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2,495,905

LIQUID TRANSFERRING APPARATUS

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2 Sheets-Sheet 1

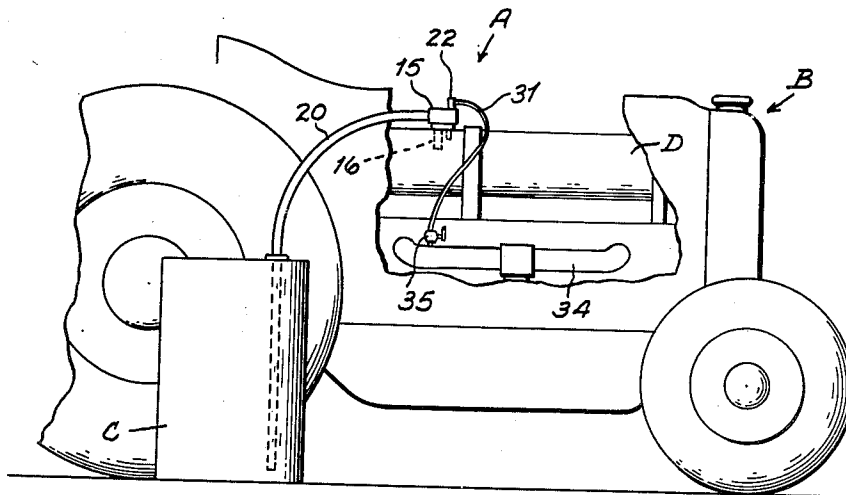


Fig. 2.

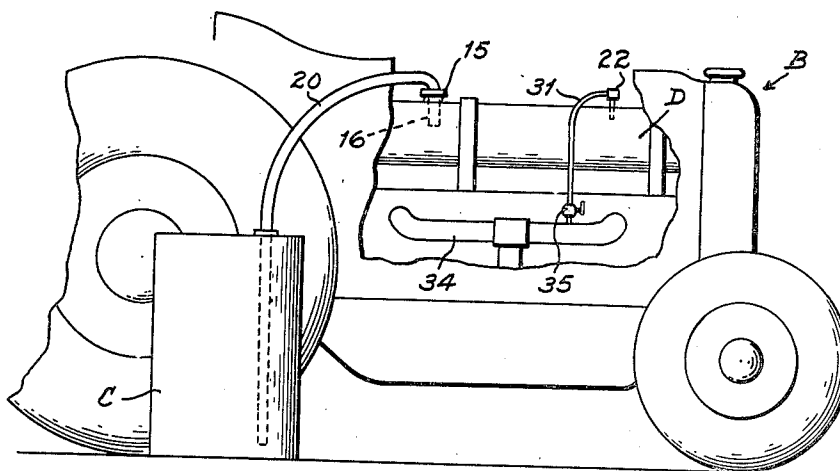


Fig. 1.

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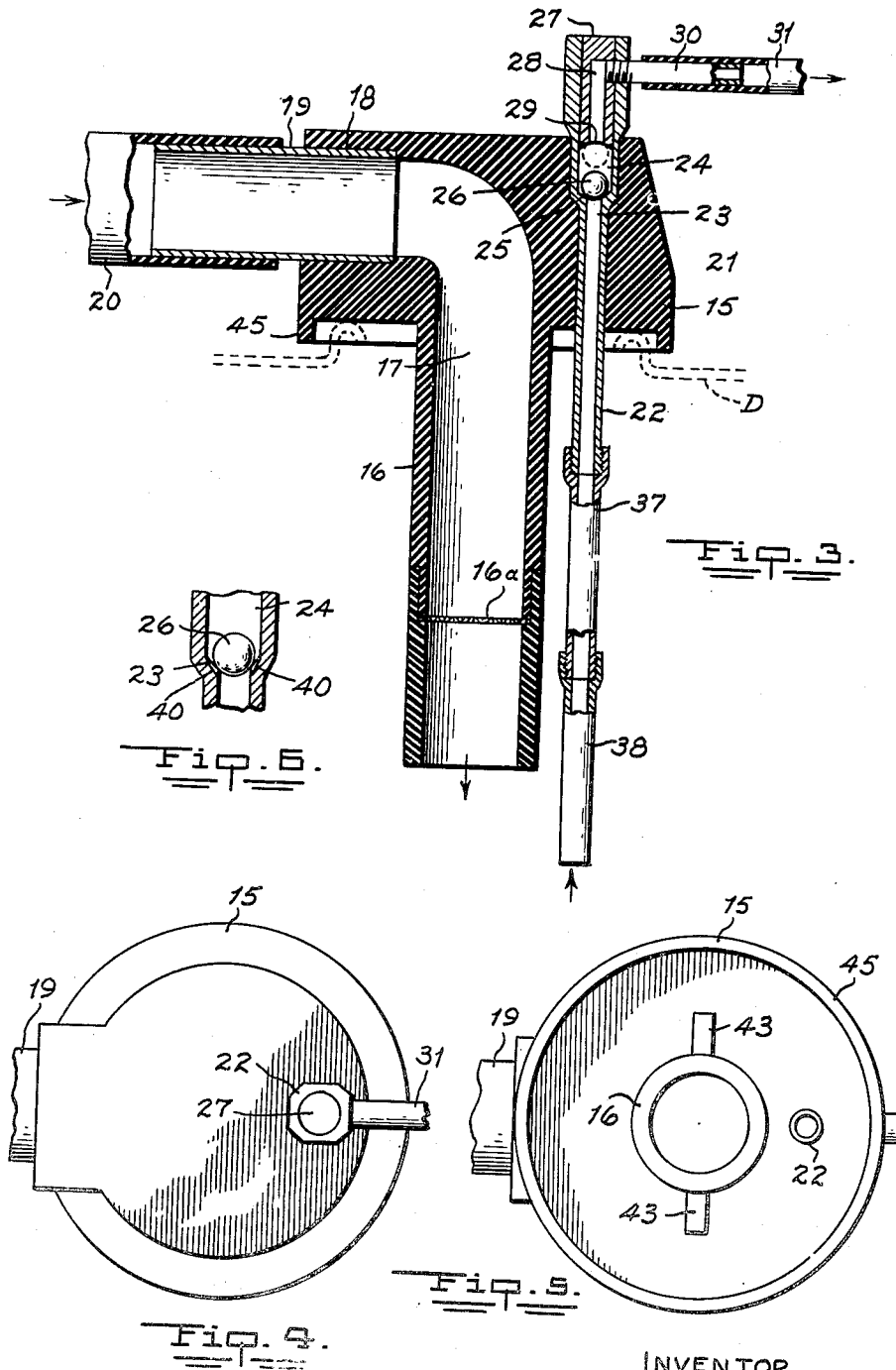
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2 Sheets-Sheet 2



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LIQUID TRANSFERRING APPARATUS

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2 Claims. (Cl. 226-116)

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This invention relates to liquid transferring apparatus and has more particular reference to devices of this character for the transfer of liquids from a source of supply to a required container or vessel.

In the art of transferring liquids, a well known and most commonly employed method is to first fill a container at the source of the supply and then carry it by hand to the required vessel and then pour the liquid into the vessel direct from the container or by use of a funnel. This mode of transferring or conducting liquids from one point to another has many disadvantages not only from the standpoint of view of loss of the liquids and the difficulty of labour involved in the transfer but where liquids such as gasoline and other combustibles are involved, the question of fire hazard immediately arises and if for no other reason, fire hazard is one thing that requires to be carefully guarded against.

Where "tractors," "combines," motor boats, etc., are concerned, the replenishing of a supply of gasoline or oil is frequently required and invariably such supply is some considerable distance from the point of operations. To replenish the supply then, one has to return to the central point of distribution and this procedure is uneconomical and sometimes quite difficult. On the other hand where a supply is transported to the immediate area of activity, for example, in drums, the usual procedure is to resort to the old method of removing a supply from a drum into a can by hand pump or the like and then carrying it to the tractor or like device where it is poured into the tank and as already mentioned this is not only a laborious and difficult task but where gasoline and like inflammables are concerned, it requires very little spilling to create a fire hazard which is most dangerous and should by all means be avoided.

It is one of the objects of the present invention therefore to avoid and overcome the foregoing and other objections and disadvantages by providing a device of this character wherein liquids including gasoline, oil, etc., may be transferred from a source of supply to the required container or receptacle without the necessity of resorting to ordinary filling means.

Another object of the present invention is to provide a device of this character wherein means are provided for automatically shutting off the flow of the liquid when a predetermined level has been reached within the container or vessel to which it is transferred.

A further object of the present invention is

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to provide a device of this character wherein substantially the entire apparatus for transferring the liquid may be of the detachable or of the permanent type.

Having regard to the foregoing and other objects and advantages which will become apparent as the description proceeds and the details become known, the invention consists essentially in the novel combination and arrangement of parts hereinafter set forth in detail and illustrated in the accompanying drawings in which:

Fig. 1 discloses an embodiment of the present invention wherein the suction element is shown as a permanent installation.

Fig. 2 is a view similar to Fig. 1 disclosing the present invention in the form of a portable or detachable installation.

Fig. 3 is an enlarged sectional elevation showing the structural arrangement in detail.

Fig. 4 is a top plan view of Fig. 3.

Fig. 5 is a bottom plan view of Fig. 3 and

Fig. 6 is an enlarged fragmentary section taken through the center of the valve.

Referring now to the accompanying drawings wherein a preferred embodiment of the present invention is disclosed and wherein like letters and numerals of reference designate corresponding parts in the different illustrations, the letter A indicates the present invention as a whole which for purposes of illustration is shown operatively associated with a tractor B while the letter C indicates a container or drum in which is carried a source of liquid supply and the letter D a tank or container to which the liquid is to be transferred.

For operative purposes the present invention preferably employs a vacuum or suction producing mechanism. Such mechanism may take any practical and convenient form and in the present instance I disclose this means in the form of a connection with the intake manifold of an internal combustion engine. While I have illustrated the intake manifold as a medium of producing a vacuum or suction in this instance, it is to be clearly understood that other types of vacuum producing mechanism may be conveniently and appropriately employed. Thus, for example, where the device is employed for factory or plant use, a vacuum pump, electrically or otherwise operated may be utilized.

Referring now to the details of the invention as herein exemplified, the device includes a cap or cover member 15 preferably constructed of rubber or like material having a liquid conduct-

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ing tube or conduit 16 formed integral therewith. The integral conduit may, of course, be dispensed with, if required, and a metal or like conduit substituted therefor. Preferably, a screen or the like 16a is mounted in the tube.

A relatively large liquid conducting passageway 17 is formed within the cap 15 to provide communication with the conduit 16 while an opening 18 is arranged at one side of the cap and is adapted to receive therein a pipe or like connection 19. A flexible hose 20 of any desired length is connected to the pipe 19 and is adapted to extend into the drum or reservoir C which may contain a supply of gasoline or other liquid.

At a point adjacent the passageway 17 I provide the cover cap 15 with a further passageway 21 which extends vertically therethrough. Into the passageway or opening 21 I insert a tube like valve fitting 22, such valve fitting being designed to create a vacuum in the tank and to determine the level to which the vessel or tank is to be filled with liquid. The valve fitting has a diameter appreciably smaller than the conduit 16 and includes a conducting tube 23 mounted in opening 21 and extending above and below the cover cap 15. Within the fitting or tube I provide an enlarged passageway 24 the base of which is formed with a seat 25 while a spherical ball valve 26, preferably of metal, is normally designed to rest upon the seat 25.

As more particularly illustrated in Fig. 3, the head of the fitting 22 is provided with an insert or plug 27 having a passageway 28 therein, the base of the plug having a valve seat 29 formed thereon. Extending through one side of the fitting 23 and communicating with the passageway 28 is a pipe or like connection 30, while extending from the connection to the vacuum-producing mechanism is a flexible hose or conduit 31. The vacuum producing mechanism, in the present instance, is illustrated in the form of an intake manifold 34 and such manifold is provided with a shut-off valve 35 to which the hose 31 is connected. From the foregoing it will be seen that a valve controlled connection is established between the fitting 22 and mechanism 34 for producing a vacuum.

As previously mentioned, the lower extremity of the fitting 22 determines the level to which a tank or other vessel is to be filled and under differing circumstances different levels of liquid filling are required. In order to make provision for such conditions, the member 22 is provided with pipe extensions 37 and 38 which are detachably connected to member 22 as by threading or other appropriate means.

By again referring to Fig. 3 it will be observed that the ball valve 26 is of a lesser diameter than the passageway 24 so that when the valve is lifted from its seat through the action of a vacuum, air may flow freely around the ball valve and through the connecting conduits. Further, it is observed that while I do not set an exact distance of travel of the ball valve 26 in its movement to shut-off the vacuum, such distance of travel should not normally exceed about three-sixteenths of an inch where the diameter of the ball valve approximates one-quarter of an inch. Thus in operation the ball valve permits air to flow freely therearound yet when contacted by a solid such as liquid, has a relatively limited distance to travel in order to shut-off a vacuum. The distance of travel or movement of the ball valve then is important in as much if the distance of travel is too great, the ball valve will not oper-

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ate to shut-off the vacuum in the container D immediately it is required to do so.

In addition to the foregoing, the valve seat 25 of the member 22 is provided with drain recesses or the like 40 so that should some small amount of liquid enter the passageway 24 during the shut-off operation, such liquid may automatically drain therefrom into the tank when the vacuum is released.

As illustrated in Figs. 2 and 3, the cover cap 15 is placed upon the neck 42 of the filler inlet of vessel D which is to be filled, with the conduit 16 and pipe 22 extending thereinto. In practice, while I have found it expedient and sufficient to simply place the cover cap over the inlet 22, the base of the cover may be provided with lugs 43 for engagement with the customary lock engaging means of the neck of the inlet. Additionally, the base of the cover cap is provided with a depending skirt 45 to insure that the device is in a proper position prior to operation.

The description thus far given has been directed more particularly to the details of the invention disclosed in the portable type of device wherein the unit as a whole is carried or transported from place to place as required. Where, however, the vacuum section is formed as a permanent installation, only the cover cap and connection observed in Fig. 1 are required to be portable. With the permanent fixture then the flexible hose or conduit 31 is connected directly and permanently with the tank or vessel D and the valve 35 while the cover cap is fitted with the hose connection 20. Primarily, the permanent type is designated for tractors, combines, motor boats, etc., moving from place to place and obtaining supplies at different points of convenience which are ordinarily removed from a source of supply, thus, while one type of structure differs from the other in the matter of making one section permanent, the function and principle is exactly the same in both forms of structure.

In operation, drums or like containers with gasoline, oil or other liquids are arranged at desirable points and as the supply of fuel or oil in the tractor or other vehicle becomes low, the vehicle is driven to the closest point of refill and the apparatus is attached thereto by simply placing the cover member 15 over the neck of the gasoline or other filling inlet. With this complete, the hose connection 20 is extended into the source of supply or drum C while the flexible hose 31 is connected with the shut-off valve 35 of the manifold 34 or other vacuum producing device. The combustion engine, being in operation, produces a vacuum or suction in the manifold 34 so that by opening valve 35 a vacuum is created in tank D through conduit 31. With the vacuum thus created, the liquid in the drum or other source of supply C to be drawn through the hose connection 20 and by way of conduit 16, is discharged into the fuel tank D or other receptacle.

With the application of the vacuum, the ball valve 26 moves upwardly from its seat 25 into passageway 24 where it is maintained in suspended form by the vacuum permitting air to flow freely therearound while the liquid is drawn from container C and discharged through member 16 into tank D. The fuel tank D or other receptacle will then commence to fill with the liquid being transferred and continue to rise until such time as such liquid reaches the level of the lower extremity of the members 38 or 37 or 22 as the case may be.

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When the liquid transferred to the tank or vessel D reaches a level corresponding to the lower extremity of the members 38 or 37 or 22 previously mentioned, the liquid will then endeavour to pass upwardly through the valve apparatus 22 and in doing so will, as a solid, impinge against the ball valve 26 causing it to move upwardly and against the seat 29 where it will shut off the vacuum and thus the flow of liquid from one container to the other ceases immediately.

At this point of operation, and with the vacuum to the tank D broken, the valve 35 is operated to close the vacuum connection between the manifold 34 and the tank D. With this operation complete, the vacuum in the tank is released and the ball valve 26 drops to the normal position shown in Fig. 3. The cap 15 with associated elements is then removed and the ordinary reservoir cap is applied to the inlet 42 of the vessel or container D.

Many changes may be made in the above and many apparently widely different embodiments constructed without departing from the spirit or essential characteristics of the invention. It is intended therefore that the present disclosure be interpreted as illustrative rather than restrictive and that all changes coming within the meaning and range of equivalency of the claims are intended to be embraced therein.

What I claim as my invention is:

1. In liquid transferring apparatus of the character described, a vacuum conducting conduit and a liquid conducting conduit, the said vacuum conducting conduit being provided with valve means and the said vacuum and liquid conducting conduits connecting a tank or container with a source of vacuum and a source of liquid supply, a ball valve operable in the valve means for controlling a flow of evacuated air from the tank and the transfer of liquid to the tank, the

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said ball valve permitting evacuated air to flow therearound during the transfer of liquid to the tank and to automatically shut-off the vacuum when the liquid transferred to the tank reaches a predetermined level and impinges thereagainst and said vacuum conduit extending downwardly from the valve a variable distance to vary the level of the liquid transferred to the tank.

2. In a liquid transferring apparatus of the character described, a cap member, a vacuum and a liquid conducting conduit connecting the cap member, the said cap member being adapted to connect the filler inlet of a tank or container with a source of vacuum and a source of liquid supply, valve means for controlling the flow of evacuated air from and the transfer of liquid to the tank, the said valve means being provided with a passageway having a ball valve freely movable therein, the said ball valve permitting evacuated air to flow therearound during the transfer of liquid to the tank and to automatically shut-off the vacuum when the liquid transferred to the tank reaches a predetermined level and impinges thereagainst the said passageway having a length not less than about three times the diameter of the ball valve for restricting the movement of the ball valve during the vacuum shut-off operation and drain channels permitting liquids to automatically drain from the seat of the ball valve.

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