March 17, 1964 R. K. BOYER ETAL 3,125,135

FILLING DEVICE WITH DETACHABLE FLOW COUPLING MEANS

Filed Aug. 14, 1961 2 Sheets-Sheet 1

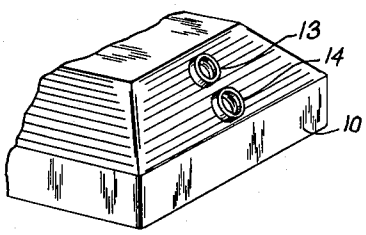


FIG. 1

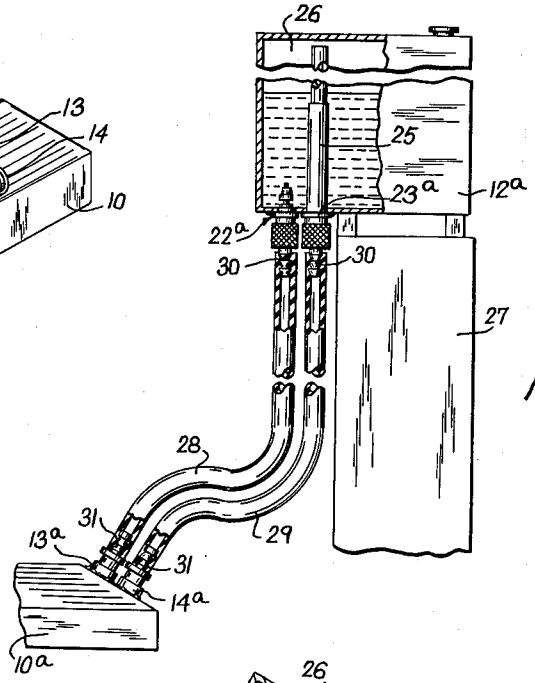


FIG. 4

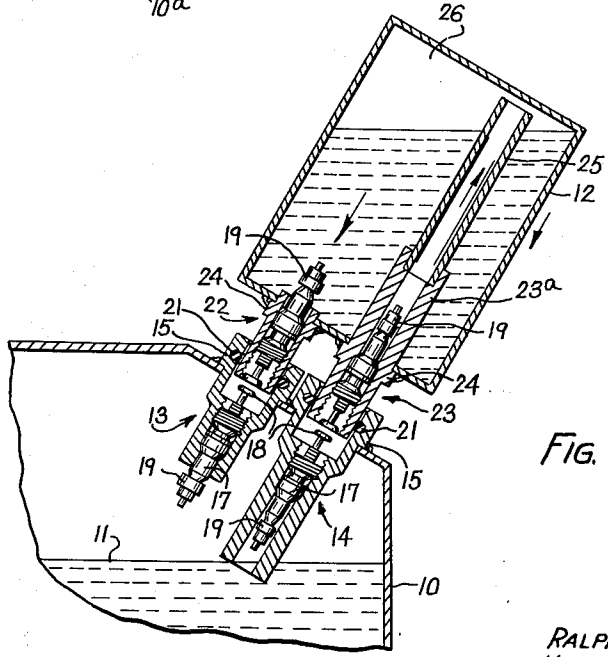


FIG. 2

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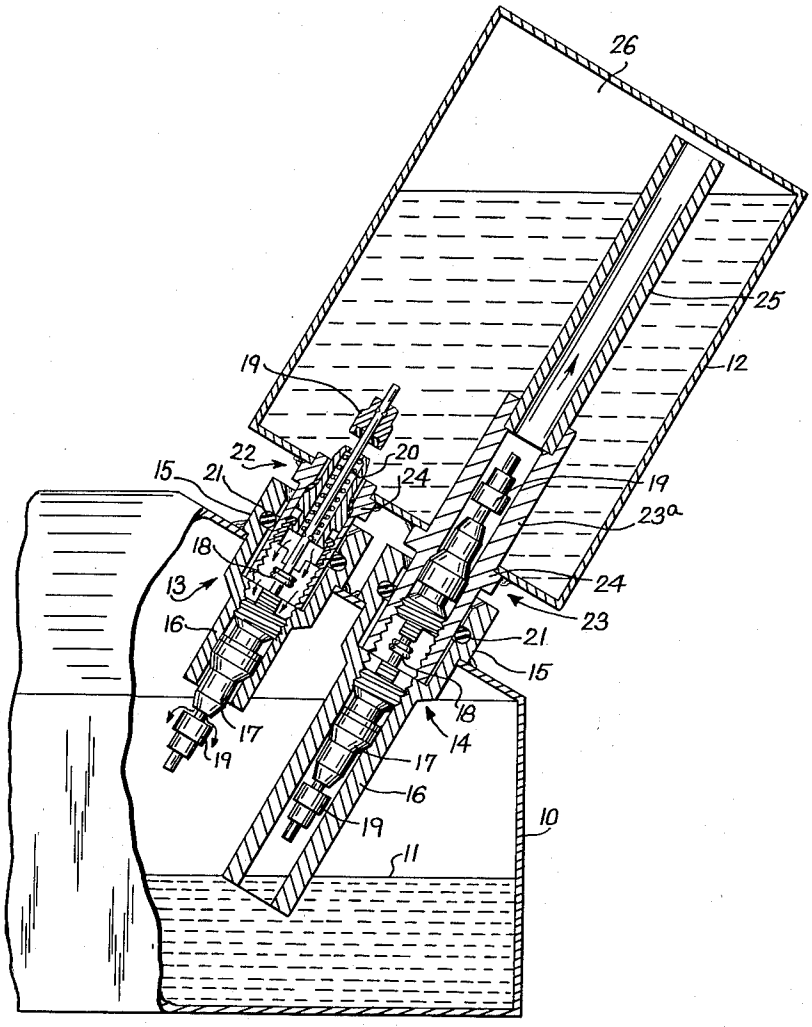


FIG. 3

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FILLING DEVICE WITH DETACHABLE FLOW COUPLING MEANS

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6 Claims. (Cl. 141—290)

This invention relates to a filling device for the fuel container of an apparatus, and more particularly to a filling device for an apparatus that utilizes a highly volatile fuel such as a fuel of the naphtha family.

The invention contemplates a filling device which provides a maximum of safety.

The invention further contemplates a filling device for an apparatus that employs highly volatile and explosive fuel and which device is such as to reduce to a minimum the likelihood of the fuel or of the vapors therefrom entering the surrounding atmosphere and also which prevents undesired and dangerous overfilling of the apparatus with the fuel.

In addition, the filling device contemplated by the invention can be quickly and easily attached to and detached from the apparatus without danger of fuel leakage or of the escape of fuel vapors from the device in a way that would create a hazard.

The filling device according to the invention can be formed of simple parts, some of which are already commercially available and hence the filling device embodying the invention is susceptible of economic manufacture.

A filling device embodying the invention is illustrated in the accompanying drawings and is shown as connecting a fuel supply container with the apparatus with which the device is to be used.

Referring to the accompanying drawings forming a part of this specification—

FIG. 1 is a fragmentary perspective view of the fuel container of an apparatus with which the filling device can be advantageously used.

FIG. 2 is a sectional view on a larger scale than FIG. 1 and illustrates the filling device partially applied for interconnecting the fuel supply container with the fuel container of the apparatus, the valves of the filling device being shown in closed position.

FIG. 3 is a fragmentary, partly elevational and partly sectional view similar to FIG. 2 but on a larger scale and illustrates the filling device fully applied and interconnecting the fuel supply container with the fuel container of the apparatus and with the valves of the filling device open as is the situation when the apparatus is being filled with the fuel, and

FIG. 4 is a view partly in elevation and partly in section and is intended to represent the arrangement employed where the fuel supply container is too large to be supported directly by the filling device from the apparatus as is the case in the previously described views and wherein the apparatus requiring the large size fuel container is of greater size than the apparatus previously illustrated, it being understood that for the purposes of convenience FIG. 4 is on a much smaller scale than are FIGS. 1, 2 and 3.

Although the filling device embodying the invention can be used with various types of apparatus employing volatile, explosive or inflammable fuel, it will be described herein for purposes of illustration as used in conjunction with a type of stove.

Referring to FIGS. 1, 2 and 3 the fuel container of the apparatus or stove is indicated at **10**. The apparatus may be of the type intended to utilize a highly volatile fuel,

such as a fuel of the naphtha family. This fuel is flowed into the fuel container **10** of the apparatus in a manner later to be described until the volume of fuel therein attains a predetermined and desired level as indicated by the line **11** in FIGS. 2 and 3.

In FIGS. 2 and 3 the fuel supply container **12** is connected to the fuel container **10** of the apparatus and directly supported therefrom by the filling device embodying the invention. The direct connection of the fuel supply container with the apparatus and the direct support of the fuel supply container by the apparatus through the intermediary of the filling device is the arrangement that can be utilized for smaller size apparatus where the fuel supply containers **12** correspondingly are of relatively small size.

The fuel receiving container **10** of the apparatus mounts two fitting sleeves **13** and **14** which are similar in construction, with the exception that the sleeve **14** is longer than the sleeve **13** and is of a length to have its lower open end located below the desired predetermined fuel filling line **11** as clearly indicated in FIGS. 2 and 3.

Each fitting sleeve has an enlarged outer end portion **15** mounted in an opening in the wall of the fuel receiving container **10** and hermetically sealed and secured therein by being welded or otherwise suitably and fixedly attached thereto. The enlarged portions **15** of the fittings **13** and **14** extend outwardly of the container **10** and are provided with counterbores communicating with bores formed in the reduced diameter inner portions **16** of the sleeve fittings.

The bores through the inner portions **16** are threaded adjacent to the counterbores in the outer portions **15** and are shaped so that conventional tire valve cores **17** well known in the art, can be screwed into position in the bores. The headed ends **18** of the valve pins of the valve cores **17** extend into the counterbores in the enlarged outer portions **15** of the sleeve fittings **13** and **14**.

It will be understood that the valve pins of the valve cores at their ends opposite to the headed ends **18** mount thereon valves **19** which normally seat against the ends of the barrels of the valve cores. It will be noted that the valve **19** of the valve core in the sleeve fitting **13** is located below the lower end of said sleeve fitting while the valve of the valve core in the sleeve fitting **14** is located within the bore in the reduced lower portion **16** of the sleeve fitting.

As is well understood in the art, each valve core within the barrel thereof mounts a spring **20** which surrounds the valve pin and normally maintains the valve **19** seated against the end of the barrel. The enlarged portions **15** of the sleeve fittings **13** and **14** mount in the counterbores thereof suitable sealing gaskets **21** which are illustrated as in the form of rubber O-rings.

The fuel supply container **12** on one end wall thereof is provided with a pair of spaced openings into which extend sleeve fittings **22** and **23**. It should be noted that mating sleeves **23** and **14** are larger in diameter than mating sleeves **22** and **13** to provide against improper connecting arrangement. Each of the sleeve fittings **22** and **23** is provided with an external annular flange **24** that engages the end of the fuel supply container **12** and is secured thereto in sealed relationship by a suitable means such as by welding.

The sleeve fitting **22** is a short fitting and merely extends into the container **12** a slight distance, whereas the sleeve fitting **23** is a long fitting and, as indicated, has a portion **23***a* that extends a substantial distance interiorly of the fuel supply container **12**.

The portion **23***a* of the sleeve fitting **23** has secured in its inner end a tube **25** which extends nearly to the opposite end wall of the fuel supply container **12** from

the end at which the fittings 22 and 23 are located. The fittings 22 and 23 are provided with threaded bores shaped to enable conventional valve cores 17 to be screwed into operative position therein. The headed ends 18 of the valve pins of these last mentioned valve cores are located at the outer ends of the fittings 22 and 23 when the valves 19 of said valve cores are seated.

It will be understood that the fuel supply container 12 can be filled with the proper amount of fuel by pouring the same into the fuel container through the fitting 23 when the valve core therein is opened or removed. This operation of filling the fuel supply container can be carried out in a hazardous location, assuming the filling apparatus for the fuel supply container 12 has fittings corresponding to those in the fuel container 10 of the apparatus.

Now assuming it is desired to fill the container 10 from the fuel supply container the latter is positioned so the outer ends of the fittings 22 and 23 can be slidably inserted as nipples into the counterbores of the receiver fittings 13 and 14 carried by the container 10 of the apparatus. As this insertion occurs the fittings 22 and 23 sealingly engage with the O-rings 21 of the fittings 13 and 14 as indicated in FIG. 2. Until the insertion of the fittings 22 and 23 into the counterbores of the fittings 13 and 14 is nearly completed, the headed ends 18 of the valve pins of the four valve cores carried by the four fittings do not engage and the valves 19 of said cores remain seated, see FIG. 2. When the fittings 22 and 23 have been completely inserted into the counterbores in the portions 15 of the fittings 13 and 14, the headed ends 18 of all four valve pins of all the valve cores have come into engagement and said valve pins are moved against the action of the springs 20 in the cores to unseat all of the valves 19 of the four valve cores as shown in FIG. 3.

It will be noted that the free end of the tube 25 carried by the portion 23*a* of the fitting 23 extends above the level of the liquid fuel in the fuel supply container 12 and into an air space 26. The liquid fuel in the supply container 12 can flow into the container 10 of the apparatus through the now open valve cores 17 mounted in the fittings 13 and 22 so long as air is free to escape from the container 10 through the fittings 14 and 23 and the now open valve cores therein, such escaping air passing through the tube 25 to the air space 26 in the tilted fuel supply container 12. However, as soon as the desired predetermined level of the fuel in the container 10 is reached i.e., the level of the line 11, it will be seen that the lower end of the fitting 14 is below said level and hence the escape of air from the container 10 to the air chamber 26 in the fuel container 12 is terminated. As soon as this occurs the fuel in the container 12 ceases to flow into the container 10 through the fittings 22 and 13 as will be understood. The cooperating fittings may be termed detachable flow coupling means, one for the transfer of fuel from the fuel supply container 12 to the container 10 of the apparatus and the other for the transfer of air from the container 10 to the container 12. Consequently the filling device embodying the invention is such that danger of overfilling the fuel container 10 of the apparatus with the liquid fuel from the fuel supply container 12 is eliminated.

Also it will be noted that should the fuel supply container 12 become detached or partially detached from its interconnection with the container 10, all of the valves of the valve cores in the four fittings 13, 14, 22 and 23 automatically seat, thus preventing undesired escape of fuel or vapors from both the container 10 and the fuel supply container 12.

It will further be noted that when the fittings 22 and 23 are inserted in the counterbores of the fittings 13 and 14 the O-rings 21 provide an adequate seal against the escape of the fuel or vapors therefrom to the atmosphere. When the fuel supply container 12 is detached from the container 10 all the valve cores 17 are automatically

closed and hence the escape of fuel or vapor from either the container 12 or container 10 is prevented.

It will further be noted that when the apparatus is not in use or is being transported the valve cores in the fittings 13 and 14 are closed and hence there is no opportunity for the fuel or vapors to accidentally escape from the container 10 through the fittings 13 and 14.

In the case of large size apparatus requiring a larger volume of fuel than do the smaller size ones it may be necessary to provide a fuel suply container of such a size that it cannot be supported directly by the filling device from the fuel container of the apparatus but must be positioned on a separate support. FIG. 4 illustrates the situation last referred to, it being understood that although the apparatus container 10*a* and fuel supply container 12*a* shown therein appear smaller than the corresponding parts in the previous views, actually they are substantially larger and FIG. 4 is on a much reduced scale merely for purposes of illustrative convenience.

The apparatus container 10*a* of FIG. 4 carries sleeve fittings 13*a* and 14*a* corresponding to the fittings 13 and 14 of the previously described form and provided in the same manner with valve cores 17. In the form shown in FIG. 4 the fuel supply container 12*a* mounts sleeve fittings 22*a* and 23*a* similar to the fittings 22 and 23 of the previously described form and provided with valve cores in the same manner.

Also in the form shown in FIG. 4 the sleeve fitting 23*a* has attached to it a tube 25 which extends into the air space 26 in the inverted container. Due to the fact that the fuel container 12*a* is supported on a separate support 27 a pair of hoses 28 and 29 is employed to connect the fuel supply container 12*a* to the container 10*a* of the apparatus.

The ends of the hoses 28 and 29 that are to be connected to the container 12*a* are provided with sleeve fittings 30 similar to the fittings 13 and 14 except that said fittings 30 are exteriorly provided on the portion thereof of reduced diameter with serrations such as annular shoulders or teeth that act to maintain the hoses connected to the sleeve fittings. The sleeve fittings 30 are provided with valve cores in a manner similar to the fittings 13 and 14. It will be understood that the fuel supply container ends of the hoses 28 and 29 are connected to the container by telescoping the counterbored portions of the sleeve fittings 30 upon the fittings 22*a* and 23*a* carried by the container 12 and that the four valve cores carried by said four fittings are then automatically opened.

The apparatus ends of the hoses 28 and 29 are provided with sleeve fittings 31 similar to the sleeve fittings 22 and 23 or 22*a* and 23*a* and said fittings 31 mount valve cores in the same way as do the similar fittings. The fittings 31 are serrated or toothed to facilitate their retention in the ends of the hoses.

It will be understood that the fittings 31 can be inserted into the counterbores of the fittings 13*a* and 14*a* and when so inserted the four valve cores carried by the four interconnected fittings are opened.

It will be understood that the hose 28 is the liquid fuel transfer hose and the hose 29 is the air transfer hose and that the construction shown in FIG. 4 functions similarly to the previously described construction. However, the construction shown in FIG. 4 requires the use of eight valve cores and eight fittings as contrasted to the four valve cores and four fittings required in the previously described form.

It will be noted that should either end of either of the hoses 28 and 29 and the fittings mounted in such end become accidentally detached from the cooperating fittings carried by the container 12 or the container 10 that automatically the flow of liquid fuel from the container 12 stops and the container 10 is closed against the passage of fuel or air through the fittings 13*a* and 14*a*.

In addition, it will be noted that since both ends of the hoses mount fittings which carry valve cores, the acci-

dental detachment of any hose end from its cooperating fitting will not allow fuel in the hose to spill therefrom since the detached hose end will be sealed by the closing of the valve core.

Although certain preferred embodiments of the invention have been illustrated and described herein, it will be understood that the invention is susceptible of various modifications and adaptation within the scope of the appended claims.

Having thus described our invention, we claim:

1. In combination with an apparatus including a container adapted to receive a liquid fuel, a fuel supply container, and a filling device for interconnecting said supply container and said apparatus container and comprising two detachable flow coupling means connected with a wall of said supply container and a wall of the apparatus container, one of said flow coupling means being for fuel transfer and communicating with the interior of the supply container adjacent the wall thereof with which it is connected and with the interior of the apparatus container above a desired predetermined liquid level therein, the other of said flow coupling means being for air transfer and having a first passage portion communicating with the interior of the supply container adjacent the opposite wall thereof from the first mentioned wall and a second passage portion including an air inlet opening communicating with the interior of the apparatus container below said desired predetermined liquid level, both of said flow coupling means being provided with valve means operatively associated with said containers and which are closed or opened automatically when said flow coupling means are detached or attached and whereby when attached and the liquid fuel in the apparatus container rises to said desired predetermined liquid level therein it covers the air inlet opening of said second passage portion and terminates transfer of air through said other flow coupling means from said apparatus container to said supply container and of fuel from said supply container to said apparatus container through said one of said flow coupling means.

2. The combination defined in claim 1 wherein said two flow coupling means each comprise a pair of co-operable sleeve fittings carried by the walls of the respective containers, one sleeve fitting of each pair having a passage of a size and shape to telescopingly engage with the other sleeve fitting of such pair, said valve means comprising valve cores mounted in all of said sleeve fittings.

3. The combination defined in claim 2 wherein the sleeve fittings carried by said containers comprise lower female sleeve fittings on said apparatus container and upper male sleeve fittings on said supply container, said male sleeve fittings being receivable in said female sleeve fittings when said flow coupling means are attached and at which time the supply container is supported by the apparatus container through the intermediary of said sleeve fittings.

4. The combination defined in claim 2 comprising a pair of hoses extending between the sleeve fittings of one container and the sleeve fittings of the other container, other sleeve fittings on the ends of said hoses adapted to be coupled with the sleeve fittings of said containers, and other valve cores in said other sleeve fittings, all of the valve cores of all of said sleeve fittings being located for actuation to their open condition when the sleeve fittings of said hoses are coupled with the sleeve fittings of said containers.

5. The combination defined in claim 1 wherein said flow coupling means comprise a pair of receiver sleeve fittings on the wall of one of said containers and a pair of nipple fittings on the wall of the other of said containers, said nipple fittings being slidably insertable into said receiver sleeve fittings, said valve means comprising valve cores mounted in all of said fittings.

6. The combination defined in claim 1 wherein said flow coupling means comprise a pair of receiver sleeve fittings on the wall of one of said containers and a pair of nipple fittings on the wall of the other of said containers, said nipple fittings being slidably insertable into said receiver sleeve fittings, said valve means comprising valve cores mounted in all of said fittings, and sealing means of the O-ring type in said receiver sleeve fittings for embracing sealing engagement with said nipple fittings when the latter are inserted into said receiver sleeve fittings.

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