Dec. 20, 1927. 1,653,018

C. W. MUMMERY

LIQUID FUEL BURNER

Original Filed May 16, 1925 2 Sheets-Sheet 1

Fig. 1.

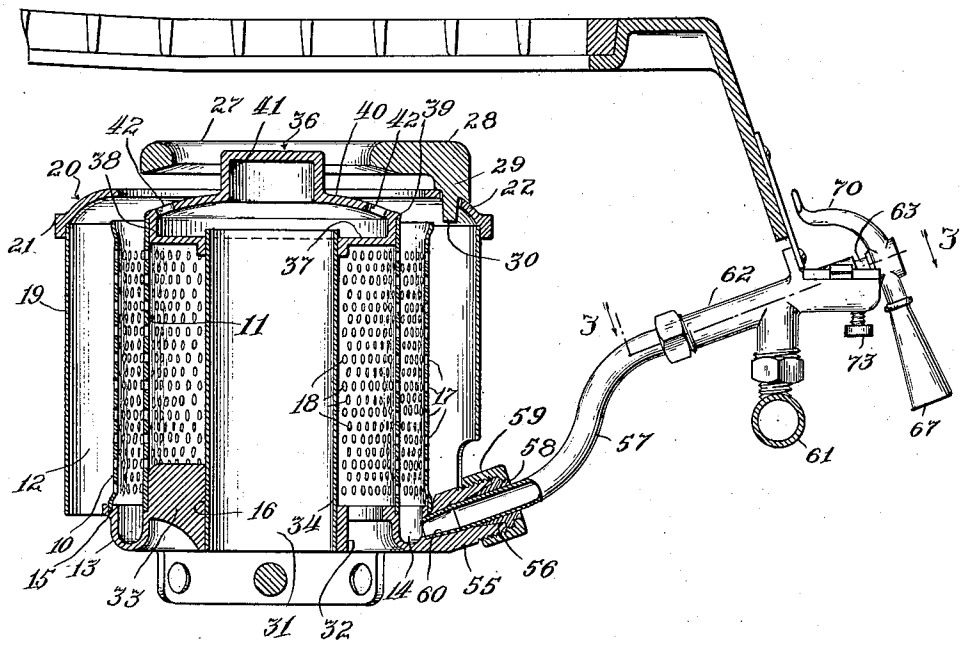
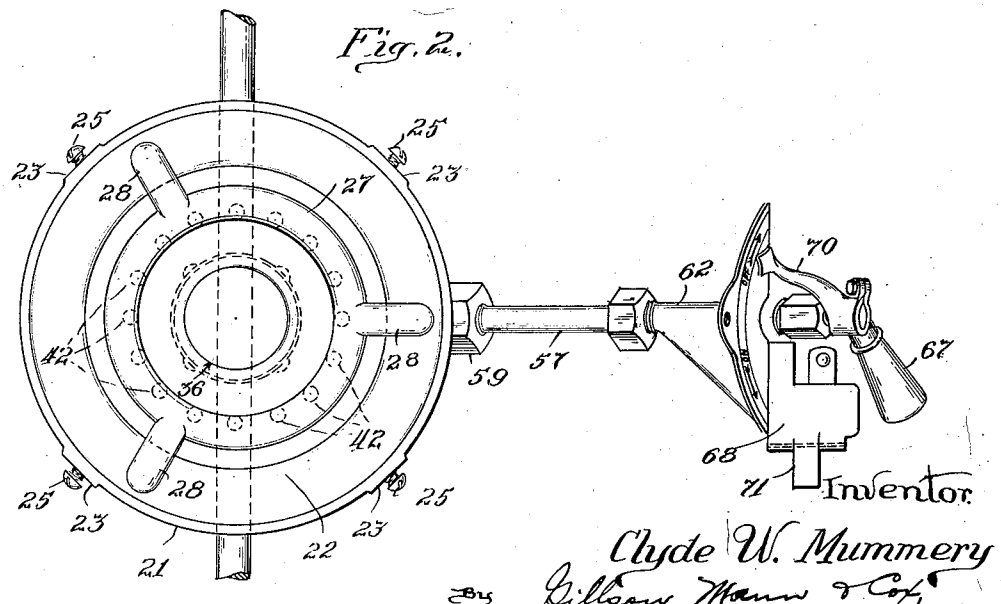


Fig. 2.



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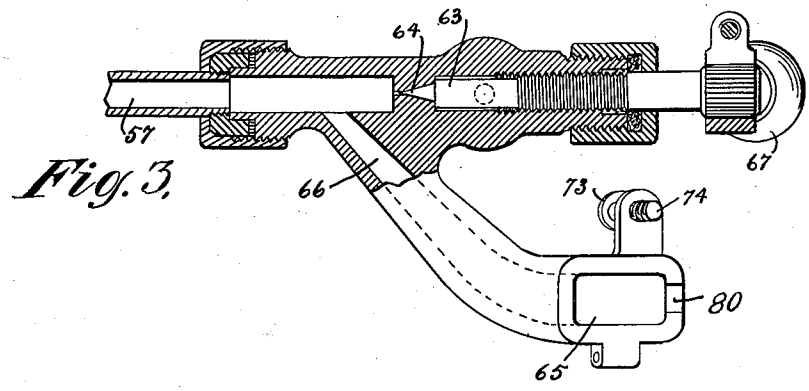


Fig. 3.

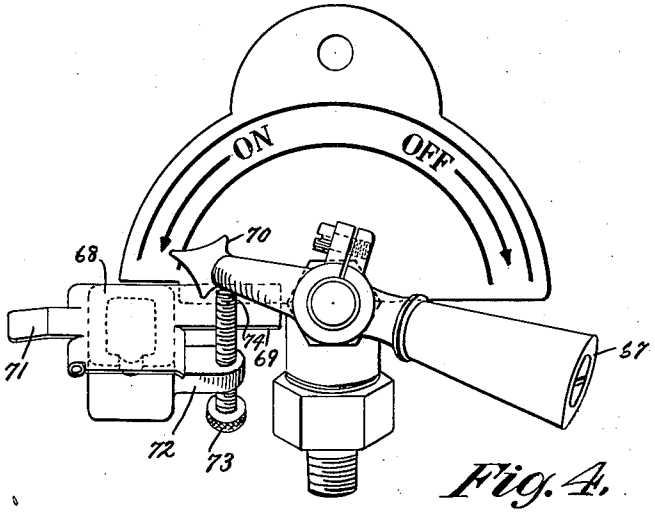


Fig. 4.

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Patented Dec. 20, 1927. 1,653,018

UNITED STATES PATENT OFFICE.

CLYDE W. MUMMERY, OF DETROIT, MICHIGAN.

LIQUID-FUEL BURNER.

Original application filed May 16, 1925, Serial No. 30,695. Divided and this application filed April 6, 1926. Serial No. 100,061.

This invention relates to liquid fuel burners and has for its principal objects to prevent the accumulation of residue at or near the point where the fuel is fed to the vaporizer, and to prevent the injection of priming fuel when the burner is in operation.

Further objects and advantages of the invention will become apparent as the description is read in connection with the accompanying drawing, in which

Fig. 1 is a sectional view through the preferred form of burner together with a fragment of the stove and the feed pipes;

Fig. 2 is a plan view of the same;

Fig. 3 is a sectional view taken on the line 3—3 of Fig. 1, showing the fuel control valve and the relation between the main fuel supply pipe and the primer; and

Fig. 4 is an elevation showing how the fuel control valve prevents priming of the burner while it is in operation.

The reference numerals 10 and 11 indicate the outer and inner combustion tubes respectively which are concentrically arranged and define between them a vapor space 12. At their lower ends the tubes 10 and 11 are secured to a vaporizer 13 having therein a trough 14 for the fuel to be vaporized. The bottom of the outer vapor tube is received within an annular recess 15 in the vaporizer, outside of the trough 14. The bottom of the inner combustion tube telescopes with a cylindrical portion 16 inside of the trough and adjacent to the top thereof. The tubes 10 and 11 are provided with the usual perforations 17 and 18 by which air is supplied to the vapor as it rises through the vapor space.

A cylindrical air drum 19 surrounds the outer combustion tube and is equipped at its upper end with an air drum cap 20 for diverting air inwardly adjacent to the upper end of the combustion tubes. In the form shown, the air drum cap is a casting having a cylindrical base 21 telescoping with the upper end of the air drum and a somewhat spherical flange 22 arching towards the discharge end of the vapor space. Four lugs 23 depend from the cylindrical base 21 along the outside of the air drum. These lugs are provided with threaded perforations at 24 to receive screws 25 which pass through the air drum, the outer combustion tube and rest against the outer wall of the inner combustion tube. These screws, therefore, not only secure the air drum cap to the air drum, but support the air drum on the outer combustion tube and maintain the proper spacing between the air drum and the outer combustion tube and between the two combustion tubes.

A flame control ring 27 is supported above the annular vapor space 12, preferably from the air drum cap 20. In the present illustration this ring is cast and has a plurality of radial arms 28 terminating in depending legs 29, the lower reduced ends 30 of which are received in appropriate perforations in the flange 22 of the air drum cap.

The vaporizer has a cylindrical bore 31 formed in a ring 32 supported from the trough or main body of the vaporizer by the stays 33. An air shaft 34 has its lower end seated in the bore 31 and extends upwardly concentric with and in spaced relation to the inner combustion tube. This air shaft is preferably imperforate except for relief vents 35 that may be located adjacent to its upper end.

An air cap 36 closes the inner combustion tube and has a flange 37 closing the space between the inner combustion tube and the air shaft. Above this flange is a cylindrical portion 38 telescoping with the inner combustion tube and having an external shoulder 39 to rest on the top of that tube. Above the cylindrical portion the cap arches inwardly, as indicated at 40, and joins a substantially cylindrical core section 41, which extends to or above the bottom of the flame control ring 27. The arched portion of the air cap is provided with an annular series of perforations 42 for feeding air into the flame and vapor adjacent to the discharge end of the vapor space and below the flame control ring.

The features of construction here disclosed are most useful in connection with a wickless burner. In such a burner the fuel must be supplied in a continuous, though very thin stream. As this stream approaches the trough 14 of the vaporizer, it becomes heated and partial distillation and vaporization takes place. As a result there is a tendency to throw down a residue of carbonaceous material which, accumulating at the delivery end of the supply passage, tends not only to obstruct the flow, but to reduce the smooth continuity of the stream.

In the present construction, the vaporizer is provided with an annular boss 55 having a tapered bore 56 which receives the delivery end of the supply pipe 57 and a tapered fitting 58 which is clamped in place by the cap 59 threaded on the boss. The piping 57 does not extend to the end of the bore and the portion adjacent to the trough is lined with a tube 60, preferably of brass and presenting a polished surface to the stream of fuel.

I have discovered that a polished surface prevents the accumulation of residue within this passage. I prefer to use brass because of its economy combined with its ability to take a good surface polish. It will, of course, be understood that a liner formed as a separate piece is not necessary where the metal of the burner will take the polish necessary.

The low grade fuel is supplied by a pipe 61 joined to the pipe 57 by the casing 62 of the control valve, which may have a stem 63 tapering to a needle point 64, as indicated particularly in Fig. 7. The starting or priming fuel is supplied by injecting it into a primer 65, which is connected with the pipe 57 by a passage 66, between the seat of the control valve and the vaporizer.

It is particularly desirable to prevent high grade fuel from being put in the primer while the burner is in operation, and to accomplish this I provide a primer with a closure that cannot be opened with the control valve in operative position, whether fully open or only slightly open.

Referring to Fig. 4 it will be seen that the primer is equipped with a hinged lid 68, having a projection 69 of sufficient length to strike the arm 70 of the handle 67 when the control valve is open. For convenience in operation the lid 68 is provided with a thumb piece 71 on the left side to permit the primer to be opened with the left hand while the container for the priming fuel is handled with the right hand.

A lug 72 projecting laterally from the primer is equipped with an adjusting screw 73, the point 74 of which lies in the path of the arm 70 of the valve handle 67. This provides a readily adjustable limit for the opening of the control valve.

The primer 65 is provided with a notch 80 in its upper surface which is not closed by the lid 68. Hence, during the operation of the burner this notch with the passage 66 serves to admit a small amount of air to the fuel supply pipe 57, and hence to the vaporizer and the vaporized fuel rising therein. The quantity of air thus supplied should, of course, be varied with the dimensions and relative proportions of the parts, and the exact amount in each case will have to be determined by trial, but the admission of a small amount of air in this way greatly improves the operation of the burner. As the air is admitted between the control valve and the burner it is not affected by the position of the former.

The vaporizer 13 is preferably made of aluminum and the mass is reduced to the minimum possible to correspondingly reduce the quantity of British thermal units required to raise the temperature of the vaporizer to the point necessary to properly vaporize the fuel.

This is a divisional application of Serial No. 30,695 filed May 16, 1925, by this applicant.

I claim as my invention:

1. In a wickless liquid fuel burner, the combination of a vaporizer including a trough for the liquid fuel, means for supplying fuel to said trough including a passage, a valve for controlling the flow of fuel through said passage, a primer for starting fuel communicating with said passage, a closure for said primer, and means for preventing the movement of said closure while said valve is opened.

2. In a wickless liquid fuel burner, the combination of a vaporizer having a trough for liquid fuel, means for supplying fuel to the trough including a passage, a valve for controlling the flow of fuel through said passage, a handle for operating said valve, a primer for priming fuel communicating with said passage, a closure for said primer, and means operated by the handle for said valve for preventing the movement of the closure while the valve is open.

3. In a wickless liquid fuel burner, the combination of a vaporizer, means for supplying liquid fuel to the vaporizer including a passage, a valve for controlling the flow of such fuel through said passage, a handle for operating the valve, a primer for priming fuel communicating with the passage, and a closure for the primer and a pointer for indicating the position of the valve and preventing the opening of the closure when the valve is open.

4. In a wickless liquid fuel burner, the combination of a vaporizer including a trough for the liquid fuel, means for supplying fuel to said trough including a passage, a valve for controlling the flow of fuel through said passage, a handle for operating the valve, a primer for starting fuel communicating with said passage between the valve and the trough, a hinged lid for the primer, and means carried by the lid for engaging the handle when the valve is open, whereby the introduction of priming fuel is prevented while the burner is in operation.

In testimony whereof I affix my signature.

CLYDE W. MUMMERY.