

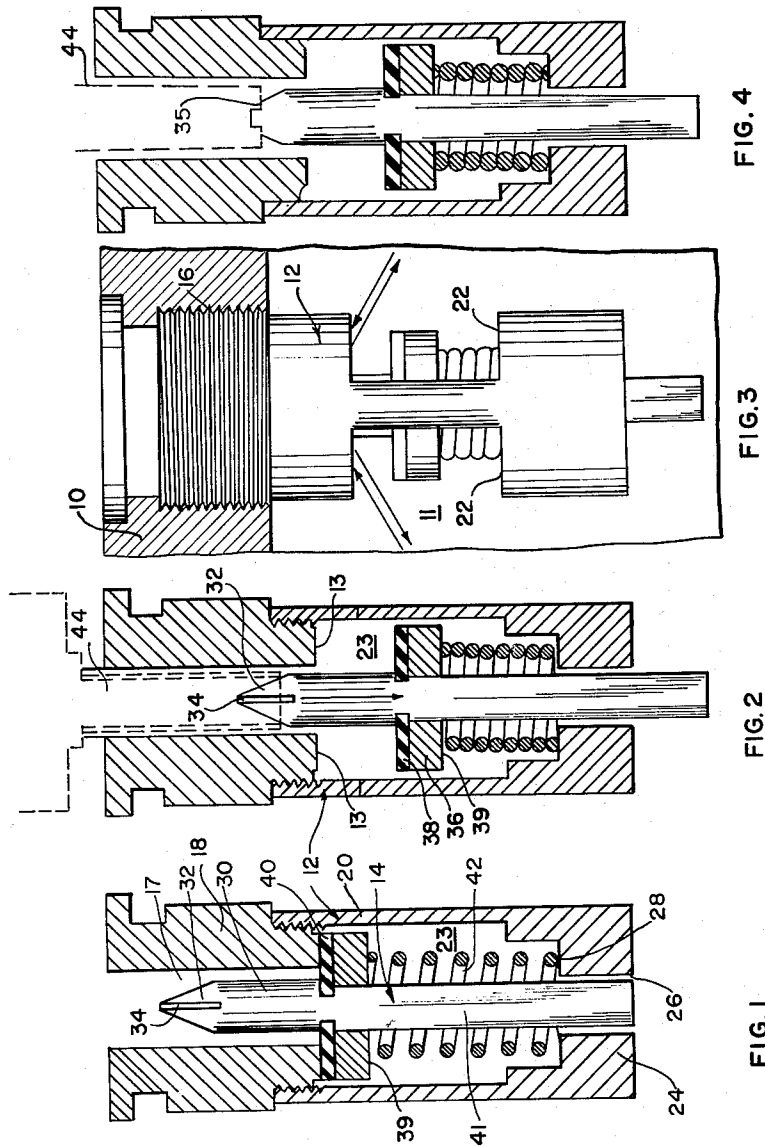
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YOSHIO KANAMARU

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GAS LIGHTER FILLER VALVE MECHANISM

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INVENTOR
YOSHIO KANAMARU

BY SEMMES & SEMMES

ATTORNEY

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GAS LIGHTER FILLER VALVE MECHANISM

Yoshio Kanamaru, Tokyo, Japan, assignor to Japan Gas
Lighter Association, Tokyo, Japan

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4 Claims. (Cl. 141-236)

The present invention relates to gas fueled cigarette lighters, and in particular to a valve mechanism for introducing gaseous fuel to the lighter reservoir.

Valves, for filling reservoirs with liquified gas, having separate and distinct passageways for (1) the introduction of fuel to the reservoir and (2) the escape of air and excessive fuel from the reservoir to the atmosphere, are well known in the art. Valves of this type, having separate "inlet" and "outlet" passageways to and from the lighter reservoir are described, for example, in U.S. Patent Nos. Re. 24,163; 2,882,940; 2,993,166 and 3,115,907. Although the valves disclosed in the above patents are satisfactory from a functional standpoint, the manufacture of the separate passageways is relatively complicated and obviously results in an increase in the manufacturing costs of the valves.

The present invention concerns valves for refilling lighter reservoirs with liquified gas wherein a single passageway is utilized for the introduction of gaseous fuel to the reservoir and for the escape of air and excessive fuel from the reservoir to the atmosphere.

Although the utilization of a "single" passageway filler-valve obviously reduces manufacturing costs, such a valve structure will only be commercially acceptable if the refilling operation is smooth and safe. Prior filling valves, such as described in the above patents, have utilized separate inlet and outlet passageways because of the assumptions that (1) the pressure in the filler valve itself is constant throughout and greater than the pressure in the lighter reservoir and (2) the pressure in the lighter reservoir is constant and greater than the atmospheric pressure. Careful study and experimentation, however, has revealed that the pressures both in the filler valve and in the reservoir are not constant. In fact, these pressures vary in accordance with the relative positions within the valve and reservoir. Guided by the above discovery, and desirous of establishing the necessary pressure relationships to ensure the smooth flow of fuel, it was further discovered that a "jet" stream of released butane might establish within the valve an independent inlet path of gaseous fuel without the necessity of separating same from the outward flow of air and excessive fuel. Furrows were designed to cause the fuel discharging from the refiller bomb to "jet" into the reservoir thus eliminating the necessity of utilizing structure defining a separate inlet passageway for the gaseous fuel.

Accordingly, it is an object of invention to provide in a gas fueled lighter an improved filler-valve mechanism.

Another object of invention is to provide in a gas fueled lighter an improved filler-valve comprising a single passageway for both the inlet of gaseous fuel and the outlet of air and excessive fuel from the reservoir.

Still another object of invention is to provide in a gas fueled lighter an improved filler-valve comprising a single passageway wherein an inner valve member containing furrows is used to cause the inflowing fuel to "jet" into the reservoir.

Yet additional objects of invention will become apparent from the ensuing specification and attached drawings wherein:

FIGURE 1 is side elevation in section of a first embodiment of the filler valve in closed position.

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FIGURE 2 is a side elevation in section of a first embodiment of the filler valve in open position.

FIGURE 3 is a side elevation of the filler valve in open position.

FIGURE 4 is a side elevation in section of a second embodiment of the filler valve in open position.

Referring to FIGURES 1 through 3, the wall of the lighter casing is indicated by 10 and the reservoir contained therein by 11. The filler-valve comprises a stationary outer valve member 12 and a movable inner valve member 14 mounted within outer valve member 12 for rectilinear sliding movement. The stationary outer valve member 12 is secured to the wall 10 of the lighter casing by external threads 16 contained by upper cylindrical portion 18 and contains an axial passageway 17 opening to the atmosphere. Below the bottom surface of valve seat 13 of upper cylindrical portion 18 is located lower cylindrical portion 20 which contains windows 22 providing communication from the valve chamber 23 to the interior of reservoir 11. At the bottom of lower cylindrical portion 20 is located a bottom wall 24 having opening 26 and interior supporting surface 28, the functions of which will be described hereinafter.

The movable inner valve member 14 consists of an upper rod 30 terminating in a diverging tip 32 which may be either conical, semispherical or in the shape of a truncated cone. Located on converging tip 32 are a plurality of furrows 34 which are used to "jet" the gaseous fuel into valve chamber 23 and then through windows 22 when inner valve member 14 is in an open position. Below upper rod 30 is located transverse shoulder 36 containing upper surface 38 and a lower surface 39. A gasket 40 may be supported by surface 38 if desired. Below transverse shoulder 36 is located a lower rod 41 resting in sliding relationship within opening 26 of bottom wall 24 of lower cylindrical portion 20. The movable inner valve member 14 is held in closed position by spring 42, the bottom portion of which rests on supporting surface 28 and the top portion of which rests in engagement with lower surface 39 of transverse shoulder 36.

As seen in FIGURE 2, when the lower cylindrical portion 44 of a conventional fuel containing bomb is pressed against converging tip 32, the movable inner valve member 14 is pushed downwardly thus separating surface 38 of transverse shoulder 36 from valve seat 13 and permitting gaseous fuel to "jet" through furrows 34 in a stream to the interior of valve chamber 23 and then through windows 22 into reservoir 11 of the lighter. Simultaneously, air and excessive fuel pass inwardly from reservoir 11 through windows 22 and upwardly to the atmosphere along the passageway defined by the internal periphery of axial passageway 17 of upper cylinder 18 and the outside surface of lower cylindrical portion 44 of the fuel containing bomb.

In a second embodiment of applicant's filler-valve construction, as illustrated in FIGURE 4, the furrows may be located at the discharge end of lower cylindrical portion 44 of the fuel containing bomb. In this embodiment the furrows or openings are designated by reference numeral 35.

Manifestly, various changes in construction and substitution of parts may be employed without departing from the spirit and scope of invention, as defined in the subjoined claims.

I claim:

1. A lighter constructed to be charged with liquefied gas fuel under pressure and including in combination:

(A) a casing containing therein a fuel reservoir;

(B) gas charging means carried by said casing and affording simultaneous escape of gas from said reservoir and charging of said reservoir with liquified gas fuel under pressure, said fuel charging means includ-

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ing an outer valve member having side walls fixed with respect to said casing, said outer valve member including

- (1) a passageway located at one end thereof and communicating with the atmosphere,
- (2) at least one window located in the side walls thereof, and
- (3) valve seat means located near the mid portion thereof;

said fuel charging means further including an inner valve member mounted to move within said outer valve member between open and closed positions; said inner valve member including

- (1) a first rod terminating in a converging tip portion, said tip portion containing at least one furrow,
- (2) an intermediate transverse shoulder portion extending outwardly from said first rod and including an upper surface resting in abutting relationship with said valve seat of said outer valve member when said inner valve member is in closed position, and
- (3) a second rod portion extending beneath said intermediate transverse shoulder portion;

(C) mounting means affording substantially rectilinear sliding movement of said inner valve member with respect to said outer valve member whereby said inner valve member slides with respect to said outer valve member in moving between said open and closed positions; and

(D) spring means urging said inner valve member towards said closed position.

2. A lighter as in claim 1, wherein said tip portion of said first rod portion is conical in configuration.

3. In a lighter mechanism for liquified gas, the combination including a casing having a reservoir contained therein and filler valve means carried by said casing and affording a simultaneous escape of gas from said reservoir and charging of said reservoir with liquified gas under pressure, comprising

(A) an outer valve member having side walls fixed with respect to said casing, said outer valve member including

- (1) a passageway communicating at one end thereof with the atmosphere,
- (2) window means located in the side walls thereof and communicating with said reservoir, and
- (3) valve seat means formed as an integral part of said side walls;

(B) an inner valve member mounted to move within said outer valve member between open and closed positions; said inner valve member including

- (1) means for permitting said liquified gas to jet from within said outer valve member to said window means, and
- (2) shoulder means resting in abutting relationship with said valve seat means of said outer valve member when said inner valve member is in closed position;

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(C) mounting means affording substantially rectilinear sliding movement of said inner valve member with respect to said outer valve member when moving between said open and closed positions; and

(D) spring means urging said inner valve member towards said closed position.

4. In a lighter mechanism for liquified gas, the combination including a casing having a reservoir contained therein and filler valve means carried by said casing and affording a simultaneous escape of gas from said reservoir and charging of said reservoir with said liquified gas under pressure, comprising

(A) an outer valve member fixed to said casing, said outer valve member including a central passageway, communicating at one end thereof with the atmosphere, window means located in said outer valve member and providing communication between said passageway and said reservoir, and valve seat means within said outer valve member;

(B) an inner valve member mounted to move within said outer valve member between open and closed positions; said inner valve member including means for causing said liquified gas to jet from within said outer valve member to said window means; said inner valve member further including shoulder means located below said means for causing said liquified gas to jet; said shoulder means forming a part of said inner valve member and resting in abutting relationship with said valve seat means when said inner valve member is in closed position;

(C) mounting means affording substantially rectilinear sliding movement of said inner valve member with respect to said outer valve member; and

(D) spring means urging said inner valve member toward said closed position.

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LAVERNE D. GEIGER, *Primary Examiner.*