuel issues therefrom with an increased velocity. It will be noted that the axis of port 50 is such that fuel issuing therefrom does not pass directly up the axis of tube 18, but rather impinges against the lower part of the tube and is deflected thereby, thus causing a turbulence which assists in the successful flashing of the mixture in the tube. Further, the position of this passage prevents the flame issuing therefrom from impinging against the guard 54 after the burner 12 is ignited, and thereby overheating the guard. It will be observed that the flame from 50b will not impinge on guard 54.

Operation of the device as shown in Figs. 1–6

The pilot valve is constantly open. Gas flows through tube 15 into chamber 21, whence it passes in a pressure jet through orifice 20, the size of which is controlled by needle 22 and maintained by lock nut 24'. The pressure or injection jet of gas emitted from orifice 22 draws air in through ports 25, and it mixes with this air in chamber 26. In chamber 26, turbulence is produced by the effect of constriction 27, resulting in a vertical issuance of gas in a jet from port 27 of nozzle 32. This jet is mixed with secondary air coming through chimney 36, and is ignited.

When the gas cock 14 is turned on, a mixture of air and gas is supplied to the burner 12 through the tube 13 and issued from the burner ports 55. Some of the mixture passes through port 50, and through the tube 18 after being mixed with additional air drawn in through port 53, to the pilot burner 16 where it is ignited. There is an immediate flash-back through the tube which is directed over the surface of the main burner 12 and ignites the mixture issuing from the ports 55. The restricted portion 42 has the effect of impeding the flow of gas from the tube 18 to the pilot burner and also concentrating the gas adjacent the pilot, thus insuring combustion. Apparently it also serves to prevent the explosion in tube 18 from blowing out the pilot.

The modifications illustrated in Figs. 6 to 11 inclusive are directed to other methods of mounting the inner end of the flash tube, or the sleeve corresponding to sleeve 43 of the embodiment previously described, in the pilot housing, and to other constructional features.

Referring to Figs. 6 and 7, the sleeve 56 has a flanged inner end 57 inside the housing 58, and is retained in position by an ear 59 cut from the top of the housing and bent downwardly. The opening 60 thus formed serves as an air passage similar to the openings 40 of the first embodiment.

In this embodiment, the tube 18 is shown as having a tip 49' having a substantially vertical fuel passage 50c and a plurality of cooperating substantially horizontal fuel passages 50d of relatively small diameter. As shown in Fig. 9 the passages 50d may be formed by inserting a piece of stock 50e of the general design of a small gear in a passage 50f of relatively large diameter. Preferably the total area of the passages 50d should be less than that of the passages 50c in order to increase the velocity of the fuel mixture in the tube 18. The plurality of small ports 50d insures against flash-back and an explosion in the bowl of the associated burner 12, but at the same time provides the same quantity of gas and substantially the same pressure thereof, as does the tip shown in Fig. 4.

In the form shown in Fig. 9 two ears 61 are cut out of the bottom of the tube or sleeve 62 and bent downwardly. The side wall of the housing 63 is provided with a circular opening 64 and a cooperating horizontal opening 65. When the tube is inserted the inner ear is passed through the opening 65 and the tube is then rotated 90°. The ears 61 are so spaced as to allow adjustment of the tube with respect to the housing. By means of such adjustment the necessity of using the sleeve connection heretofore described is obviated. Another manner of mounting the pilot casing 71 and cone-shaped chimney member 72 is shown in this figure. The upper end of pilot burner 16 screw-threadedly supports a small circular plate 73 carrying the conical chimney member 72 and provided at its periphery with an upturned flange 75. The casing 71 is provided in its lower or bottom portion with an opening 76 large enough to fit over the conical member 72. There is provided at the periphery of opening 76 a groove 77 for receiving the flange 75 provided on plate 73 whereby the plate 73 supports the casing 71. With this construction the casing 71 and its associated flash tubes may be radially removed from the range.

In the embodiment shown in Fig. 10 the circular opening 66 in the wall of the pilot housing 67 has a pin 68 projecting upwardly and bent

slightly outward. This pin may conveniently be cut out of the housing wall. The sleeve or tube 70 has a hole 69 at its inner end through which the pin 68 projects. This construction forms a pivot mounting allowing lateral and vertical adjustment of the outer end of the flash tube. In this construction the conical chimney member 78 is supported from the top of the casing 79 by means of two upwardly extending straps 80 joined at their upper ends by a flat portion 81 which is in turn secured to the top of casing 79 by any suitable means such as a rivet 82. The straps 80 are not wide enough to interfere with the successful operation of the lighter, and by the construction shown the conical member about the pilot burner is removed with the casing 79, thus rendering this burner readily accessible for cleaning.

In the illustration we have given, we have shown the device used on a gas system. It is obvious that the construction could be used with other systems than gas, such as oil or the like. It is equally clear that the use of a gas pilot is but one application, and the pilot employed could be any one providing a means of ignition for the fuel from the burners. We would suggest an electric pilot, as illustrations of this last adaptation. Accordingly where the claims refer to a pilot, it is intended that the term shall be generic; and where they refer to a burner, a like interpretation is intended.

We claim:—

1. In a device of the kind described, a flash tube, a pair of spaced arms extending in a generally axial direction from one end of said tube, and a fuel jet embraced by and secured in said arms adjacent their outer ends.

2. In a device of the kind described, a flash tube, a pair of spaced arms extending in a generally axial direction from one end of said tube, and a fuel jet embraced by and secured in said arms, said jet being spaced adjacent the outer ends of said arms and spaced from the juncture of said arms with said tube to provide an air port adjacent said jet.

3. A flash tube device of the character described, comprising a sheet metal tubular element having a plurality of integrally formed longitudinally extending spaced projections at one end, two of said projections extending from adjacent the longitudinal edges of said tube, a jet element fixedly mounted between the outer portions of said two projections, and another of said projections extending from said tube end so as to at least partially overlie said jet.

4. A flash tube device of the character described, comprising a sheet metal tubular element having a pair of integrally formed longitudinally extending spaced projections at one end, each of said projections extending from adjacent the longitudinal edges of said tube, and a jet element mounted between the outer ends of said projections, and said jet element having means along its sides to receive said projections.

5. A flash tube device of the character described, comprising a sheet metal tubular element having a pair of integrally formed longitudinally extending spaced projections at one end, each of said projections extending from adjacent the longitudinal edges of said tubes, and a jet element mounted between the outer ends of said projections, and said jet having longitudinal recesses in its opposite sides to receive said projections, the portions of said jet bounding said recesses being peened over onto said projections.

6. In a device of the kind described, a sheet metal flash tube, a pair of spaced arms integral therewith extending in a general axial direction from one end of the tube, a fuel jet positioned adjacent the outer ends of said arms, and means for fixedly securing said jet to said arms.

JOHN T. MARVIN.
BIRCHARD L. MATTHEWS.