PROTECTIVE BAFFLE FOR MANTLE TYPE HYDROCARBON BURNERS

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The invention described herein, if patented, may be manufactured and used by or for the Government for governmental purposes, without the payment to me of any royalty thereon.

The present invention relates to devices for guarding the mantles of hydrocarbon burners against accidental damage and more particularly to a device for intercepting and breaking up liquid fuel discharged from the generator of the burner before such liquid fuel strikes the mantle.

Although there are many different kinds of liquid hydrocarbon burners, the present invention is designed particularly for use on mantle lamps and lanterns. In these devices, liquid fuel is forced under pressure from a fount to a generator which vaporizes the fuel and discharges the vaporized fuel into a manifold tube that has a mantle holder on its lower end to which a mantle is fixed. Flow of fuel is controlled in these burners by a manual valve, and when this valve is first opened on a cold lamp or lantern a small quantity or jet of liquid fuel may be discharged from the generator into the manifold tube and toward the mantle. As those familiar with mantles well know, they are too fragile to withstand any but the lightest contact, and even gentle impingement of a liquid thereon, such as liquid fuel, is enough to rupture the mantle to a sufficient extent at least to weaken the same and impair its efficiency, if not destroy its usefulness, making its replacement necessary more frequently in the first case and mandatory in the second. Thus, unless a lamp or lantern is provided with means to guard against the hazard presented by this initial jet or charge of liquid fuel (and many conventional lamps and lanterns are not) there exists the possibility of accidentally impairing or even destroying the mantle every time the fuel control valve of a cold lamp or lantern is opened to start the same. The present invention eliminates this possibility and thus greatly prolongs the useful life of mantles for gaseous fuel burners.

Accordingly, it is an object of the invention to provide a new and improved device to protect the mantles of lamps or lanterns from impingement thereon of liquid fuel accidentally discharged by the lamp or lantern.

Another object of the invention is to provide a device as above set forth which does not impair the efficiency of the lamp or lantern.

A further object of the invention is to provide a device of the character above described which is adapted for use on existing lamps or lanterns without necessitating extensive alteration of the latter.

A more specific object of the invention is to provide a device for the purpose above-described which comprises a central target plate or area and a plurality of arms which not only cooperate to support the device in operative position but also cooperate centrally to locate the target plate with respect to the fuel passageway leading to the mantle of the burner.

Another object of the invention is to provide a device of the character above-described designed to catch and hold droplets of liquid fuel accidentally discharged from the burner of a hydrocarbon burning lamp or lantern. A more general object of the invention is to provide a liquid fuel intercepting baffle for the purpose described in the foregoing, of such simple construction that it may readily be stamped from sheet metal, but which nevertheless, is sufficiently durable and sturdy in construction to withstand long periods of use.

These and other objects, advantages and capabilities of the invention will become apparent from the following description wherein reference is had to the accompanying drawings, in which:

Fig. 1 is a view partly in elevation, partly in section and partly broken away showing a gasoline burning lantern of the type upon which the present invention is particularly adapted to be used, but not limited to this type; Fig. 2 is a plan view of the baffle of the present invention on an enlarged scale; Fig. 3 is a sectional view of the mantle holder and a portion of manifold tube of the lantern shown in Fig. 1, also on an enlarged scale, and Fig. 4 is a sectional view through a portion of the baffle of the present invention, on a still further enlarged scale taken on the plane of the line 4—4 of Fig. 2.

For the purpose of illustration, the invention is shown in Fig. 1, applied to a gasoline burning lantern of a type in wide use both publicly and by various departments of the Government, such as the Armed Forces. These lanterns include a fount 10 from which gasoline is forced under pressure to a generator, part of which is shown at 12. Liquid fuel is vaporized by the generator, and this vaporized fuel is discharged from a jet at the tip of the generator into a manifold or mixing tube 14 when a fuel control valve 16 is open. This manifold tube has a mantle holder 18 of any suitable material fixed upon its lower end, and a mantle 20 of conventional construction is fixed on this mantle holder in the usual manner. In many of the lanterns on the market the mantle holder 18 has a threaded recess 22 (Fig. 3) adapted to be threaded on the lower threaded end of the manifold tube and a single orifice or passage 24 communicating with the recess and corresponding in diameter to the internal diameter of the manifold tube thus providing an internal shoulder 26 and an unobstructed passageway 28 for fuel from the jet or tip of the generator 12 to the mantle 20. Because this passageway is unobstructed in many conventional lanterns, liquid fuel accidentally discharged from the generator may be projected onto the mantle of these lanterns causing serious damage to the same. Such accidental discharge of liquid fuel is apt to occur when the valve 16 is first opened on a cold lantern because the generator 12 does not operate as efficiently when cold as when warm.

This hazard of conventional lanterns is obviated by the present invention which comprises a baffle in the form of a spider indicated in its entirety by the number 30. This baffle has a disk-shaped central target area 32 from which a plurality of duplicate supporting arms 34, preferably three in number, project radially outwardly at angularly equally spaced intervals and for like distances. Preferably, the baffle is of unitary construction, and it may be stamped from sheet metal of relatively thin gauge, for example 22 gauge or \( \frac{3}{16} \), so that it is compact and inexpensive to construct. The central disk-shaped area 32 is accurately dished as indicated in Fig. 4, but the supporting arms 34, which are of narrow width, lie in a single plane which also includes the rim of the disk-shaped central part.

It will be understood that the presence of the baffle 30 in the fuel passageway 28 reduces the capacity of this passageway to pass gaseous fuel to the mantle and thus
might impair the efficiency of the lamp or lantern on which it is used. However, this impairment in function is avoided by increasing the diameter of the fuel passageway 28 in the manifold tube adjacent its lower or outlet end as shown at 36 in Fig. 3 and similarly increasing the size of the aperture 24 in the mantle holder 18 as compared with the size of these parts in the same type of lantern not having a protective baffle. The amount these diameters are increased will vary in different lamps and lanterns because of variations in the internal diameter of the manifold tube necessitated by variations in the size of the lamp or lantern, but the amount of increase required can readily be calculated because the increased transverse cross-sectional area thus provided should at least approximate the area of the spider or baffle 30.

To facilitate mounting of the baffle 30 and properly to locate the same in the passageway 28, the overall dimensions of the perimeter of the baffle are made to correspond approximately to the diameter of the recess 22 in the mantle holder so that the baffle may be received in this recess. When this occurs, the tips of the supporting arms 34 rest upon the shoulder 26 in the mantle holder, so that the baffle may be clamped against the end of the manifold tube 14 by tightly threading the mantle holder upon the manifold tube. As a result, the baffle will be firmly held in position, and moreover, the central target area 32 thereof will be accurately centered relative to the passageway 28 because the arms 34 are of equal length as previously explained and thus operate to center the central target area 32 in addition to supporting the same.

It should be noted that in mounting the baffle 30 the distal end of the central target area 32 is disposed downwardly relative to the lantern or concavely relative to the up-stream side of the passageway 28. This increases the shattering or atomizing effect of the baffle upon a jet of liquid fuel striking the same. In addition a reservoir is thus provided for attracting and holding small droplets of liquid fuel which may be discharged by the generator 12.

Another advantage of the baffle of the present invention is found in the fact that it tends to increase the efficiency and resulting luminosity of a lamp or lantern once it has become heated by operation of the lamp or lantern. This results from increased turbulence of the fact that the baffle tends to preheat the gaseous fuel flowing through the passageway 28, thus more definitely assuring vaporization thereof.

In the operation of mantle lamps and lanterns flashback in the manifold tube occurs sufficiently frequently so that various expedients have been devises to avoid it, the use of metal screen across the discharge outlet aperture in the mantle holder being a common expedient. However, these screens tend to clog quickly when leaded gasoline is used as a fuel. The present invention has the further advantage of not only preventing flashback, but in addition, it does not clog as does a screen used for this purpose.

While a specific embodiment of the invention has been described, it will be realized that the invention is susceptible to variations and modifications. It is desired, therefore, by the following claims, to include within the scope of the invention all such variations and modifications by which substantially the results of the invention may be obtained through the use of substantially the same or equivalent means.

I claim:

1. A baffle for disposition across the passageway through which vaporized liquid hydrocarbon fuel is fed to the mantle of a hydrocarbon burner to intercept jets of liquid fuel discharged into said passageway and thereby avoid damage to the mantle by the liquid fuel, comprising a unitary sheet metal body having a generally disk-shaped portion and at least one arm projecting radially therefrom to support said disk-shaped portion in the said passageway centered relative thereto and extending transversely thereof, the area of impedance to the free flow of fuel through said passageway afforded by the baffle being less than half the transverse cross-sectional area of said passageway.

2. A baffle for disposition across the passageway through which vaporized liquid hydrocarbon fuel is fed to the mantle of a hydrocarbon burner to intercept jets of liquid fuel discharged into said passageway and thereby avoid damage to the mantle by the liquid fuel, comprising a unitary sheet metal body having a generally disk-shaped central portion and a plurality of duplicate arms of narrow width projecting radially therefrom in uniform angular spaced relation to support the disk-shaped portion in the said passageway centered relative thereto and extending transversely thereof, said disk-shaped portion being concavely dished relative to the up-stream side of said passageway.

3. In an inverted mantle hydrocarbon burner the combination comprising a manifold tube defining a fuel passageway, said tube having a free end, a mantle holder having a recess for receiving the free end of the tube to adapt the mantle holder for mounting on the tube and an internal shoulder opposed to the end of the tube when the holder is mounted thereon and defining the perimeter of a fuel discharge outlet passageway therethrough aligned with the fuel passageway in the tube, and a baffle having a central portion of much smaller area in plan than the transverse cross-sectional area of the fuel passageway and a plurality of duplicate supporting arms projecting outwardly therefrom in uniform spaced relation to a length sufficient to make the dimensions of the outer perimeter of the baffle conform substantially to the dimensions of the recess in said mantle holder so that the arms will center the central portion relative to the fuel passageway in said mantle holder when the baffle is placed thereon and the tips of the arms will be clamped against the lower end of the manifold tube by the shoulder when the mantle holder is placed on the manifold tube.

4. In an inverted mantle hydrocarbon burner the combination comprising a manifold tube defining a cylindrical-shaped fuel passageway, said tube having a free end, a mantle holder having a recess for receiving the free end of the manifold tube to adapt the mantle holder for mounting on the tube and an internal shoulder opposed to the end of the tube when the holder is mounted thereon and defining the perimeter of a fuel discharge outlet passageway therethrough aligned with the fuel passageway in the tube, and a baffle comprising a unitary sheet metal body having a central portion of much smaller area in plan than the transverse cross-sectional area of the fuel passageway concavely dished relative to the up-stream side of the passageway and a plurality of duplicate supporting arms of narrow width projecting outwardly therefrom in uniform spaced relation to a length sufficient to make the dimensions of the outer perimeter of the baffle conform substantially to the dimensions of the recess in said mantle holder so that the arms will center the central portion relative to the fuel passageway in said mantle holder when the baffle is placed thereon and the tips of the arms will be clamped against the end of the manifold tube by the shoulder when the mantle is placed on the manifold tube.

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