Nov. 4, 1958 W. J. TOWNSEND ET AL 2,859,332

INVERTED LANTERN

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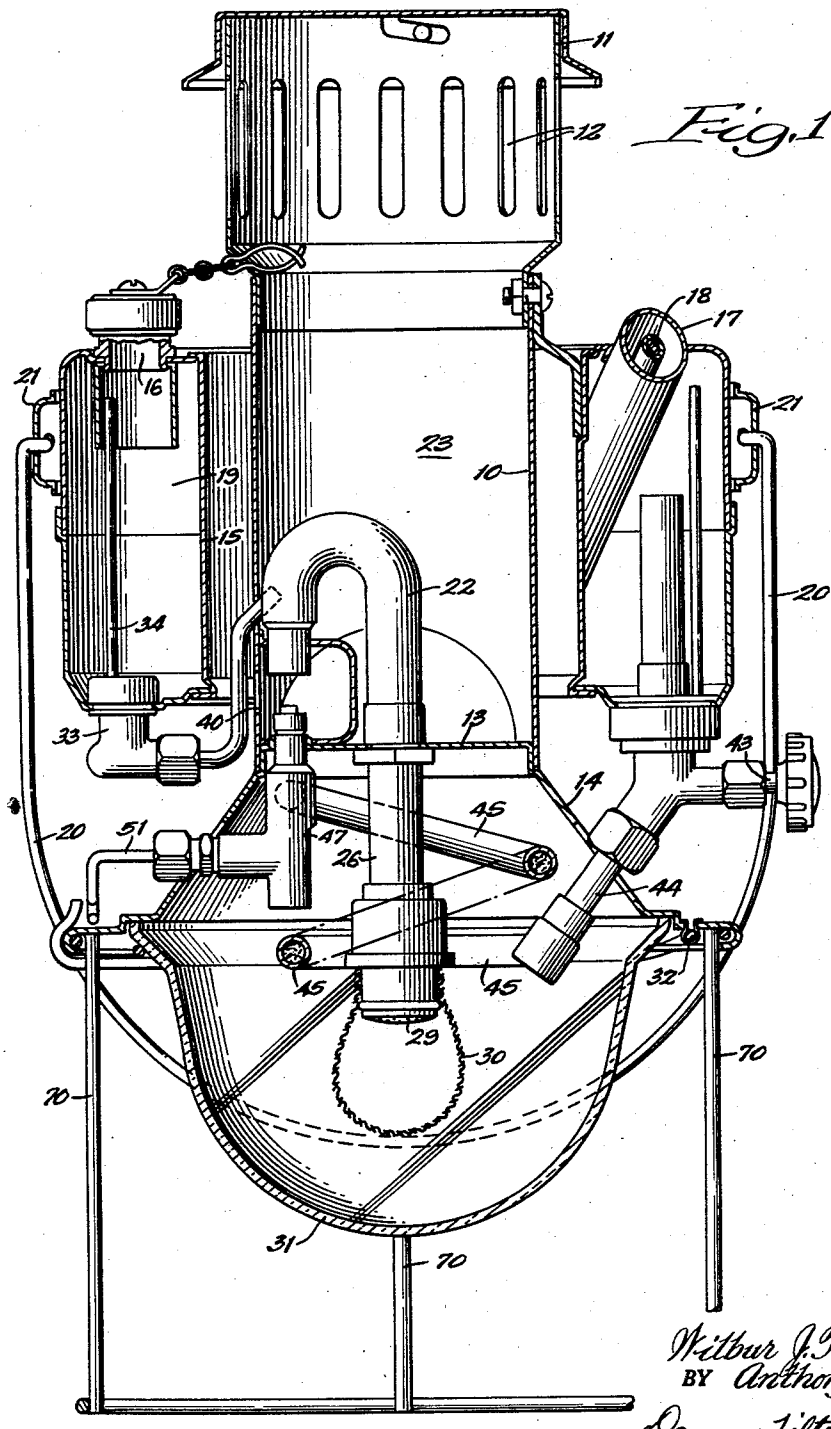

Fig. 1

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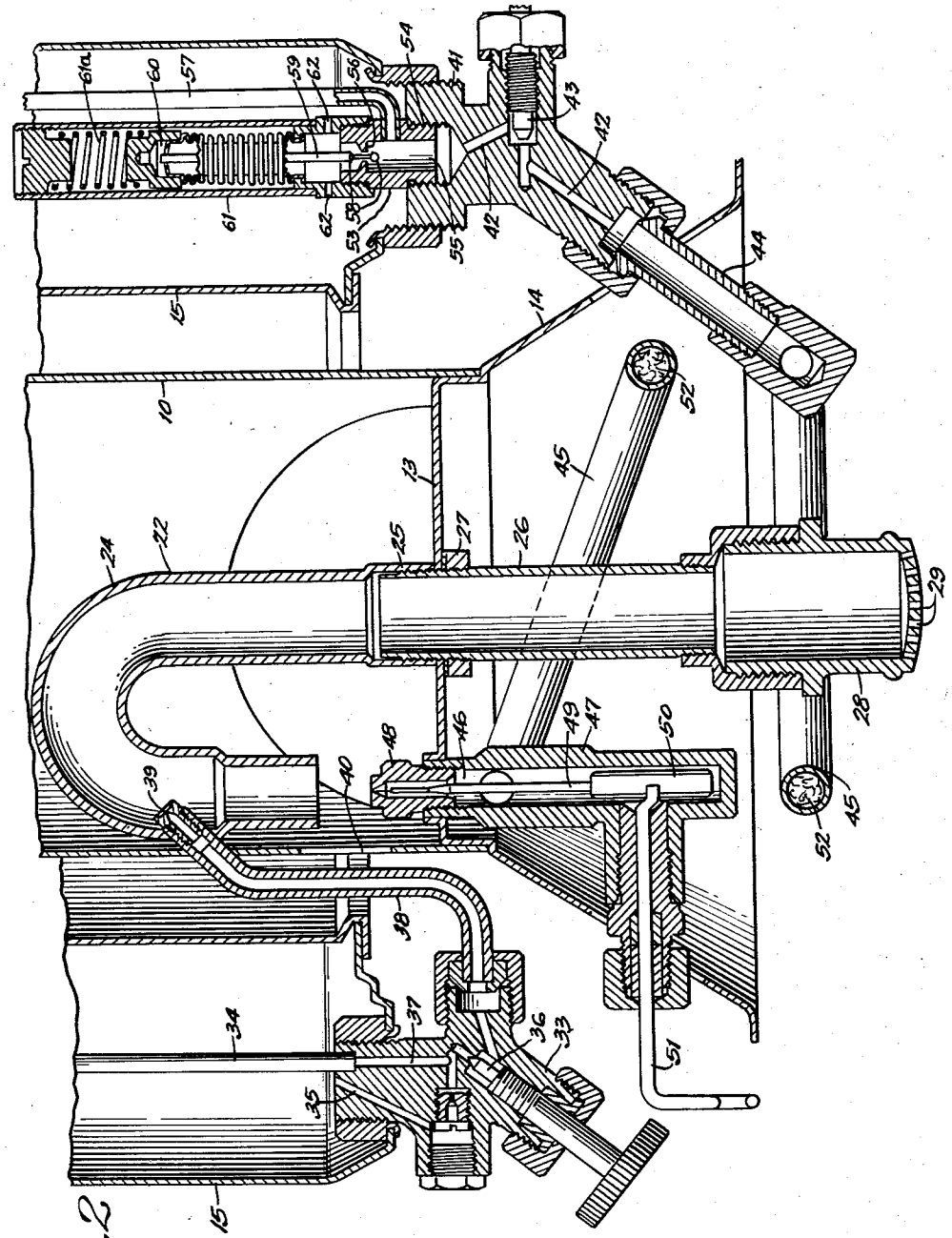

Fig. 2

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INVERTED LANTERN

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5 Claims. (Cl. 240—38)

This invention relates to an inverted lantern or burner apparatus. The invention is particularly useful as a liquid fuel burner in which the fuel is converted to a gas supplied to a mantle-equipped burner, while at the same time providing a depending burner with an enclosing globe through which light rays may be directed downwardly without obstruction upon the area below.

In the burning of fuels such as, for example, gasoline, and particularly such fuels which are provided with anti-knock compounds such as lead tetraethyl, there is considerable difficulty encountered in the clogging up of the apparatus and particularly to supply tubes leading to the burner. Further, there is a tendency for some of the parts to be short-lived under the conditions imposed, and the mixing chamber particularly may be rendered inefficient by reason of partial clogging due to the deposition of lead or lead compounds, etc. at restricted areas within the mixing chamber adjacent the burner. Further, such gasoline lamps or liquid-burning apparatus present problems in the furnishing of uniform volumes of vapor to the burning portion of the apparatus, and safety features are highly desirable for use with such devices.

An object of the present invention is to provide an inverted lantern having means for overcoming the difficulties described above and providing the stated desired advantages. A further object is to provide in such a structure simple means whereby a burner may be suspended for illumination of the area below by direct light rays uninterrupted by obstacles, while at the same time providing means for the uniform supply of combustible vapors or carburized air to the burner. A still further object is to provide in such a mechanism means for removing anti-knock compounds or rendering the same substantially harmless to the apparatus. A still further object is to provide mechanism whereby the vaporizing chamber may be supplied with fuel from two distinct sources, the starting supply being separate from the normal feed for the apparatus. Yet a further object is to provide mechanism for instant lighting of the lantern while providing automatically-controlled means for supplying vaporized fuel to the burner after the initial lighting thereof. Other specific objects and advantages will appear as the specification proceeds.

The invention is shown, in an illustrative embodiment, by the accompanying drawings, in which—

Figure 1 is a vertical sectional view of an inverted lantern embodying our invention; and Fig. 2, a broken enlarged sectional view, showing in detail the fuel-supplying means and burner apparatus.

In the illustration given, **10** designates a cylindrical casing provided at its top with a hood **11** provided with gas escape ports **12**. The lower portion of the casing **10** is provided with a platform **13** having downwardly-extending bell-shaped sides **14**. About the cylindrical member **10** is secured an annular fuel tank **15** having a closure-equipped inlet **16** and an annular extending pressure pump **17**. Since the pressure pump **17** is a well-known structure, a detailed showing is not given herein. It will be understood that the pressure pump is equipped with a handle **18** which extends outwardly and which may be manipulated for the supplying of pressure within the chamber **19** of the fuel tank **15**. A bail or handle **20** is pivotally secured to attachment ears **21** carried by the fuel tank **15** so that, when desired, the entire lantern may be suspended from a hook or other support thereabove.

An air-mixing tube **22** is supported within the chamber **23** provided by the cylindrical casing **10**, and the same extends downwardly through an opening in the casing platform **13**. In the specific structure, as shown more clearly in Fig. 2, the mixing chamber or tube **22** comprises an upper gooseneck tube **24** which is enlarged at its lower end **25** so as to rest upon the platform **13**. The lower portion **25** of the tube **24** is interiorly threaded to engage the upper threaded end of the lower tube **26** which, together with tube **24**, forms the mixer tube **22**. A nut **27** may be employed for drawing the upper tube **25** down tightly against the partial wall or platform **13**.

The mixer tube **22** is threadably connected at its lower end to a burner chamber **28** having at its bottom apertures **29** for the escape of the air and fuel mixture. A mantle **30** may be employed about the burner **29**, as shown more clearly in Fig. 1.

In the illustration given, we provide a globe or transparent bowl **31** about the burner **29** and mantle **30**. We prefer to mount the globe **31** upon a frame pivotally mounted at **32** so that the entire structure may be swung downwardly to provide access to the mantle **30** for the lighting of the burner. It will be understood, however, that any suitable form of light globe may be provided, and the same may be secured in any desired manner.

In the burner apparatus shown, we provide two means for supplying fuel to the mixing tube **22**. For the starting of the burner, we prefer to inject atomized fuel into the mixer tube where it passes, together with air, downwardly into the burner while, at the same time, we provide means for supplying fuel through another passage to a point where it is vaporized and the vapor, mixed with air, is supplied to the mixing tube **22**. After the second source of fuel becomes effective for supplying carburized air to the burner, we prefer to discontinue the injection of fuel through the first-described source.

The means for injecting atomized fuel into the tube **22** will first be described. In this structure, there is provided at the base of tank **15** on one side thereof a fitting **33** into which extends an air-inlet pipe **34**. As shown more clearly in Fig. 2, there is provided within the fitting **33** a fuel flow passage **35** controlled by a valve **36**. On the opposite side of the valve, there is provided an air passage **37**. The fuel is metered by head of the fuel column on orifice. The mixture passes through the tube **38** and thence out through the atomizing nozzle **39** into the mixer tube **22**. Air enters the lower open end of the tube **22** through the air inlet **40**. The atomized fuel and air pass through the pipe **22** to the burner **28** and the mixture may be ignited by the user after the globe or light bulb has been swung downwardly. After the lantern has been thus lighted and the bulb **31** swung upwardly to closed position, fuel will be supplied to the burner through a different course, as indicated above. On the side of the lantern opposite the fitting **33**, is a second fitting **41** having a flow passage **42** extending downwardly and controlled by the manually-operated valve **43**. From the valve-controlled passage **42**, the fuel extends downwardly through the extension member **44** and thence into a vaporizer tube coil **45**. The tube coil **45** extends above and about the burner **28** and opens into the chamber **46** of the feed member **47**. The feed

member 47 is provided at its top with a feed nozzle 48, and the nozzle is kept free by a pin or plunger 49 adapted to be reciprocated by a rotatably-mounted member 50 within the member 47. The handle member 51, having an end portion eccentrically engaging the member 50, may be utilized for raising and lowering the same to move the pin or plunger 49 within the discharge nozzle of the fitting 48.

In order to prevent the lead material from accumulating within the mixing chamber and clogging the flow therein, we fill the vaporizer tube 45 with steel wool 52, and by providing the coil 45 in a circular spiral shape about the burner 28 so as to receive radiated heat therefrom, we provide for the gradual increase of temperature within tube 45 so that the lead compounds are decomposed uniformly within the tube. With this structure, there is no build-up of lead compounds in a specific area so as to provide blocking of the structure while at the same time preventing substantially any accumulation of lead materials within the important mixing chamber or tube 22.

In order to provide for the uniform feeding of fuel to the burner apparatus in accordance with the needs thereof, we provide within the fuel tank 15 a bellows control valve and standpipe structure which will now be described. A fitting 53 threadably engages the outlet portion 54 of the fitting 41 just above the outlet passage 42, and the fitting 53 provides a valve chamber 55 therein. Communicating with the valve chamber 55 below the valve 56 is a standpipe 57 which has its upper open end communicating with the upper air space or chamber 19 of tank 15, but which is filled with a column of liquid. A valve 58 is carried by the valve stem 59 secured at its upper end to a bellows-supported member 60. A spring 61*a* normally urges the bellows 60 downwardly. The bellows is enclosed within a housing 61 having inlet apertures 62 near its lower portion. With the valve 58 open, as shown in Fig. 2, fuel leaves the tank 15 and passes downwardly through the outlet passage 42. When pressure in tank 19 becomes excessive, bellows 60 forces valve stem 59 upwardly restricting orifice 56. Fuel then feeds from standpipe 57 into chamber 55 partially bypassing orifice 56. When liquid fuel in the standpipe is depleted the air-vapor mixture from the top of chamber 19 passes through the standpipe reducing pressure in this chamber.

With the structure shown, in which the supply of fuel to the mixing chamber is accomplished through a conduit entirely separate from the conduit through which the main fuel supply is made, the vaporizer tube 45 can thus be kept dry and the life of the tube can be greatly increased. The vaporizer tube 45, which has been a limiting factor in the life of a lantern, can be caused to operate almost indefinitely by the present arrangement, in which starting of the burner is accomplished through a separate mechanism which brings about the spraying of liquid or atomized fuel directly into the mixing chamber, which is unconnected with the vaporizer tube 45. Further, the instant lighting mechanism avoids the de-leading structure and provides a safety feature for the starting of the burner. At the same time, safety of operation is promoted by the automatic valve structure controlling the flow of fuel through the vaporizer pipe in accordance with the demand of the nozzle 48.

If desired, the lantern may be provided with a wire stand 70, as shown more clearly in Fig. 1. With this and the bail structure 20, the lantern may be placed in a standing position, as indicated in Fig. 1, or suspended from a support by means of the bail 20.

While in the foregoing specification we have set forth a specific structure in considerable detail for the purpose of illustrating the invention, it will be understood that such details of structure may be varied widely by those skilled in the art without departing from the spirit of our invention.

We claim:

1. In a burner apparatus, a frame, a burner suspended from the frame, a tube providing a mixing chamber above the burner and leading thereto, a vaporizing tube, a fuel tank, and means within said fuel tank for supplying fuel to said vaporizing tube in automatically adjusted proportion to the discharge of vaporized fuel therefrom, said means comprising a valve-controlled passage, a liquid-filled pipe communicating with the lower end of said valve passage, and a bellows secured to the stem of said valve and having inlets communicating with the liquid in said fuel tank.

2. An inverted lantern, comprising a frame, an air-mixing tube within said frame and depending therefrom, a burner carried by said tube, means for supplying air to the upper end of said tube, an annular fuel tank about said frame, means for supplying atomized fuel from said tank directly to said mixing tube, a vaporizing tube disposed above and about said burner with portions thereof located at varying distances therefrom, means for discharging fuel from said vaporizing tube into said mixing tube, and valve-controlled means communicating with said annular tank at another point for supplying fuel to said vaporizing tube and for automatically maintaining the pressure thereof at a relatively constant value.

3. The structure of claim 2, in which the vaporizing tube is in the form of a coil about said mixing tube above said burner and has distributed therethrough steel wool.

4. An inverted lantern adapted to burn liquid fuel, comprising a frame, a mixing tube having an open inlet within said frame and depending therefrom, a mantle-equipped burner communicating with the lower end of said mixing tube, a generally helical vaporizing coil about said mixing tube and above said burner and containing steel wool disposed uniformly throughout, means for supplying fuel at a predetermined limited pressure to said vaporizing coil, a movably mounted glass bulb suspended from said frame about said burner and mantle, an air chamber communicating with the open inlet of said mixing tube, means for discharging fuel from said vaporizing coil into said air chamber, and a separate conduit leading from a source of fuel for injecting atomized fuel into said mixing tube above said air chamber.

5. A liquid fuel-burning lantern, comprising a frame, a burner suspended therefrom, a tubular mixing chamber above the burner and leading thereto, a helical vaporizing tube about said burner and equipped at one end with a nozzle for injecting fuel into said chamber, a liquid fuel tank on said frame, means for injecting atomized fuel with air from said tank directly into said mixing chamber for priming said burner for initial ignition, and separate means for supplying fuel from said tank to said vaporizing tube, said means including a valve responsive to the flow of fuel through said nozzle for automatically maintaining pressure of fuel entering said vaporizing tube at a relatively constant value.

References Cited in the file of this patent

UNITED STATES PATENTS

215,890	Davis	May 27, 1879
629,227	Yarton	July 18, 1899
971,019	Cappon et al.	Sept. 27, 1910
1,078,441	Johnson	Nov. 11, 1913
1,262,968	Misun	Apr. 16, 1918
1,658,081	Fezer	Feb. 7, 1928
2,263,659	Tullis	Nov. 25, 1941
2,590,434	Cahill	Mar. 25, 1952
2,619,820	Davis et al.	Dec. 2, 1952