Dec. 27, 1966 KARL-ERICH WIEDEN ETAL 3,294,118

FILLING VALVE FOR GAS LIGHTERS

Filed July 7, 1964

Fig. 1

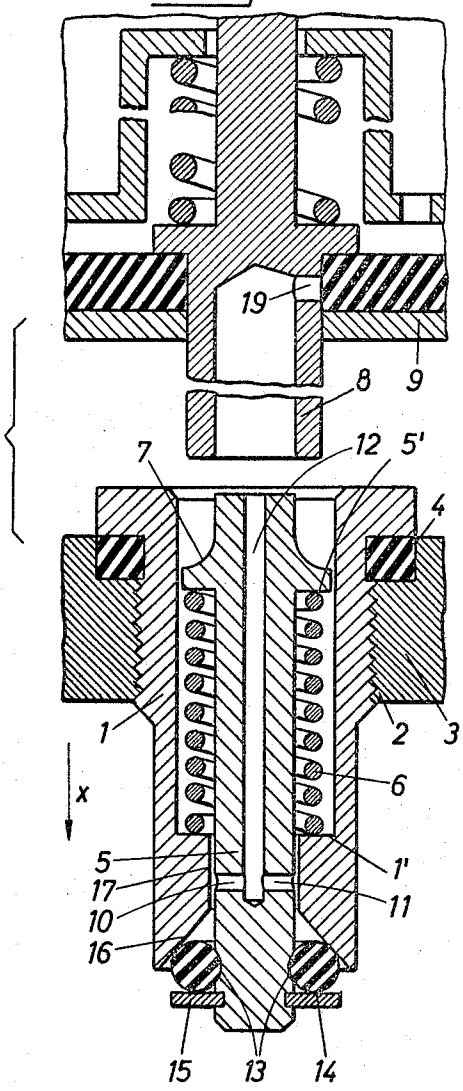


Fig. 2

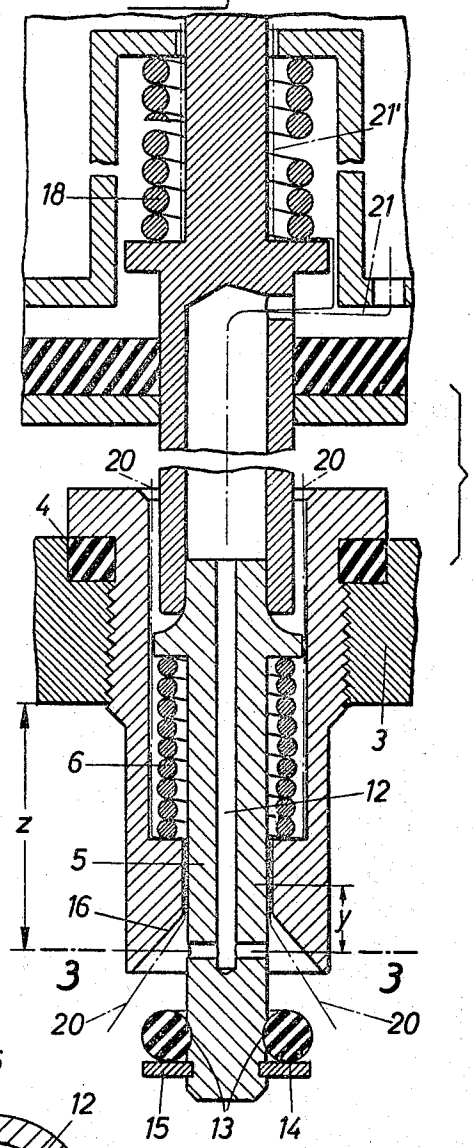
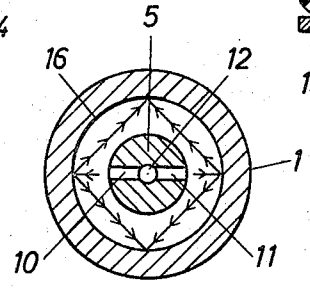


Fig. 3



INVENTORS
Karl-Erich Wieden
Paul Helbing
BY Emmett Montague
Attorney

United States Patent Office 3,294,118 Patented Dec. 27, 1966

3,294,118

FILLING VALVE FOR GAS LIGHTERS

Karl-Erich Wieden, Solingen-Merscheid, and Paul Heling, Solingen-Wald, Germany, assignors to Firma Wieden & Co. G.m.b.H., Solingen-Ohligs, Germany, a corporation of Germany

Filed July 7, 1964, Ser. No. 380,845
Claims priority, application Germany, July 15, 1963, W 34,888
2 Claims. (Cl. 137—588)

The present invention relates to a filling valve for gas lighters with a spring-biased valve body, which is guided for longitudinal movement with slight play through a bore in a valve housing disposed in the tank of the gas lighter, whereby the valve body has entrance openings pointing in opposite directions, which originate from an axially disposed feeding channel and wherein the valve body is formed at its lower end as closing body, which cooperates with the lower end of the valve housing, the latter serving as a valve seat.

In the known filling valves of this type, which are used for gas lighters operated by means of liquefied gas, the filling valve has two separate channels, one of which serves as a filling channel and the other of which serves as bleeding channel. The opening and closing of these two channels takes place by a position change of a single longitudinally displaceable valve body. In improved structures, it is provided that the passage through the feeding channel is smaller, than the discharge channel and that the feeding channel is closed upon a completed filling prior to the closing of the discharge channel. The known filling valves have disadvantages as to their structure. An appreciable drawback during the use resides in the fact, that a portion of the incoming liquefied gas escapes through the discharge channel during the filling process. In order to avoid this drawback, other filling valves have been known having a spring-biased valve body, which filling valves have two sealings disposed in series relative to each other, whereby the first sealing comprises a semi-permeable, one-sided osmatically operating material, which is known per se.

In a similar design, it has been proposed also already to provide such filling valve with a valve seat face, which has the shape of a cone, which valve seat face is engaged by a likewise conically shaped valve body, which is under spring pressure and guided with slight play. A solution of the problem concerning the formation of air escaping channels, however, is not found in this structure.

The above-stated structures are cumbersome and do not provide a safe and durable solution. Even a further development in this direction, wherein the first seal comprises a sleeve of rubber or plastic material, which opens under the filling pressure, is not in the position to solve by simple means the problem, namely, that a return shock of the incoming liquefied gas through the discharge opening of the valve is avoided by all means, as long as the lighter tank is not completely filled or filled within the range of the predetermined volume.

It is therefore, one object of the present invention to provide a filling valve for gas lighters, which avoids the drawbacks of the known structures.

It is another object of the present invention to provide a filling valve for gas lighters, wherein the valve seat face has the shape of a cone face and which extends in the open position of the valve body umbrella-like in front of the entrance openings.

It is still another object of the present invention to provide a filling valve for gas lighters, wherein the valve body carries at its lower end a sealing ring in an annular groove of the valve body, which sealing ring is supported on the side opposite of the sealing face by a split-ring.

Due to this arrangement, a favorable design of the filling valve for gas lighters is provided concerning the manufacture and also concerning its use. First of all, without any additional means which are subject to wear it is obtained that the entering liquefied gas during the incoming procedure does not flow outwardly through the discharge openings, as long as the intended filling volume is not reached. The liquefied gas emerging from the entrance openings rather hits the valve seat face which extends umbrella-like in front of the entrance openings. It is there dispersed and forms, under circumstances, after multiple reflections from individual points of this umbrella-like valve seat face in turn a liquid umbrella in front of the exit openings. This umbrella or screen, formed from dispersed liquified gas and the drop in pressure caused thereby, prevents a return shock of the liquid through the exit cross-section, as long as the exit openings and the umbrella-like valve seat face is disposed still above the liquid level in the lighter tank. The umbrella-like formation of the valve seat face makes it also possible to eliminate a particular discharge channel in the valve body itself. The corresponding arrangement of a sealing ring, which is supported on its back side by a split-ring, is not only favorable as to manufacture and as to use, but enhances also the formation of the limited zone of the dispersion of the entering liquefied gas.

With these and other objects in view, which will become apparent in the following detailed description, the present invention will be clearly understood in connection with the accompanying drawing, in which:

FIGURE 1 is a longitudinal section of the filling valve with a longitudinal section through the closed filling valve with a filling bottle disposed thereabove;

FIG. 2 is a similar section with mounted filling bottle and open filling valve; and

FIG. 3 is a section along the lines 3—3 of FIG. 2.

Referring now to the drawing, the filling valve for gas lighters comprises a housing **1** which is screwed into a bore **2** of a lighter bottom **3** or the like. A rubber packing **4** provides a sealed seat.

A valve body **5** is disposed in the housing **1** of the filling valve. It is axially displaceable against the pressure of a spring **6** in the direction of the arrow *x*. The spring **6** supports itself, on the one hand, on the bottom **1'** of the housing **1**, and, on the other hand, against a shoulder **5'** of the valve body **5**.

At its upper end, the valve body **5** forms a fitting face **7** for mounting the head portion **8** of the filling bottle **9** thereon.

The valve body **5** has entrance openings **10** and **11** which point in opposite directions and which originate from an axially disposed feeding channel **12**. At its lower end the valve body **5** carries in an annular groove **13** a sealing ring **14**, which is supported at its bottom side by a split-ring **15**.

The sealing ring **14** engages in the closed position of the filling valve (see FIG. 1) the valve seat face **16**. The latter is continued from a bore **17** receiving the valve body **5** with slight play.

The valve seat face **16** is arranged such, that is extends in the open position of the filling valve (see FIG. 2) umbrella-like in front of the entrance openings **10** and **11** pointed in opposite directions. In the embodiment disclosed in the drawing, the position of the entrance openings **10** and **11** opposite to the umbrella-like valve seat face **16** is obtained such, that the pressure spring **6** permits only the total stroke *y* of the valve body **5**.

The head portion **8** of the filling bottle **9** is displaceable, and in particular against the pressure of the spring **18** disposed in the housing of the filling bottle **9**. In the position of the head portion **8** disclosed in FIG. 1 of the

drawing, the discharge opening **19** of the filling bottle **9** is closed. In the position of the head portion **8** shown in FIG. 2, the discharge opening **19** is open.

The operation of the present filling valve for gas lighters takes place in the following manner:

Starting from the position shown in FIG. 1 of the drawing, the head portion **8** of the filling bottle **9** is mounted on the outer end of the valve body **5**. Upon pushing down the filling bottle **9** in the direction of the arrow *x*, the valve body **5** moves likewise in the direction of the arrow *x*. The sealing ring **14** is lifted from the valve seat face **16**. At first, a reduction of the pressure above atmospheric pressure, present in the lighter tank, takes place and in particular the gas under pressure above atmospheric pressure escapes along the line **20—20**. Upon reaching a certain lowered position of the valve body **5**, and at least upon reaching the final lowered position, as shown in FIG. 2, respectively, the discharge opening **19** of the filling bottle **9** is opened up. Liquefied gas flows along the likewise point-dotted lines **21–21'** through the channel **12** of the valve body **5** to emerge from the entrance openings **10** and **11**. The liquefied gas emerging therefrom is sprayed towards the valve seat face **16**. Multiple reflections take place, which are indicated in FIG. 3 by the respective arrows. This liquid forms a liquid umbrella, which prevents the escape of the liquefied gas outwardly along the point-dotted lines **20—20**. The latter takes place only when the liquid level of the tank reaches about the height of the entrance openings **10** and **11**. The still then remaining height *z* constitutes the prescribed safety idle space. As soon as the first portion of the liquefied gas is observed next to the head **8** of the filling bottle **9**, the operator knows that the lighter tank has reached with safety the maximum possible filling capacity.

While we have disclosed one embodiment of the present invention, it is to be understood that this embodiment is given by example only and not in a limiting sense, the scope of the present invention being determined by the objects and the claims.

We claim:

1. A filling valve for gas lighters comprising

a valve housing having a substantially cylindrical bore extending through the entire length of said valve housing adapted to be inserted into an opening of a fuel tank,

a spring-biased valve body longitudinally movable in said valve housing,

air escape passage means formed by slight radial play between said valve body and housing,

said valve body having an axial bore open at the outer end thereof and terminating short of the inner end of said valve body, and

said valve body has two oppositely directed and substantially radial entrance bores communicating with said axial bore thereof and terminating at the outer periphery of said valve body,

said valve housing terminating at its lower end into a conically widening valve seat face,

said valve body constituting closing means for the inner end of said valve housing, and

said conically widening valve seat face of said valve housing being disposed umbrella-like opposite said entrance bores of said valve body in the open, lowered position of said valve body, and causing repeated reflections of the fuel against said valve seat face to prevent escape of fuel from the tank.

2. The filling valve, as set forth in claim **1**, wherein

said valve body has an annular groove near its inner end,

a sealing ring received in said annular groove and engaging sealingly said conically widening valve seat face of said valve housing, and

a split ring secured to the inner end of said valve body and engaging from below said sealing ring in order to support the latter.

References Cited by the Examiner

UNITED STATES PATENTS

2,725,721	12/1955	Gruber	67—7.1
3,019,807	2/1962	Projahn	137—588 X
3,038,446	6/1962	O'Farrell	251—321 X

FOREIGN PATENTS

353,932	6/1961	Switzerland.

M. CARY NELSON, *Primary Examiner.*

ARNOLD ROSENTHAL, *Assistant Examiner.*