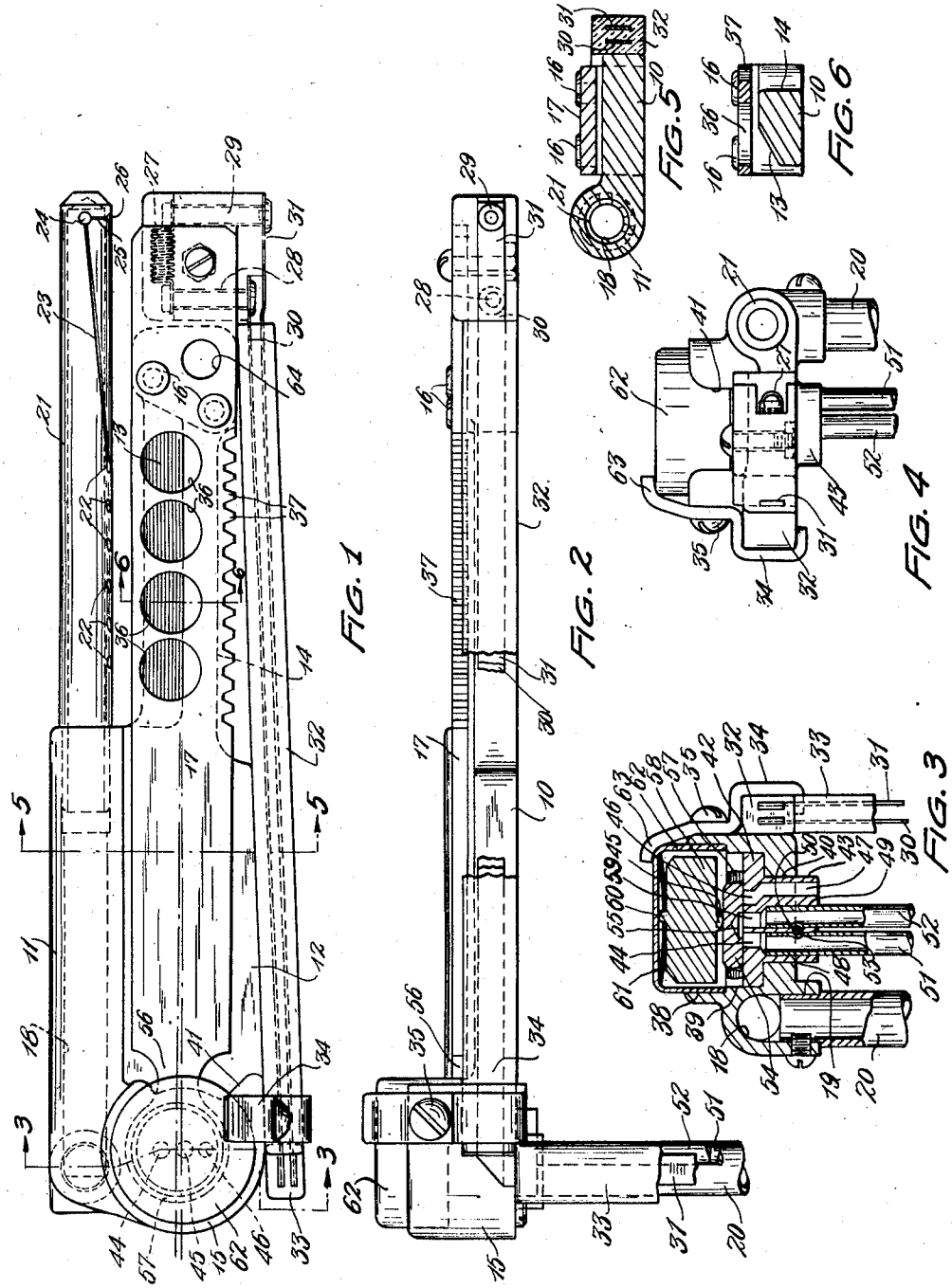
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LIGHTER

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LIGHTER

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This invention relates to improvements in lighters, that is to say means for lighting gas burners by means of gas pilots. The invention of the present application is adapted for use in lighting systems similar to that disclosed in the applications of Frank R. Higley, Serial Numbers 354,061 and 354,062, filed August 24, 1940, the former being now Patent No. 2,300,156 and involves control of the gas to the main burner through a slide valve moving in response to pilot operation, which slide valve in turn controls a valve in the gas supply to the burner.

One of the objects of the present invention is the provision of improved pilot construction such that the cost of the pilot tube is reduced while at the same time the gas supplying the pilot is caused to cool the slide valve.

Another object of the invention is the provision of an improved housing for the valve parts especially adapted for economical manufacture.

Another object is the provision of improved weight means for maintaining bearing between the moving parts of the slide valve.

A further object is the provision of improved means for mounting small tubular conductors in the valve body.

Other objects and features of novelty will appear as we proceed with the description of that embodiment of the invention which, for the purposes of the present application, we have illustrated in the accompanying drawing, in which

Fig. 1 is a top plan view of a lighter assembly embodying the invention.

Fig. 2 is an elevational view of the same.

Fig. 3 is a transverse sectional view taken substantially on the line 3—3 of Fig. 1.

Fig. 4 is an end elevation.

Figs. 5 and 6 are transverse sectional views taken substantially on the lines 5—5 and 6—6 respectively of Fig. 1.

In the drawing the bar which forms the body member and main support for the device is shown at 10. This bar is a casting which for about half its length comprises a lateral enlargement 11 on one side and on the other side a wing 12 which tapers toward the inner end of the bar. The inner half of the bar is of smaller cross section and is beveled off along one edge as at 13 and cut back along the opposite edge as at 14. The outer end of this bar has an enlargement 15 in which the slide valve is housed, as will presently appear.

Near the opposite end the surface of the bar 10 is elevated somewhat, and upon this elevated portion we secure by means of rivets 16 or the like the inner extremity of a thermal member 17 which is a flat strip of metal preferably having a different coefficient of expansion from that of bar 10. Thermal member 17 is thus spaced slightly above bar 10 and extends to the outer end of the latter, where it enters the housing 15 and, when warped by the application of heat from the pilot, operates the slide valve in the housing.

The enlargement 11 is bored out lengthwise, as indicated at 18, and vertically as indicated at 19. A gas supply pipe 20 is suitably mounted in the bore 19. In cases where it is more convenient to have the gas supply enter the device horizontally the opening 19 may be omitted and the drilled opening 18 may be continued through the outer end of the bar 10, the gas supply pipe being connected with the latter opening. In either case the gas flowing through the device to the pilot is caused to pass through a bore formed in the bar 10 adjacent the housing 15 in which the slide valve is mounted, and the flowing gas exerts a considerable cooling effect which is transmitted through the housing to the valve itself. From bore 18 there extends a pilot tube 21 which parallels bar 10 and thermal member 17. This pilot tube is made of metal that is highly resistant to heat and chemical action, and is accordingly expensive, so that its short length presents the advantage of economy. In this pilot tube there are a series of small ports 22 arranged to direct small flames upwardly at an angle against the adjacent edge of the thermal member 17. Gas from an end port 22 is ignited by flame following a slit 23 in the tube, which slit is connected with a larger port 24, the flame from which serves to light the main burner, not shown. A short slit 25 connects port 24 with a port 26 from which a stream of gas is adapted to flow toward an electric heating coil 27 by means of which the pilot is ignited.

The ends of coil 27 are connected through binding posts 28 and 29 with metallic ribbon conductors 30 and 31 which are suitably insulated. As herein shown the insulation may be in the form of a continuous bar 32 of porcelain or other material having heat resistant qualities. This bar is provided with longitudinal passages through which the conductors are threaded. At the rear of bar 32 each conductor is bent down at a 45° angle and then enters another insulation bar 33 of similar character which extends downwardly parallel to the pipe 20. The inner end of bar 32 is supported by conductors 30 and 31, while the outer end is supported by a

bracket 34 which is secured to the housing 15 by a screw 35.

It will be obvious that when gas is caused to flow through the pilot and current is turned into the circuit of which the conductors 30 and 31 form a part the coil 27 will become incandescent and the gas flowing from port 26 in the end of the pilot tube will be ignited. The flame will then travel to the gas flowing from port 24 and thereafter through slit 23 to the small ports 22 which will be ignited successively one after another.

The edge of thermal member 17 which is subjected to the flame from ports 22 is partially isolated from the balance of the thermal member by a series of holes 36, and the opposite edge surface is increased in area by serrations 37 in order that any heat which may be transmitted across the thermal member may be the more readily dissipated.

In the enlargement 15 at the outer end of bar 10 we form an opening which extends through the bar from top to bottom in three different concentric bores, produced preferably by a sinble stepped drill. The upper bore 38 is the largest, the middle one 39 is of intermediate size, and the lower one 40 is the smallest. The upper and intermediate bores are open toward the front end of the device, owing to the fact that the enlargement 15 is cast with a cut-back 41 through which the drill projects. The smallest diameter portion of the drill of course enters the metal first and acts as a pilot for the larger diameter portions, thereby preventing the drill from running out.

In the bores 40 and 39 we mount a valve body consisting of a head 42 and a shank 43. In this valve body there are three ports 44, 45 and 46. Port 46 is open to the atmosphere through a passage 47. Ports 44 and 45 communicate with drilled sockets 48 and 49 that are spaced close together, and a tiny transverse hole 50 is drilled through the shank 43 between and transversely to the sockets 48 and 49. Tubular conductors 51 and 52 are set into these sockets, the fit being snug, and a small hardened pin 53 is driven through the transverse hole 50. The pin 53 being slightly larger in diameter than the distance between conductors 51 and 52 deforms the adjacent walls of the latter and thereby locks the conductors in place in their sockets.

A valve piece 54 slidably engages the upper surface of valve head 42. It is provided with a central port 55 of a size sufficient to bridge ports 44 and 45, or ports 45 and 46, depending upon the position of the valve piece. The latter is caused to move from its normal position illustrated in Fig. 3 to one in which the ports 45 and 46 are bridged by a deflection or warping of thermal member 14 which has a restricted neck 56 extending through the lateral opening in the housing member 15, while beyond the neck portion there is a ring 57 which loosely receives the valve piece 54.

In order to cause valve piece 54 to bear on valve head 42 we provide a weight 58 having a rounded boss 59 on its lower side in engagement with the valve piece and a central nipple 60 on its upper side engaged by a hole in a leaf spring 61. A sheet metal cup-shaped cover 62 is pressed into bore 38 and serves to protect the slide valve and exclude foreign matter as well as to center and balance the weight through the intermediacy of spring 61. While the cover 62 will ordinarily be held in place securely by its tight fit within the bore 38, we may guard against possible dislocation of the cover by an extension 63 on bracket 34 overlying one edge of the cover.

For convenience in mounting the device we form a hole 64 through the thermal member 17 and the bar 10 from top to bottom of the device, so that a fastening such as a bolt may be projected through the hole for attaching the device to a support which in most cases would be the main burner itself. The outer end of the device may be carried loosely in any suitable bracket allowing for expansion and contraction of the entire assembly.

The operation of the device, it is believed, will be clear from the foregoing description. Assuming that gas to the pilot and current to the coil 27 are turned on manually or automatically, the pilot will then be ignited electrically and the flames from ports 22 will heat the adjacent edge of thermal member 17, causing it to expand and move valve piece 54 into position to connect ports 45 and 46 of the slide valve. This action is utilized through suitable connections, as for example those disclosed in Higley application Serial No. 354,061, above mentioned, to open a control valve in the gas supply to the main burner, after which the latter is ignited by the flame from pilot port 24. During the intended operation of the main burner it remains on so long as the pilot remains lighted. Should the pilot go out however the thermal member 17 would then swing back to its former position and the slide valve would be operated to connect tubular conductors 51 and 52 which would then function to supply gas pressure to shut off the valve in the gas supply to the main burner.

Having thus described our invention, we claim:

1. In apparatus for control of a gas burner by pilot means therefor, a bar having a gas passage integrally formed therein along one side thereof and having a valve body at one end, an elongated thermal member attached to the bar at the end opposite said valve body, said thermal member carrying a valve piece cooperating with said valve body for controlling a second gas passage, and a pilot tube mounted in the bar in communication with said first named gas passage only and adapted to play a flame on the thermal member.

2. In apparatus for control of a gas burner by pilot means therefor, a bar having an integral gas passage extending longitudinally of the bar for a portion of its length, said bar having a valve body therein at one end adjacent said gas passage, said valve body having a separate gas passage adapted to be connected to burner control means, an elongated thermal member attached to the bar at the end thereof opposite said valve body, said thermal member carrying a valve piece slidable upon said valve body, and a pilot tube mounted in the bar in communication with said first named gas passage only adapted to play a flame on the thermal member.

3. In apparatus for control of a gas burner by pilot means therefor, a bar having an integral gas passage extending from the outer end of the bar part-way toward the inner end thereof, a valve body in the outer end of the bar, said valve body having a separate gas passage adapted to be connected to burner control means, an elongated thermal member attached to the inner end of the bar, said thermal member carrying a valve piece at its outer end in cooperative relation with the valve body, and a pilot tube mounted in the bar in communication with said first named gas

passage only adapted to play a flame on one edge of said thermal member.

4. In apparatus for control of a gas burner by pilot means therefor, a pilot, a valve body and a valve piece movable relatively to each other, means responsive to pilot operation for moving said valve piece and valve body relatively to each other, a weight whose mass is applied over a limited area to the upper one of said valve elements at the center thereof to hold the valve elements in operative relation, and resilient means engaging the weight and opposing tilting movement thereof.

5. In apparatus for control of a gas burner by pilot means therefor, a pilot, a valve body and a valve piece movable relatively to each other, means responsive to pilot operation for moving said valve piece and valve body relatively to each other, a weight whose mass is applied over a limited area to the upper one of said valve elements at the center thereof to hold the valve elements in operative relation, a fixed cover for said weight, and resilient means interposed between the weight and cover for holding the weight centered within the cover.

6. In apparatus for control of a gas burner by pilot means therefor, a valve body having a pair of ports and closely adjacent sockets in register with said ports, tubular conductors in said sockets, and a pin through the valve body between said sockets, said conductors being deformed slightly in their portions adjacent said pin, and said pin and deformed portions cooperating to lock said conductors in said valve body.

7. In apparatus for control of a gas burner by pilot means therefor, a pilot, a bar having at one end an enlargement through which extends a drilled opening consisting of three concentric bores, the largest at the top and the smallest at the bottom, a valve body having a head and a shank fitting the intermediate and smallest bores, a cover fitting the largest bore, a valve piece in engagement with the upper surface of said head, and means responsive to pilot operation for moving said valve piece on said head.

8. In apparatus for control of a gas burner by pilot means therefor, a pilot, a bar having at one end an enlargement through which extends a drilled opening consisting of three concentric bores, the largest at the top and the smallest at the bottom, a valve body having a head and a shank fitting the intermediate and smallest bores, a cover fitting the largest bore, a valve piece in engagement with the upper surface of said head, a weight superposed upon said valve piece, said bar having a lateral opening into the intermediate bore, and an elongated thermal member secured to the bar at the opposite end thereof extending through said lateral opening and responsive to pilot operation for moving said valve piece on said head.

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