

Aug. 13, 1957

C. J. GOSSELIN

2,802,492

INTERLOCK FOR VAPOR RECOVERY APPARATUS

Filed Oct. 8, 1956

3 Sheets-Sheet 1

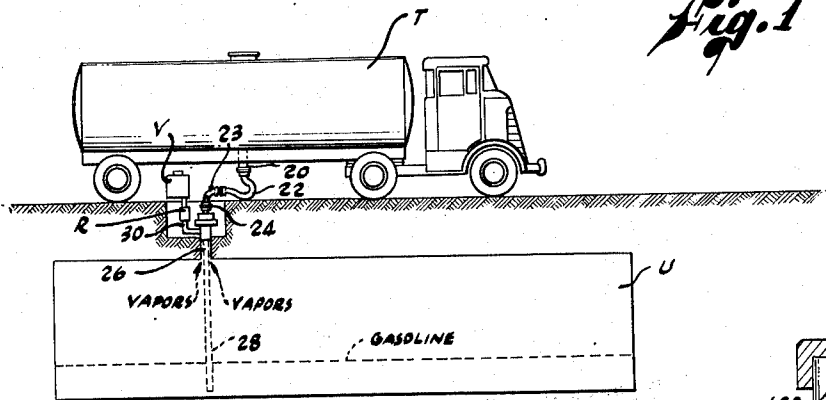


Fig. 1

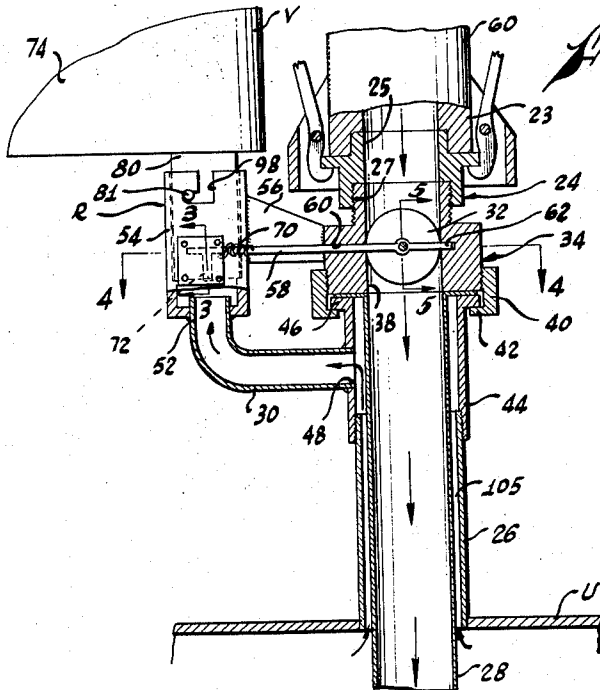


Fig. 2

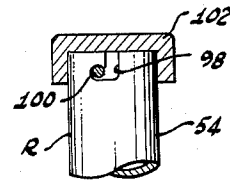


Fig. 6

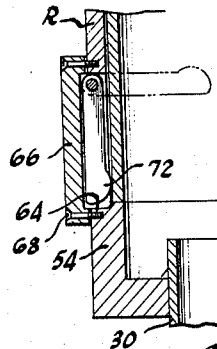


Fig. 3

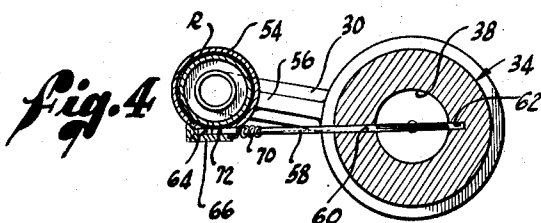


Fig. 4

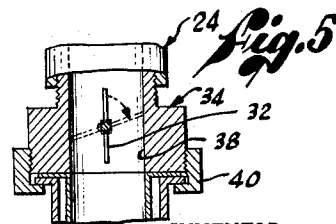


Fig. 5

INVENTOR.
CHARLES J. GOSSELIN

BY *Lulwider Mattingly & Huntley*
ATTORNEYS

Aug. 13, 1957

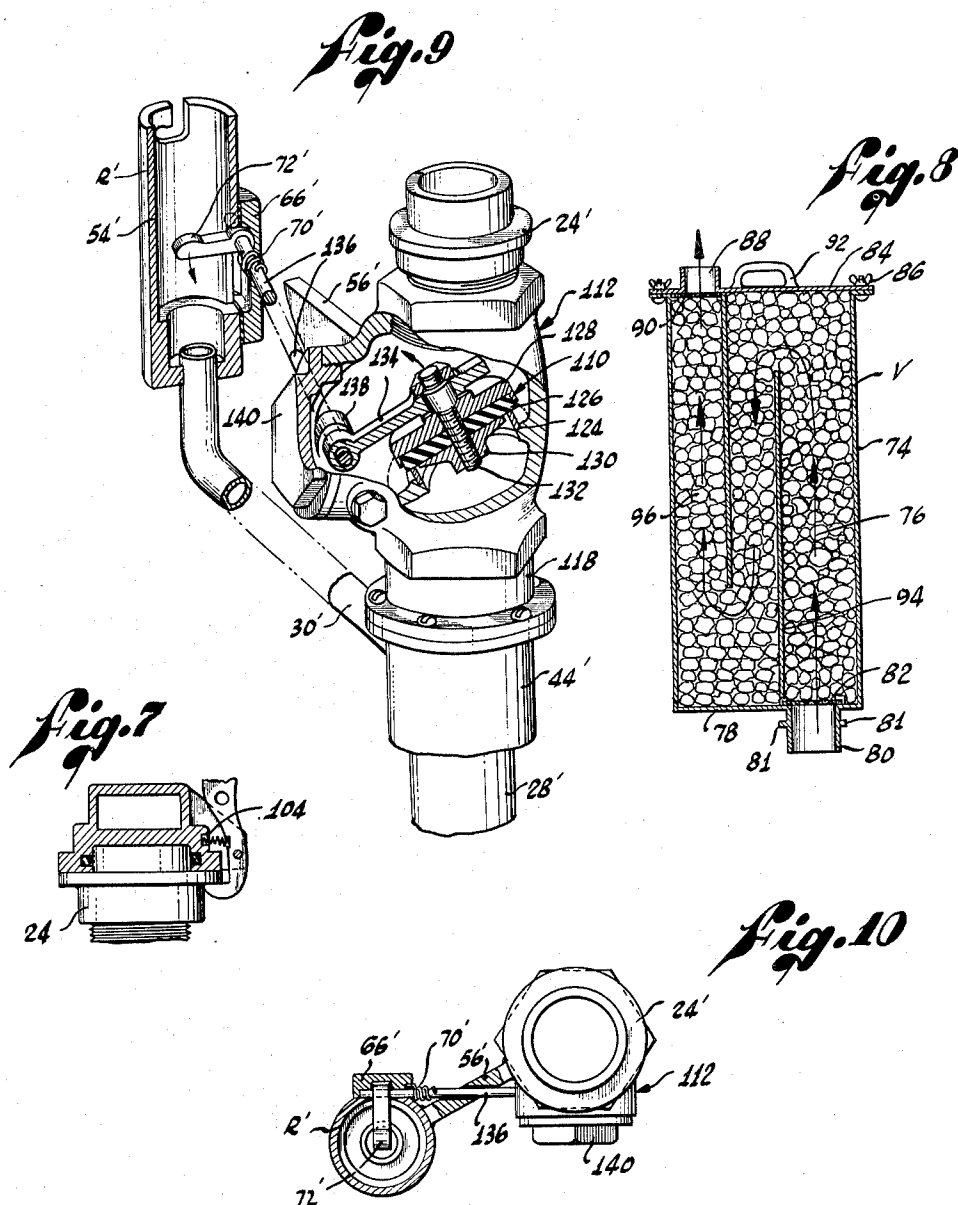
C. J. GOSSELIN

2,802,492

INTERLOCK FOR VAPOR RECOVERY APPARATUS

Filed Oct. 8, 1956

3 Sheets-Sheet 2



INVENTOR.
CHARLES J. GOSSELIN
 BY *Ludwig Mattingly & Huntley*
 ATTORNEYS

Aug. 13, 1957

C. J. GOSSELIN

2,802,492

INTERLOCK FOR VAPOR RECOVERY APPARATUS

Filed Oct. 8, 1956

3 Sheets-Sheet 3

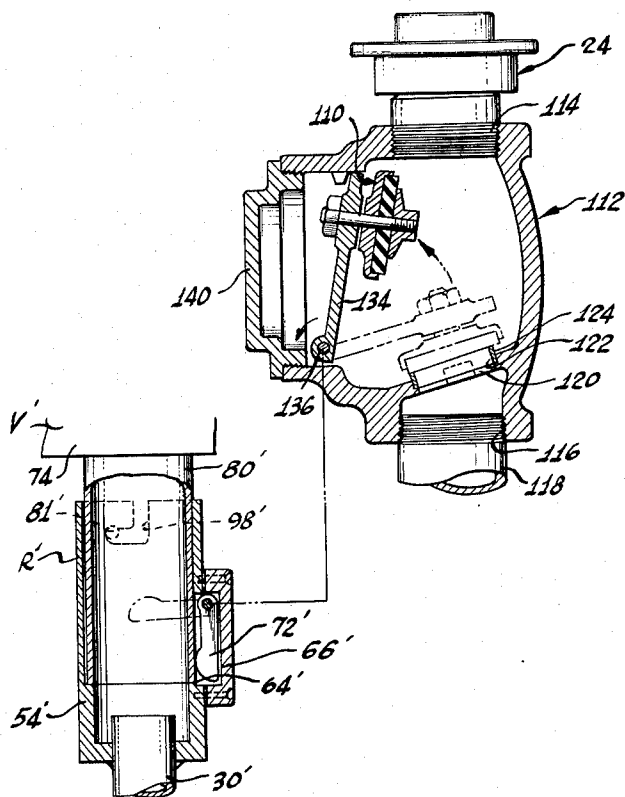


Fig. 11

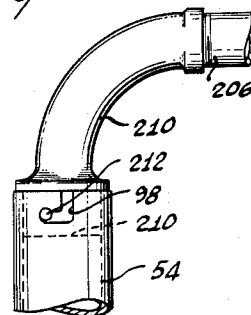
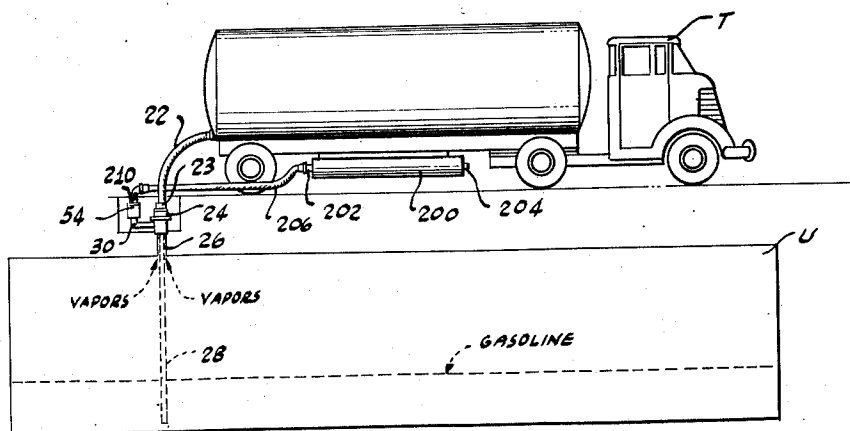


Fig. 13

Fig. 12



INVENTOR.
CHARLES J. GOSSELIN
 BY *Zulwider Mattingly & Huntley*
 ATTORNEYS

1

2,802,492

INTERLOCK FOR VAPOR RECOVERY APPARATUS

Charles J. Gosselin, Long Beach, Calif., assignor of one-half to Martin A. Nishkian, Long Beach, Calif.

Application October 8, 1956, Serial No. 614,688

22 Claims. (Cl. 141—307)

The present invention relates generally to vapor recovery systems and more particularly to a novel interlock for use therewith.

When a gasoline tank truck is unloaded into the underground storage tank of a retail service station hydrocarbon vapors are vented into the atmosphere, such vapors being displaced by the rising gasoline level. It has been determined that such hydrocarbon losses contribute heavily to the air pollution problem now existing in and around the principal population centers of the country. The present invention contemplates the use of a vapor recovery device which is adapted to receive the hydrocarbon vapors displaced from the tank by the rising gasoline level during the unloading of a tank truck. By way of example, the vapor recovery device may consist of a canister containing a hydrocarbon absorbing medium, such as activated carbon. The hydrocarbons removed from the vapor can be recovered by passing steam there-through at a location removed from the filling station, the steam and hydrocarbon content thereafter being condensed so as to recover the absorbed hydrocarbons. Although an activated carbon-containing canister will provide excellent results, other types of vapor recovery devices may also be employed in carrying out the present invention.

It is a major object of the present invention to provide an interlock for use with a vapor recovery device adapted to receive the vapors displaced from a storage tank as the tank is filled with liquid. This interlock positively insures that the liquid cannot be unloaded into the tank until the vapor recovery device has been operatively connected thereto. Accordingly, essentially complete recovery of the vapors released from the storage tank during a loading operation may be effected.

Another object of the invention is to provide an interlock of the aforescribed nature which is positive and foolproof in operation.

An additional object is to provide an interlock of the aforescribed nature which is inexpensive to manufacture and install.

Yet another object is to provide an interlock of the aforescribed nature that is compact in size and light in weight.

A further object of the invention is to provide an interlock of the aforescribed nature which is simple in design and rugged of construction whereby it may afford a long and trouble-free service life.

A more particular object is to provide an interlock for use with a vapor recovery device adapted to receive the vapors displaced from a storage tank having a liquid fill line, which interlock includes a valve in the fill line that cannot be opened until the vapor recovery device is operatively attached to the tank.

A further object is to provide an interlock of the aforescribed nature which may be readily installed upon existing gasoline storage tanks.

These and other objects and advantages of the present invention will become apparent from the following de-

2

tailed description when taken in conjunction with the appended drawings, wherein:

Figure 1 is a side elevational view of a first form of interlock embodying the present invention;

Figure 2 is a fragmentary enlarged central vertical sectional view of said interlock;

Figure 3 is a further enlarged vertical sectional view of a detail of said interlock;

Figure 4 is a horizontal sectional view taken on line 4—4 of Figure 2;

Figure 5 is a fragmentary vertical sectional view showing a valve element of said interlock;

Figure 6 is a fragmentary side elevation view of a cap employed with said interlock;

Figure 7 is a fragmentary side elevation of a second cap employed with said interlock;

Figure 8 is a central vertical sectional view of a vapor-receiving canister employed with said interlock;

Figure 9 is a perspective view, cut partly away in section, showing a second form of interlock embodying the present invention;

Figure 10 is a top view of the interlock of Figure 9 taken partly in horizontal section;

Figure 11 is a fragmentary vertical sectional view showing the second form of interlock;

Figure 12 is a side elevational view of a modified form of interlock embodying the present invention; and

Figure 13 is an enlarged fragmentary vertical sectional view showing a detail of Figure 12.

Referring to the drawings and particularly Figures 1 and 2 thereof, the first form of interlock embodying the present invention is shown in conjunction with a conventional gasoline tank truck T that is unloading gasoline into the underground storage tank U of a retail service station. The tank truck T is formed at its lower portion with an outlet fitting 20. The lower end of this outlet fitting 20 is connected to one end of an unloading hose 22. The opposite end of this unloading hose 22 is secured to conventional coupler elbow 23 that is selectively engageable with an adapter 24. The adapter 24 is mounted upon the upper end of the nozzle 26 of the storage tank U. A fill line 28 extends through the nozzle 26 into the lower portion of the tank. A vapor return line 30 extends from one side of the tank's nozzle 28 with the upper end of this vapor return line being formed with a receiving member R for a vapor recovery device V. As the level of the incoming gasoline rises within the storage tank U, the gasoline vapors and air disposed above the rising gasoline level will be displaced upwardly out of the tank through the vapor return line 30 into the vapor recovery device V. In this manner these hydrocarbon vapors will be prevented from passing into the atmosphere leaving only the air from which the hydrocarbons have been absorbed to pass to atmosphere.

More particularly, the first form of interlock includes a valve 32 mounted in a valve body 34 which is interposed between the adapter 24 and the upper end of the fill line 28. The valve body 34 is generally cylindrical and includes a vertically extending bore 38 having a diameter approximating the inner diameter of the fill line 28. The upper end of the valve body 34 is of reduced diameter and externally threaded to receive the lower end of the adapter 24. The adapter 24 is formed with a bore 25 coinciding with the bore 38 of the valve body 34. The lower portion of this bore 25 merges into an enlarged counterbore 27 that is internally threaded to receive the upper portion of the valve body 34. The lower portion of the valve body is externally threaded to receive a lock ring 40, the upper portion of this lock ring being externally threaded. The lower end of the lock ring 40 is formed with a radially inwardly extending flange 42 adapted to engage the upper end of a sleeve

3

element 44. The upper end of this sleeve element 44 is formed with a radially outwardly extending flange 46 that engages the complementary flange 42 of the lock ring 40.

The lower end of the sleeve element 44 is internally threaded so as to engage the upper end of the nozzle 26, the upper end of the latter being externally threaded for this purpose. A bore 48 is formed in the mid portion of the sleeve 44. This bore 48 receives the lower end of the vapor return line 30. The opposite end of the vapor return line is disposed within a bore 52 formed in the lower end of the receiving member R. The receiving member R includes an open-topped cup 54. This cup 54 is rigidly connected to the valve body 34 by means of a support plate 56.

The valve 32 is of a butterfly type having its mid-portion affixed to a horizontally extending rod 58. This rod 58 is rotatably supported within the valve body 34 by aligned horizontal bores 60 and 62 formed in the valve body. The opposite end of the valve rod 58 extends into a pocket 64 formed in one of the side walls of the cup 54. As indicated in Figure 3, this pocket 64 is covered by a plate 66 that is rigidly affixed to the cup 54 by bolts 68. As shown in Figures 2 and 4, a coil spring 70 encircles the portion of the valve rod 58 adjacent the cup 54. One end of this spring 70 is affixed to the plate 66 while the other end is affixed to the valve rod 58. With this arrangement the spring 70 normally biases the valve 32 to its closed position indicated by dotted lines in Figure 5.

As shown in Figures 2 and 4, a cam finger 72 is keyed to the portion of the valve rod 58 disposed within the cup 54. This cam finger 72 is normally maintained in its horizontally extending dotted outline position of Figure 3 by the spring 70. Movement of the cam finger 72 to its downwardly extending position shown in solid outline in Figure 3 will effect concurrent movement of the valve 32 from its closed position shown in dotted outline in Figure 5 to its open position shown in solid outline in Figure 5.

The vapor recovery device V shown herein comprises a generally cylindrical canister 74 filled with a hydrocarbon absorbing medium 76, such as activated carbon. The construction of this canister 74 is shown in detail in Figure 8 and referring thereto it will be observed that its bottom wall 78 is formed with a depending inlet tube 80. A screen 82 covers the upper end of this inlet tube 80. A pair of radially extending pins 81 extend from diametrically opposed points on the intermediate portion of the inlet tube 80 for a purpose to be set forth hereinafter.

The upper end of the canister 74 is closed by a cover plate 84. This cover plate 84 is removably held in place by a plurality of wing nut and bolt combinations 86. An upstanding discharge tube 88 is formed on the cover plate 84, a screen 90 covering the lower end thereof. A carrying handle 92 is formed at the mid-portion of the cover plate 84. Preferably, a pair of vertically extending baffles 94 and 96 are mounted within the canister for controlling the flow of vapors therethrough. The lower end of the baffle 94 is affixed to the bottom wall 78 adjacent one side of the inlet tube 80. The upper end of this baffle 94 terminates below the cover plate 84. The other baffle 96 depends from the cover plate 84 adjacent one side of the discharge tube 88. Its lower end terminates above the bottom wall 78.

Referring again to Figure 2, the upper end of the cup 54 is formed with a pair of diametrically opposed J-slots 98. These slots are adapted to receive the pair of pins 81 formed on the inlet tube 80 so as to support the canister 74. Referring now to Figure 6, these J-slots 98 are also engageable with the pins 100 of a cap 102 normally employed to seal the upper end of the cup 54 between loading operations. The upper end of the adapter 24 is normally closed by a conventional latch-type cap 104 shown in Figure 7.

When a gasoline unloading operation is to take place the truck operator will first remove the cap 104 from the

4

upper end of the adapter 24. Next, he will latch the coupler elbow 23 to the adapter 24. The cap 102 is then removed from the upper end of the cup 54. The cup 54 will then be ready to receive the inlet tube 80 of a canister 74. As the inlet tube 80 is lowered within the cup its lower end will engage the horizontally disposed cam finger 72. Further downward movement of the inlet tube 80 will cause the cam finger 72 to be pivoted in a clockwise direction to its downwardly extending position shown in solid outline in Figure 3. Such movement of the cam finger will effect concurrent pivoting of the valve 32 to its open position shown in solid outline in Figure 5. Thus, the cam finger 72 and cam rod 58 serve as release means for the valve 32. The unloading of the gasoline may then take place. It should be particularly observed that such unloading cannot take place, however, until the canister 74 has been operatively engaged with the open end of the vapor return line 30. Accordingly, the truck operator is forced to utilize the hydrocarbon vapor receiving canister and he cannot through neglect or laziness dispense with its use. Hence, the interlock of the present invention insures that the hydrocarbons vapors displaced from the storage tank U will be recovered and not released to the atmosphere.

As the gasoline flows downwardly through the fill line 28, hydrocarbon vapors admixed with any air in the tanks will be forced upwardly through the annulus 105 between the outer surface of the fill line 28 and the inner surface of the nozzle 26 to the lower end of the vapor return line 30. The vapors will then pass upwardly through the cup 54 and inlet tube 80 into the lower end of the canister 74. These vapors will then follow the path indicated by the directional arrows in Figure 8 between the baffles 94 and 96 and finally emerge through the canister's discharge tube 88. At the conclusion of the gasoline unloading operation the canister 74 will be removed from the cup 54. Upon upward withdrawal of the canister's inlet tube 80, the spring 70 will return the cam finger 72 and the valve 32 to their original positions. The caps 102 and 104 will then be replaced.

Conveniently, a supply of the canisters 74 may be transported on the tank truck T. When the activated carbon of the canisters becomes saturated with hydrocarbon vapors, the latter may be stripped from the carbon by steam or hot gases at a location removed from the service station. Thereafter, the activated carbon will be available for re-use. The hydrocarbons or gasoline fractions stripped from the activated carbon can be recovered by cooling and condensing the stripping steam and hydrocarbons vaporized from the absorbent.

Referring now to Figures 9, 10, and 11, there is shown a second form of interlock embodying the present invention. This second form of interlock is generally similar to the aforedescribed first form and like parts bear primed reference numerals. This second form incorporates a different type of valve than that employed with the first form. This valve, designated 110, is of the swing check type and is mounted within a hollow valve body 112. The upper end of this valve body 112 is formed with a threaded bore 114 that receives the lower end of an adapter 24'. The lower end of the valve body 112 is formed with a threaded bore 116 which is secured to a short length of pipe 118 having its lower end bolted to the upper end of a sleeve element 44'. The valve body 112 is formed above the lower bore 116 with a diagonally extending partition 120 wherein is formed a bore 122. A seal ring 124 is pressed into this bore 122. The valve 110 includes a sealing disc 126 adapted to be received by the seat ring 124. The sealing disc 126 is maintained between a pair of retainers 128 and 130 by a bolt 132. This bolt 132 also secures the assembly comprising the sealing disc 126 and retainers 128 and 130 to the free end of an arm 134. The opposite end of this arm 134 is keyed to one end of a horizontally extending valve rod 136. The valve rod 136 is journaled within a boss

5

138 formed at one side of the valve body 112. Preferably, the valve body 112 will be formed with a removable side cover 140 permitting access to the parts of the valve 110.

The end of the valve rod 136 opposite the valve body 112 extends into a pocket 64' formed in a side wall of the cup 54' of the receiving member R'. This pocket 64' is closed by a plate 66'. A cam finger 72' is keyed to the end of the valve rod 136 disposed within the pocket 64'. A coil spring 70' having one of its ends secured to the valve rod 136 and its other end secured to the plate 66' serves to constantly bias the valve 110 towards its closed position shown in Figure 9. With the valve 110 arranged in its closed position, the cam finger 72' will be maintained in its horizontally extending position shown in Figure 9. The remaining parts of this second form of apparatus are the same as that described in conjunction with the first form.

The operation of this second form of interlock is similar to that described hereinabove with conjunction with the description of the first form. When a gasoline unloading operation is to take place the truck driver is forced to insert the inlet tube 80' of a canister 74' into the cup 54' in order to force the valve 110 to an open position, such insertion effecting counter-clockwise rotation of the cam finger 72' from its dotted outline position of Figure 11 to its solid outline position therein. At the conclusion of the gasoline unloading operation the inlet 80' of the canister 74 is withdrawn from the cup. The valve 110 under the combined influence of gravity and the force of the spring 70' will then return to its closed position.

Referring now to Figures 12 and 13, there is shown a modified form of interlock embodying the present invention. This modified form employs a large canister 200 which is carried at the side of the truck T in place of the canister 74 utilized with the heretofore-described forms of interlock. The canister 200 is filled with a hydrocarbon vapor absorbing medium such as activated carbon. Its rear end is formed with an inlet tube 202 and its front end is formed with a discharge tube 204. The inlet tube 202 is attached to one end of a flexible hose 206. The opposite end of this hose 206 is connected to a nozzle 210 shown in detail in Figure 13. This nozzle 210 is formed with a pair of radially extending pins 212 and as indicated in Figure 13, these pins 212 are adapted to be received by the J-slots 98 of the cup 54. The remaining elements of this modified form of interlock may be identical to either the form of Figures 1 through 7 or Figures 9 through 11.

In the operation of this modified form of interlock, the coupler elbow 23 of the unloading hose 22 is connected to the adapter 24. As the gasoline enters the tank U through the fill line 28, the hydrocarbon vapors and air displaced from the upper portion of the tank will be forced through the hose 206 into the rear end of the canister 200. This mixture will pass through the interior of the canister 200 whereby the activated carbon contained therein may absorb the hydrocarbon vapors. Thereafter, the remaining air will pass into the atmosphere through the discharge tube 204. The activated carbon within the canister 200 may thereafter be stripped of the absorbed hydrocarbon vapors so as to render the canister re-usable.

It should be particularly noted that the main parts of the aforescribed forms of interlock should be formed of a non-sparking material, as for example, aluminum, bronze or suitable alloys thereof. It should also be noted that although the interlocks shown and described hereinabove are particularly adapted for use with the unloading of gasoline, they may also be utilized in conjunction with the unloading of industrial solvents or other liquids having a vapor pressure of more than one pound per square inch absolute.

Various modifications and changes may be made with regard to the foregoing detailed description without de-

6

parting from the spirit of the invention or the scope of the following claims.

I claim:

1. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank having a liquid fill line as said tank is filled with liquid, comprising: a vapor return line connected with said tank; a valve controlling flow through said fill line; means normally maintaining said valve closed so as to block said fill line; and valve release means operatively connected to said valve so as to effect the opening thereof when engaged by an element of said vapor recovery device as the latter is engaged with said vapor return line.

2. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank having a liquid fill line as said tank is filled with liquid, comprising: a vapor return line connected with said tank; a valve in said fill line; spring means normally biasing said valve towards a closed position so as to block said fill line; and valve release means operatively connected to said valve so as to overcome said spring means and effect the opening of said valve when engaged by an element of said vapor recovery device as the latter is engaged with said vapor return line.

3. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank having a liquid fill line as said tank is filled with liquid, comprising: a vapor return line connected with said tank; a receiving member for an element of said vapor recovery device in communication with said vapor return line; a valve controlling flow through said fill line; biasing means normally maintaining said valve closed so as to block said fill line; and valve release means operatively connected to said valve so as to effect the opening thereof when engaged by an element of said vapor recovery device as said element is engaged with said receiving member.

4. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank having a liquid fill line as said tank is filled with liquid, comprising: a vapor return line connected with said tank; a valve body formed with a bore disposed in the path of said fill line; a valve mounted in said bore so as to control flow therethrough; a receiving member for an element of said vapor recovery device, said member being in communication with said vapor return line; biasing means normally maintaining said valve in a closed position relative to said bore; and valve release means operatively interposed between said valve and said receiving member for overcoming said biasing means and effecting the opening of said valve when said element is engaged with said receiving member.

5. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank having a liquid fill line as said tank is filled with a liquid, comprising: a vapor return line connected with said tank; a valve body formed with a passage disposed in the path of said fill line; a valve rod carried by said valve body; a valve operatively connected to said valve rod whereby movement of the latter will effect concurrent movement of said valve, said valve controlling flow through said passage; biasing means normally maintaining said valve in a closed position relative to said passage; a cam finger operatively connected to said valve rod and engageable by an element of said vapor recovery device so as to overcome said biasing means and effect the opening of said valve when said vapor recovery device is connected with said vapor return line.

6. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank having a liquid fill line as said tank is filled with liquid, comprising: a vapor return line connected with said tank; a valve body formed with a bore disposed in the path of said fill line; a valve rod carried by said valve body; a valve operatively connected to said valve rod whereby

movement of the latter will effect concurrent movement of said valve, said valve controlling flow through said bore; a receiving member for an element of said vapor recovery device, said member being in communication with said vapor return line; biasing means normally maintaining said valve towards a closed position relative to said bore; and a cam finger supported in said receiving member, said finger being operatively connected to said valve rod and engageable by an element of said vapor recovery device so as to overcome said biasing means and effect the opening of said valve when said vapor recovery device is engaged with said receiving member.

7. An interlock for use with a vapor recovery device having a generally tubular inlet element to receive the vapors displaced from a tank having a liquid fill line as said tank is filled with liquid, comprising: a vapor return line connected with said tank; a valve body formed with a bore disposed in the path of said fill line; a valve rod carried by said valve body; a valve operatively connected to said valve rod whereby movement of the latter will effect concurrent movement of said valve, said valve controlling flow through said bore; biasing means normally maintaining said valve in a closed position relative to said bore; a receiving member formed with an annular cavity to telescopically receive the inlet element of said vapor recovery device, said cavity being in communication with said vapor return line; and a cam element in said cavity operatively connected to said valve rod and engageable by said inlet element so as to overcome said biasing means and effect the opening of said valve when said vapor recovery device is connected with said vapor return line.

8. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank having a liquid fill line as said tank is filled with liquid, comprising: a vapor return line connected with said tank; a valve body formed with a bore disposed in the path of said fill line; a valve rod rotatably supported within said valve body; a valve secured to said valve rod whereby rotation of the latter will effect concurrent rotation of said valve between an open and closed position so as to control flow through said bore; biasing means normally maintaining said valve in a closed position relative to said bore; a receiving member for an element of said vapor recovery device, said member being in communication with said vapor return line; a cam finger supported on said receiving member and keyed to said valve rod, said cam finger being engageable by an element of said vapor recovery device so as to overcome said biasing means and effect the opening of said valve when said vapor recovery device is engaged with said receiving member.

9. An interlock as set forth in claim 8 wherein said valve is of the butterfly type and said biasing means is a spring.

10. An interlock as set forth in claim 8 wherein said valve is of the swing check type and secured to said rod at one side of its center of gravity whereby said valve is normally biased towards a closed position under the influence of gravity.

11. An interlock for use with a vapor recovery device having a generally tubular inlet element to receive the vapors displaced from a tank having a liquid fill line as said tank is filled with liquid, comprising: a vapor return line connected with said tank; a valve body formed with a bore disposed in the path of said fill line; a valve rod rotatably supported within said valve body; a valve secured to said valve rod whereby rotation of the latter will effect concurrent rotation of said valve between an open and closed position so as to control flow through said bore; biasing means normally maintaining said valve in a closed position relative to said bore; a receiving member formed with an annular cavity to telescopically receive the inlet element of said vapor recovery device, said cavity being in communication with said vapor return line; and a cam element in said cavity and keyed to said valve rod, said cam element being engageable by said

inlet element so as to overcome said biasing means and effect the opening of said valve when said vapor recovery device is connected with said vapor return line.

12. An interlock as set forth in claim 11 wherein said valve is of the butterfly type and said biasing means is a spring.

13. An interlock as set forth in claim 11 wherein said valve is of the swing check type and secured to said rod at one side of its center of gravity whereby said valve is normally biased towards a closed position under the influence of gravity.

14. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank as the latter is filled with liquid, said tank having a nozzle and a liquid fill line concentric therewith, comprising: a vapor return line connected to the upper portion of said nozzle; a valve controlling flow through said fill line; biasing means normally maintaining said valve closed so as to block said fill line; a receiving member for an element of said vapor recovery device, said member being in communication with said vapor return line; and valve release means operatively interposed between said valve and said receiving member for overcoming said biasing means and effecting the opening of said valve when said element is engaged with said receiving member.

15. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank as the latter is filled with liquid, said tank having a nozzle and a liquid fill line concentric therewith, comprising: a vapor return line connected to the upper portion of said nozzle; a valve body formed with a bore disposed in the path of said fill line; a valve mounted in said bore so as to control flow therethrough; a receiving member for an element of said vapor recovery device, said member being in communication with said vapor return line; biasing means normally maintaining said valve in a closed position relative to said bore; and valve release means operatively interposed between said valve and said receiving member for overcoming said biasing means and effecting the opening of said valve when said element is engaged with said receiving member.

16. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank as the latter is filled with liquid, said tank having a nozzle and a liquid fill line concentric therewith, comprising: a vapor return line connected to the upper portion of said nozzle; a valve body formed with a bore disposed in the path of said fill line; a valve rod carried by said valve body; a valve operatively connected to said valve rod whereby movement of the latter will effect concurrent movement of said valve; said valve controlling flow through said bore; biasing means normally maintaining said valve in a closed position relative to said bore; and a cam element supported on said receiving member, said element being operatively connected to said valve rod and engageable by an element of said vapor recovery device so as to overcome said biasing means and effect the opening of said valve when said vapor recovery device is engaged with said receiving member.

17. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank as the latter is filled with liquid, said tank having a nozzle and a liquid fill line concentric therewith and said vapor recovery device having a generally tubular inlet element, comprising: a vapor return line connected to the upper portion of said nozzle; a valve controlling flow through said fill line; biasing means normally maintaining said valve closed so as to block said fill line; a receiving member formed with an annular cavity to telescopically receive the inlet element of said vapor recovery device, said cavity being in communication with said vapor return line; and a cam element in said cavity so as to be engageable by said inlet element; said cam element being operatively connected to said valve whereby the latter

will be opened upon the engagement of said cam and inlet elements.

18. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank as the latter is filled with liquid, said tank having a nozzle and a liquid fill line concentric therewith, and said vapor recovery device having a generally tubular inlet element, comprising: a vapor return line connected to the upper portion of said nozzle; a valve body formed with a bore disposed in the path of said fill line; a valve operatively connected to said valve rod whereby movement of the latter will effect concurrent movement of said valve, said valve controlling flow through said bore; biasing means normally maintaining said valve in a closed position relative to said bore; a receiving member formed with an annular cavity to telescopically receive the inlet element of said vapor recovery device, said cavity being in communication with said vapor return line; and a cam element in said cavity operatively connected to said valve rod and engageable by said inlet element so as to overcome said biasing means and effect the opening of said valve when said vapor recovery device is connected with said vapor return line.

19. An interlock for use with a vapor recovery device adapted to receive the vapors displaced from a tank as the latter is filled with liquid, said tank having a nozzle and a liquid fill line concentric therewith, and said vapor recovery device having a generally tubular inlet element, comprising: a vapor return line connected to the upper

portion of said nozzle; a valve body formed with a bore disposed in the path of said fill line; a valve rotatably supported within said valve body; a valve secured to said valve rod whereby rotation of the latter will effect concurrent rotation of said valve between an open and closed position so as to control flow through said bore; biasing means normally maintaining said valve in a closed position relative to said bore; a receiving member formed with an annular cavity to telescopically receive the inlet element of said vapor recovery device, said cavity being in communication with said vapor return line; and a cam element in said cavity operatively connected to said valve rod and engageable by said inlet element so as to overcome said biasing means and effect the opening of said valve when said vapor recovery device is connected with said vapor return line.

20. An interlock as set forth in claim 19 wherein said valve is of the butterfly type and said biasing means is a spring.

21. An interlock as set forth in claim 19 wherein said valve is of the spring check type and secured to said rod at one side of its center of gravity whereby said valve is normally biased towards a closed position under the influence of gravity.

22. An interlock as set forth in claim 19 wherein removable caps are provided for said fill line and said cavity.

No references cited.