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TRANSFER VALVE UNIT FOR GAS CIGARETTE LIGHTERS

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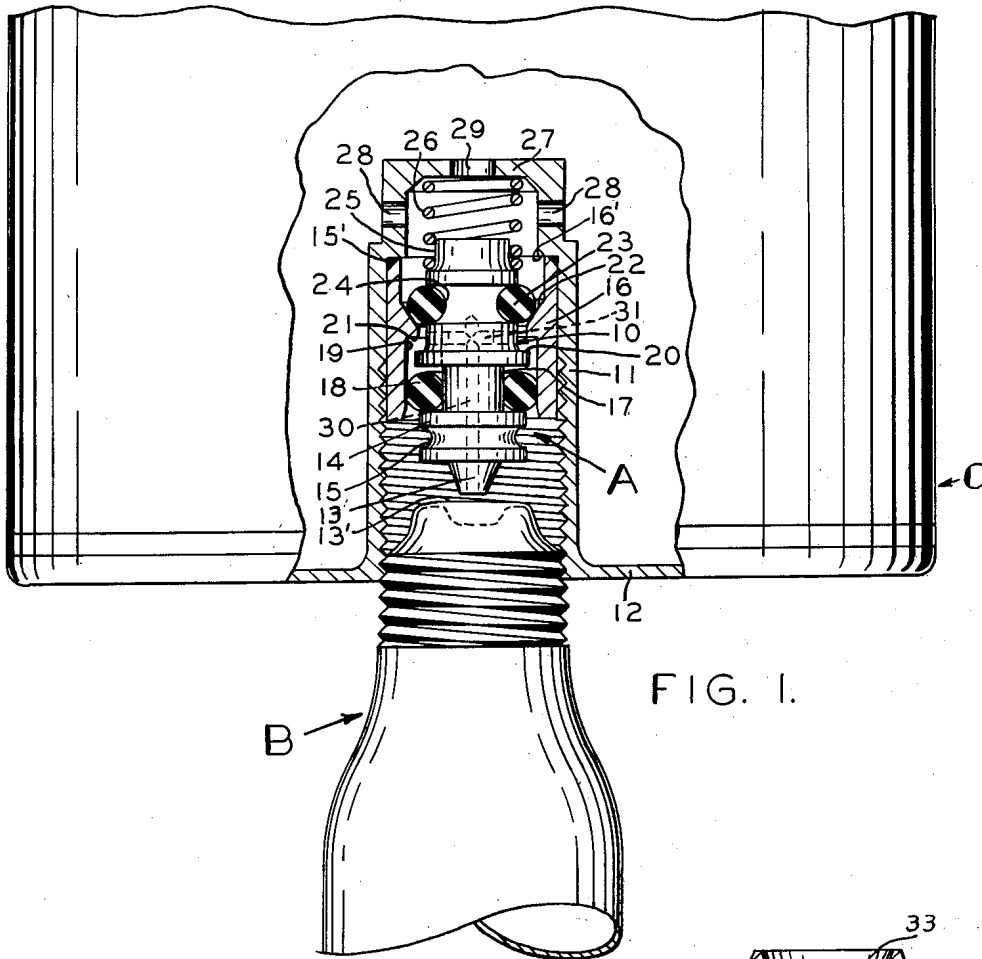


FIG. 1.

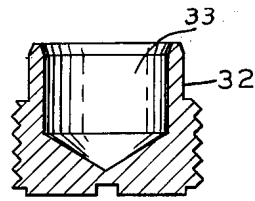


FIG. 2.

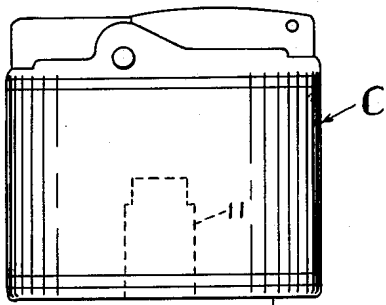


FIG. 3.

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TRANSFER VALVE UNIT FOR GAS CIGARETTE LIGHTERS

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5 Claims. (Cl. 62—1)

My invention relates to an improvement in transfer valves adapted to receive the neck of a cartridge which holds a supply of liquified petroleum fuel, such as butane and other fuel of a similar character which can be compressed into liquid form so that when the cartridge is screwed in the body of the lighter the end of the cartridge is punctured and the liquid fuel in the throw-away cartridge is quickly transferred into the body of the lighter.

An object is to provide a transfer valve of a construction wherein an O ring can be pressed over the inner end of the valve needle onto its seat where it is retained both by its own elasticity and the pressure of the liquified fuel and gas in the body of the lighter.

A further object resides in the use of a second O ring for the inner seal of the valve which provides wide passages for the transfer of the liquid fuel from the cartridge into the body of the lighter when the valve is opened.

It is also an object to provide a transfer valve adapted to be fixed in the body of the lighter in a manner to prevent the same from being rotated so that it becomes loose by the frictional contact of the end of the cartridge which is screwed into the body of the lighter and is adapted to be pierced by the needle of the valve as the cartridge is screwed home. This feature prevents the valve unit from becoming loose through its contact with the filler cartridge. The sleeve of the valve unit is fixed within a thimble-like recess formed in the body of the lighter; however, the core which includes a needle of the valve is removable for repair should it become necessary but the sleeve of the valve unit remains in the thimble-like recess of the lighter body. A further feature of my injection valve for a gas lighter resides in the small number of parts, simplicity of construction together with a sturdy needle. The needle is formed with an axially passageway for injecting the liquid fuel into the body of the lighter when the needle pierces the end of the cartridge.

A further feature of my valve unit resides in providing the core member with an annular groove positioned just back of the piercing needle which provides means for a tool to grip the core of the valve unit to remove the same when desired. The sleeve of the valve unit, however, is press fit into the thimble of the lighter body so that the sleeve will remain fixed and cannot come loose. This prevents the injection valve unit from ever becoming loose in its operation and when its piercing needle comes in contact with the closed end of the fuel throw-away cartridge.

The valve unit is held normally close by a spring which urges it into closing position. Pressure in the fuel chamber also tends to normally hold the valve in closed position.

It is also a feature to permit the core of the valve unit which carries the piercing needle to rotate when the same is under frictional contact with the end of the cartridge without rotating the sleeve of the valve unit, this prevents the valve unit from working loose in the thimble of the lighter body. It will be apparent that as the fuel

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cartridge is screwed in against the needle of the valve unit, the frictional contact with the cartridge increases until the cartridge has been completely screwed into the thimble of the casing of the lighter. Then when the cartridge is removed the frictional contact with the piercing needle gradually decreases between the cartridge and the needle valve. However, the sleeve of the valve unit remains fixed irrespective to the number of times the lighter is filled because at no time does the sleeve of the valve move after it has once been fixed in place and by reason of the fact that the core of the valve unit may turn in the filling operation of the lighter.

The invention will appear more clearly from the following detailed description when taken in connection with the drawings showing by way of example a detailed embodiment of the inventive idea wherein each part is defined and designated to indicate the function of the operation of the same.

In the drawings forming part of this specification:

Figure 1 is a partial sectional view of the valve unit as it will appear when mounted within the body of the lighter, a portion of the body of the lighter being broken away.

Figure 2 is a sectional view of a screw plug for the lighter which is adapted to close the injection valve opening wherein the supply cartridge of fuel is adapted to be inserted when said plug is removed.

Figure 3 illustrates the lighter in which my injection valve is secured and indicated by the dotted lines to show the approximate position of the injection valve unit in the body of the lighter.

My transfer valve A is composed of the cylindrical core member 10 which is axially mounted within the cylindrical thimble portion 11 formed integrally with the body or tank 12 of the lighter. The thimble 11 extends into the chamber within the body of the lighter A.

The core member 10 has formed on the lower end thereof the piercing point 13 which is adapted to pierce a frangible top which closes the end of the fuel supply cartridge B.

The core member 10 is formed with an annular shoulder 14 and also with an annular groove 15. The groove 15 is adapted to receive a suitable tool (not shown) whereby the core member 10 may be removed from the sleeve 16 which supports the valve member and needle of the injection valve unit.

A recess 17 is formed in the valve member which is adapted to receive the O ring 18. This O ring forms a lower seal in the valve unit.

The O ring 18 is adapted to operate in the recess 19 formed in the sleeve 16 and an annular shoulder 20 formed on the valve member is adapted to bear against the annular shoulder 21 formed in the sleeve 16 when the needle 13 is in the act of piercing the top 13' of the cartridge B, as the cartridge B is screwed into the sleeve 11.

An inclined annular shoulder 22 is formed in the sleeve 16 against which a second O ring 23 is adapted to bear and form a seal to prevent the escape of compressed liquid fuel in the lighter chamber. The O ring 22 is held in the annular recess 24 formed in the core of the valve.

The core of the valve extends inwardly and is provided with a reduced end portion 25 which is adapted to be engaged by the coil spring 26 which is positioned within the thimble 11. The coil spring 26 normally holds the valve closed to prevent the escape of compressed fuel within the body of the lighter.

The inner end portion 27 of the thimble 11 is formed with the openings 28 and 29 to permit the compressed fuel to be injected from the cartridge B into the fuel chamber of the lighter C.

The valve A is formed with an axial opening 30 (in-

licated in dotted lines) which connects with a transverse passageway 31 (indicated in dotted lines) to provide a passageway for the compressed fuel contained in the cartridge B to be passed from the cartridge through the passageways 30 and 31 around the upper O ring 22, when the same is moved inwardly by the contact of the cartridge B against the needle end 13 and the annular shoulder around the same which forms a seal between the cartridge and the valve A during the period that fuel is transferred from the cartridge B into the body of the lighter C.

The neck of the cartridge B is threaded to engage with complementary threads formed within the thimble 11.

When the cartridge B is removed after it has discharged a quantity of compressed fuel into the body of the lighter C the opening in the thimble from which the cartridge has been removed is closed by the threaded plug 32. This plug is formed with a hollow recess 33 to extend around the needle 13 and does not contact the needle but is merely for the purpose of closing the opening and protecting the piercing needle 13 of the valve unit.

The valve unit may be assembled in the sleeve 16 with the O rings 18 and 22 in their respective places in the grooves 17 and 24 respectively with the core member which is formed in an integral part and carries the piercing needle 13 on one end and the head portion 25 on the other end, before the valve unit A is positioned in the thimble 11. When the coil spring 26 is dropped into position in the thimble 11 the valve unit A with the sleeve 16 is forced into the thimble 11 against an annular gasket 15'. The gasket 15' is positioned against the shoulder 16' and the edge of the sleeve 16' is forced against said shoulder to provide a gas tight joint.

The valve unit A is simple in construction having this single piece core member which carries the piercing needle and which can be made in production by a screw machine. The sleeve 16 may also be made in a similar manner as the core member. Thus, I provide a very simple injection valve for the lighter C which is virtually fool-proof and which will not become loose in the thimble 11 and which forms an effective cartridge piercing means to permit the user of the lighter C to readily fill the fuel chamber of the lighter whenever necessary.

Heretofore, injection valves used for butane lighters and the like have been more complicated and are inclined to become loose in the thimble in the course of using the same.

In assembling my injection valve unit A before the sleeve 16 has been inserted into the thimble 11, the O sealing ring 18 is slipped onto the core member 10 in the groove 17. Then the core member 10 with the O ring 18 is slid into the lower end of the sleeve and moved until the shoulder 20 comes in contact with the shoulder 21. The upper O ring 22 can then be slipped over the head of the core member and into the groove 24.

It is an important feature of my injection valve to provide easy removal of the core which is accomplished by engaging the groove 15 with a suitable tool and pulling the core out of the sleeve 16. This also permits repair when necessary such as applying new O rings in the respective grooves of the core and without the necessity of removing the sleeve 16, whereupon the core member and piercing needle with the new O rings is forced back into position in the sleeve 16.

The simplicity of my injection valve unit will be apparent and the efficient operation thereof will also be obvious.

The drawings and specification have been drawn to illustrate the best embodiment of my invention, however, I desire to have it understood that obvious variations may be made within the scope of the claims without departing from the spirit of the invention.

I claim:

1. A transfer valve for gas lighters adapted to use a compressed liquid fuel which when released to the atmos-

phere in the form of a gas provides a large number of lights including a sleeve, an annular shoulder formed projecting inwardly in said sleeve said shoulder having an annular inclined seat formed thereon, a core member having a gas passageway formed therethrough and supported reciprocally in said sleeve, a pair of gasket O rings supported in spaced relation in respective grooves formed in said core member one of which is adapted to contact the inner surface of said sleeve and the other to contact said inclined shoulder seat to support said core, a piercing needle formed on one end of said core member adapted to pierce the cover on a throw-away cartridge holding a supply of compressed fuel when the cartridge is caused to bear against said piercing needle, spring means for holding said core member with said first mentioned O gasket ring in sealing position on said inclined annular seat to normally close off the flow of gas through said sleeve, said supporting sleeve of said injection valve unit being adapted to be forced into a receiving thimble formed in the fuel chamber of the lighter against a sealing gasket to provide a gas tight joint around said sleeve.

2. A gas transfer valve comprising a one piece core member, upper and lower O rings, a sleeve member forming a gas passageway and support for said core member said sleeve having an inclined shoulder seat formed internally thereof, groove means formed in said core member adapted to support said O rings, said upper O ring positioned above said inclined shoulder a gas passageway formed in said core member, a piercing element formed on one end of said core member, a coil spring adapted to normally hold said upper O ring against said inclined shoulder seat in closed position, said sleeve being positioned in a thimble in a lighter and a gasket for sealing the inner end of said sleeve against a shoulder in the thimble.

3. A fuel transfer valve unit comprising a one piece central member having a fuel passage formed therein, gasket means mounted on said central member adjacent the upper and lower ends thereof, shoulder means formed on said central member intermediate said upper and lower gasket means, a gas passageway supporting sleeve for said central member, a valve seat formed in said sleeve against which said upper gasket means is adapted to seat to close off said passageway of said sleeve of said valve said central member axially spaced from the inner surface of said sleeve by said gasket means, shoulder means formed on said valve seat in said sleeve adapted to engage against shoulder means formed on said central member to limit the opening movement of said central member and spring means bearing against said central member adapted to normally urge the same into closed position and cause said upper gasket means to bear against said valve seat.

4. An injection valve unit for cigarette lighters using a compressed fuel in the fuel chamber thereof including a sleeve adapted to be fixed in a thimble-like portion positioned within the fuel chamber of the lighter, a fuel passageway leading out of said thimble-like portion, a core valve member positioned in said fixed sleeve, a fuel passageway formed in said core member, spaced apart inner and outer O rings carried in grooves formed in said core member to floatingly support the same in said sleeve, a seat in said sleeve for said inner O ring, a spring for normally urging said core member into a closed position with said inner O ring on said seat, a shoulder in said sleeve formed on the underside of said seat adapted to contact a shoulder formed on said core member to limit the inner movement of said core member, a piercing outer end formed on said core member and a groove formed in said core member adapted to receive a tool to remove the core member when desired.

5. An injection valve for butane lighters comprising a sleeve, a valve seat formed in said sleeve, a shoulder formed in said sleeve integrally with and on the underside of said seat, a floating valve core supported within

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said sleeve, a shoulder on said valve core for limiting the opening movement of the same by engagement with said shoulder formed in said sleeve, spaced apart gasket valve means carried by said floating valve core and adapted to contact said valve seat, a spring for normally closing said gasket valve means on said valve seat, a fuel passageway extending through said valve core and opening above and below said gasket valve means, a needle like end for piercing a fuel cartridge formed on

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said valve and an annular recess formed on said valve adapted to be engaged by a tool to remove said valve from said sleeve when desired.

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