Dec. 26, 1939. L. L. MEYERS 2,185,061

SELECTIVE VALVE MANIFOLD FOR TANK TRUCKS

Filed July 14, 1937

Fig. 1.

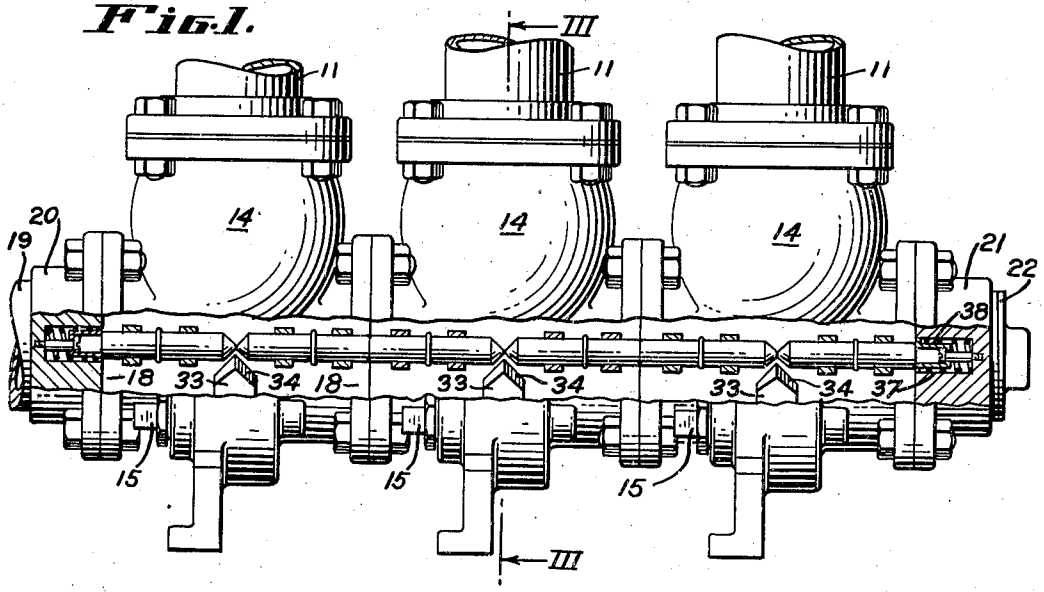


Fig. 2.

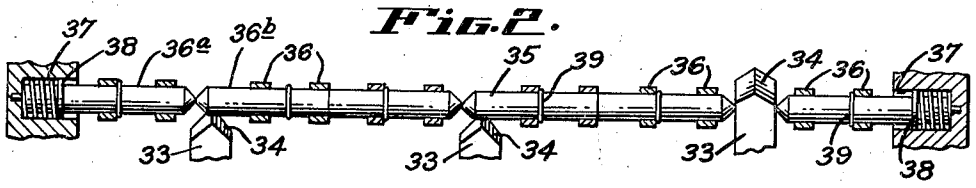


Fig. 3.

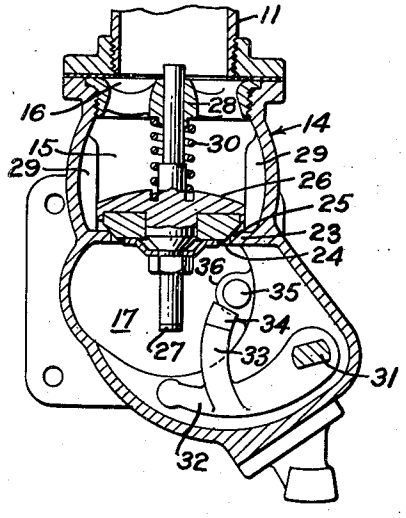
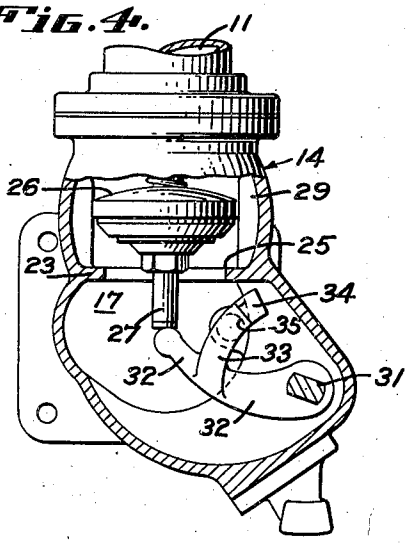


Fig. 4.



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SELECTIVE VALVE MANIFOLD FOR TANK TRUCKS

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13 Claims. (Cl. 277—20)

This invention relates to valves and particularly pertains to a selective valve manifold for use in connection with a plurality of tanks or with tanks having a plurality of separate compartments.

Tank trucks for delivering gasoline or other oils are usually fitted with a plurality of tanks or with a single tank divided into separate compartments, each tank or compartment being fitted with a separate discharge valve. The outlets of these valves are connected to a meter through a common discharge pipe line. If a valve connected with an empty tank or compartment is deliberately or inadvertently left partly open, while delivering gasoline or oil to the discharge line from a full compartment, air from the empty compartment is drawn into the discharge line and the meter will measure this air with the gasoline or oil and consequently the customer will exactly receive gallonage less than that indicated by the counting mechanism of the meter.

It is the principal object of my present invention to prevent such an occurrence from happening, either inadvertently or deliberately, by providing an improved valve manifold capable of being connected with the compartments of a tank, which valve manifold includes selectively operable valves and a latching mechanism which positively prevents opening of more than one valve at a time so as to prevent the simultaneous placing of two or more compartments in communication with the discharge line to the meter.

In actual practice I provide a manifold having a separate inlet connection for each compartment or tank, and a common outlet connection for connection with a meter. A separate valve is provided for each inlet connection, each of which valves is provided with a separate operating mechanism, the operating mechanisms being selectively operable. A latching mechanism is provided which is operatively associated with the operating mechanisms so that the latter are normally capable of selective operation to open the selected valve. The latching mechanism is so constructed and so associated with the valve operating mechanisms that operation of one of the latter will actuate the latching mechanism to latch the remaining valve operating mechanisms against valve opening operation.

One form which the invention may assume is exemplified in the following description and illustrated by way of example in the accompanying drawing, in which:

Fig. 1 is a view in elevation of my improved invention with parts thereof in section to disclose certain features of construction.

Fig. 2 is a fragmentary view diagrammatically arranged disclosing the relationship of the latch mechanism with the valve operating mechanisms.

Fig. 3 is a sectional view through one of the valve units taken on line III—III of Fig. 1.

Fig. 4 is a similar view showing the valve in open position.

Referring more particularly to the accompanying drawing, 10 indicates a valve manifold having three separate inlet connections 11 which may be connected by pipe lines to three separate tanks or to three separate compartments of a single tank. Although in the present instance I have shown the manifold as having three inlet connections, after an understanding of the invention, it will be apparent that it may contain two or more as desired. The valve manifold has a single outlet connection and each inlet connection is fitted with individual valves which may be selectively operated to establish communication between any selected inlet connection and the outlet.

In the present instance the valve manifold is sectional as it is made of three valve bodies 14 enclosing three separate valve units, all of which are identical in construction. Referring to Figs. 3 and 4, it will be seen that each valve body 14 is formed with an intake chamber 15 communicating with an inlet port 16. The valve body is also formed with a discharge chamber 17 communicating with two axially aligned outlet ports 18. The axis of the inlet port 16 is disposed at 90 degrees to the axes of the outlet ports 18, and is disposed substantially midway therebetween. Each valve body 14 is provided with flanges circumscribing the outlet ports 18 so that a plurality of the valve bodies 14 may be arranged with their outlet ports in alignment and secured together to form the sectional manifold 10.

The outlet port 18 of the valve body 14 at one end of the manifold is connected with a discharge line 19 through the medium of a head member 20. The discharge line 19 is, as in usual practice, connected with the meter. The outlet port 18 of the valve body 14 at the opposite end of the manifold is fitted with a head 21 which is plugged by a plug 22 so as to blank off this end of the manifold.

The intake chamber 15 of each valve body 14 is separated from the discharge chamber 17 thereof by a partition 23 having a valve port 24 formed therethrough. This valve port is in axial

alignment with the intake port 16 and is surrounded by a valve seat 25. A valve member 26 is disposed in the intake chamber 15 to cooperate with the seat 25 in controlling the flow of fluid through the port 24. It will be noticed that the valve member 26 opens against the flow of fluid and closes with it.

The valve member 26 is secured on a valve stem 27 which is guided for reciprocation in a valve stem guide 28 adjacent the inlet port 16. The valve member 26 itself is guided at its perimeter by radial guide ribs 29 formed in the body 14 within the intake chamber 15. The valve member 26, as described, is disposed and reciprocates coaxially of the valve port 24 and the inlet port 16. It will be noticed that the valve stem 27 projects axially through the valve port 24 into the discharge chamber 17 of the valve body 14 so that it may be manipulated to open the valve member 26. A valve spring 30 is provided between the valve stem guide 28 and the valve member 26 and constantly tends to maintain the valve seated to close the valve port 24.

Each valve unit of the manifold 10 is provided with a separate valve operating mechanism which consists of a valve operating shaft 31 which extends parallel to the axes of the outlet openings at a spaced distance therefrom, and is journaled in the walls of the discharge chamber as illustrated. Secured on this valve operating shaft 31 within the discharge chamber 17 is a valve operating lever 32. It will be noticed from Figs. 3 and 4 that this valve operating lever 32 is secured at one end on the valve operating shaft 31, while its free end is in a position when operated to engage the adjacent end of the valve stem 27 so that movement in one direction of the free end of the valve operating lever 32 will move the valve stem 27 axially in a direction unseating the valve 26 and opening the valve port 24.

One end of the valve operating shaft 31 projects to a point exteriorly of the valve body 14 so that it may be fitted with a detachable valve operating handle (not shown) by means of which the valve operating shaft 31 may be turned to actuate the valve operating lever 32 and move the valve member 26 to an open position.

The present invention is particularly concerned with means for enabling the opening of but one valve 26 at a time. This, as previously described, will prevent inadvertent or intentional establishment of communication between one tank or compartment with the discharge line 19 simultaneously, and thus prevent siphoning of air into the discharge line from an empty tank or compartment while gasoline or oil is being delivered from a second tank into the discharge line.

The means by which I accomplish this includes a latch finger 33 formed on each valve operating lever 32. Each latch finger 33 is formed with a cam end 34. The latch fingers 33 are operatively associated with a sectional latching bar 35 which is so arranged and disposed within the manifold as to intersect the path of movement of the cam ends of the latch fingers 33, when the latter are moved as the operating levers are actuated to open the valves 26.

The latching bar 35 is composed of a plurality of axially aligned but relatively movable latch bar sections which are separately journaled in spaced bearings 36 secured in the valve bodies 14. The latch bar sections are capable of a limited amount of endwise reciprocation in the said bearings 36. A pair of these latch bar sections 36a and 36b are provided for each valve unit with their contiguous ends normally aligned with the cam end of their associated latch finger 33. These contiguous ends of the latch bar sections are likewise cam like as illustrated in order to permit the insertion therebetween of the cam end 34, of the associated latch finger 33.

The head members 20 and 21 at the opposite ends of the manifold are each formed with an outwardly extending bore 37, the axes of which are in alignment with the axis of the latch bar 35. A spring-pressed plunger 38 is reciprocably mounted in each bore 37. These plungers abut against the opposite ends of the latch bar 35 and tend to hold the same yieldingly in normal position as shown in Fig. 1, in which position any one of the valve operating mechanisms may be operated to open its associated valve member 26. However, it should be pointed out that after one valve operating mechanism has been operated to open a valve, the latch mechanism is so actuated thereby that the remaining valve operating mechanisms of the other valve units are latched against valve opening operation.

From Figs. 1 and 2 it is obvious that by moving the cooperating latch bar sections of any one valve unit in opposite directions by the insertion of the adjacent latch finger therebetween, that the latch bar 35 will be lengthened. This lengthening will be permitted by yielding in an outward direction of the plungers 38, but, however, this lengthening will be limited due both to the limited movement permitted the plungers 38 and the engagement of annular abutments 39 on the latch bar sections with the bearings 36. Also, it is apparent that when the latch bar sections are shifted endwise during this lengthening movement created by the insertion of a latch finger 33 between the ends of the two associated latch bar sections of any valve unit, that the cam ends of the other pairs of latch bar sections for the other valve units are shifted out of alignment with their associated latch fingers 33, thus latching the latter against movement. This, of course, will prevent the other valve operating mechanisms from operation in opening their associated valve members 26.

It is manifest that when the latch finger 33 is withdrawn from between the ends of the latch bar sections, that the spring-pressed plungers will return the latch bar sections to normal position so that any other valve member may be selected for operation.

From Fig. 3 it will be apparent that the valve operating levers 32 must move a considerable distance before engaging the lower end of the valve stem 27 for operating the same, and that during this movement the cam end 34 of the associated latch finger 33 must pass between its cooperating latch bar sections, and if it is held from so passing, that the operating lever 32 cannot be brought into operative relation with the valve member 26. This will prevent two or more valves from being simultaneously and partially opened. In other words, in order to open one valve, the latch bar must be actuated so as to prevent even partial opening of the remaining valves.

In operation of the device, it is constructed substantially as illustrated and described, and when in normal position the latching mechanism and the valve operating mechanisms will be disposed substantially as shown in Figs. 1 and 3. Any one of the three valve units may be then selected for opening to connect one of the compartments or tanks with the outlet connection

19. To do this the removable operating handle is applied to the proper valve shaft 31 and the latter is turned to swing the operating lever 32 in a direction to open the valve 26. Immediately that this lever commences to swing, the cam end 34 of the latch lever 33 projects between the cam ends of the associated latch bar sections 36a and 35b, which will spread apart to permit the latch finger 33 to pass therebetween. In doing this, the cam ends of the other pairs of sections will be moved out of alignment with the latch fingers 33 of the remaining valve operating mechanisms so that any attempt to open the latter will be prevented by engagement of the latch fingers 33 with the latch bar sections. In the valve unit that has been selected for operation, the lever 32 will thereafter engage the end of the valve stem 27 and unseat the valve 26. When the valve operating handle is moved to a position permitting the valve 26 to close, the latch bar 35 will return to its normal position as shown in Fig. 1 so that any other valve may be operated.

From the foregoing it is obvious that I have provided an improved and simplified valve manifold which is so constructed that only one valve thereof may be opened at a time. It is also obvious that I have eliminated the necessity of providing any selecting mechanism which it is necessary to operate prior to a valve opening operation. In my present apparatus it is only necessary to select and perform the opening operation of the desired valve and the latch mechanism operates automatically to latch the remaining valves against opening.

While I have shown the preferred form of my invention, it is to be understood that various changes may be made in its construction by those skilled in the art without departing from the spirit of the invention as defined in the appended claims.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. An apparatus of the character described comprising a manifold having a plurality of separate inlets and a common outlet, a separate valve to control each inlet and normally closing the same, a separate valve operating mechanism for each valve, a latching mechanism for said valve operating mechanisms normally enabling selective operation of any one of said valve operating mechanisms, said latching mechanism being actuated by the valve opening operation of the selected valve operating mechanism to latch the remaining valve operating mechanisms against valve opening operation.

2. An apparatus of the character described comprising a manifold having a plurality of separate inlets and a common outlet, a separate valve to control each inlet and normally closing the same, a separately operable valve operating mechanism for each valve, a latching mechanism for all of said valve operating mechanisms and normally enabling operation of any one thereof to open its associated valve, said latch mechanism being so operatively associated with said valve operating mechanisms that it will be actuated by the valve opening operation of any one of said valve operating mechanisms to latch the remaining valves against valve opening operation.

3. An apparatus of the character described comprising a manifold having a plurality of separate inlets and a common outlet, a separate valve to control each inlet and normally maintaining the same closed, a separate valve operating mechanism for each valve, the same being separately operable, each one of said valve operating mechanisms including a valve operating lever, a latching mechanism for all of said levers normally enabling any one of said levers to be operated to open its associated valve, said latching mechanism being so associated with said levers that it will be actuated by valve opening movement of any one thereof to latch the remaining levers against valve opening operation.

4. An apparatus of the character described comprising a manifold having a plurality of separate inlets and a common outlet, a separate valve to control each inlet and normally maintaining the same closed, a separate valve operating mechanism for each valve, each of said valve operating mechanisms including a valve operating member, a latching mechanism for all of said operating members normally enabling any one thereof to be operated to open its associated valve, a sectional latch bar, a latching finger for each member, said latch bar being actuated by valve opening operation of any one of said members through its latch finger to latch the remaining members against valve opening operation.

5. An apparatus of the character described comprising a manifold having a plurality of separate inlets and a common outlet, a separate valve to control each inlet and normally closing the same, a separate valve operating mechanism for each valve, each of said valve operating mechanisms including an oscillatory operating lever mounted within the manifold and capable of engaging the valve and opening the same, a latch finger connected with each operating lever, the said latch finger being mounted in the manifold, a latch bar extending longitudinally of the manifold and intersecting the path of movement of said latch fingers, said latch bar being sectional with a junction between sections in alignment with each latch finger, said sections being shifted longitudinally by insertion of one latch finger between the same so as to place the remaining junctions out of alignment with the remaining latch fingers and thereby prevent valve opening operation of the remainder of said operating levers.

6. An apparatus of the character described comprising a manifold having a plurality of separate inlets and a common outlet, a separate valve to control each inlet and normally closing the same, a separate valve operating mechanism for each valve, each of said valve operating mechanisms including an oscillatory operating lever mounted within the manifold and capable of engaging the valve and opening the same, a latch finger connected with each operating lever, the said latch finger being mounted in the manifold, a latch bar extending longitudinally of the manifold and intersecting the path of movement of said latch fingers, said latch bar being sectional with a junction between sections in alignment with each latch finger, said sections being shifted longitudinally by insertion of one latch finger between the same so as to place the remaining junctions out of alignment with the remaining latch fingers and thereby prevent valve opening operation of the remainder of said operating levers, and means for automatically returning said latch bar sections to normal position when said valves are in closed position.

7. The combination with a plurality of valves each adapted to control the flow of fluid from a different source of means for permitting liquid to flow from any single one of the valves only at a time, said means comprising independent

valve opening devices one for each valve and means actuated by valve opening movement of any of said devices for locking the remaining devices against movement.

8. The combination with a plurality of valves each adapted to control the flow of fluid from a different source of means for permitting liquid to flow from any single one of the valves only at a time, said means comprising independent valve opening devices, one for each valve and means interposed between the valves and opening devices for opposing movement of the latter, said interposed means being normally freely movable into position to free any of the opening devices for movement, there being co-operating means on the devices and interposed means for locking the latter against movement of any one of the opening devices.

9. In combination a manifold, a pair of valves mounted on and each adapted to control the flow of fluid from a different source into the manifold, stems on the valves extending downwardly into the manifold, independently operable valve unseating levers mounted on the manifold and movable into engagement with the valve stems and means for preventing valve stem engaging movement of either of the levers when the other thereof is in engagement with its valve stem, said means including an axially movable rod extending across the path of movement of the levers, said rod being of greater length than the distance between the levers and cams on the ends of the rods adapted upon engagement with the levers to move the rod out of the path of the levers.

10. The combination with a plurality of valves each adapted to control the flow of fluid from a different source of a plurality of independently operable spaced valve opening devices one for each of said valves and means for preventing actuation of the remaining devices when one thereof is in valve opening position, said means including aligned abutting shiftable elements extending across the path of movement of the devices, the ends of said elements being opposite the devices, camming means on said elements adapted to be engaged by the devices for movement of the elements out of the path of movement of the devices and means for limiting the movement of the elements such that when the latter are cammed out of the path of one of the devices the elements are restrained against further movement.

11. The combination with a plurality of valves each adapted to control the flow of fluid from a different source of a plurality of independently operable spaced valve opening devices one for each of said valves and means for preventing actuation of the remaining devices when one thereof is in valve opening position, said means including aligned abutting shiftable elements extending across the path of movement of the devices, the ends of said elements being opposite the devices, camming means on said elements adapted to be engaged by the devices for movement of the elements out of the path of movement of the devices and means for limiting the movement of the elements such that when the latter are cammed out of the path of one of the devices the elements are restrained against further movement and in which the shiftable elements comprise axially aligned cylindrical rods.

12. The combination with a plurality of valves each adapted to control the flow of fluid from a different source of a plurality of independently operable spaced valve opening devices one for each of said valves and means for preventing actuation of the remaining devices when one thereof is in valve opening position, said means including aligned abutting shiftable elements extending across the path of movement of the devices, the ends of said elements being opposite the devices, camming means on said elements adapted to be engaged by the devices for movement of the elements out of the path of movement of the devices and means for limiting the movement of the elements such that when the latter are cammed out of the path of one of the devices the elements are restrained against further movement and in which the shiftable elements comprise axially aligned cylindrical rods the ends of the rods being in the form of truncated cones engageable by the devices to cam the rods in an axial direction.

13. The combination with a plurality of valves each adapted to control the flow of fluid from a different source of a plurality of independently operable spaced valve opening devices one for each of said valves and means for preventing actuation of the remaining devices when one thereof is in valve opening position, said means including aligned abutting shiftable elements extending across the path of movement of the devices, the ends of said elements being opposite the devices, camming means on said elements adapted to be engaged by the devices for movement of the elements out of the path of movement of the devices and means for limiting the movement of the elements such that when the latter are cammed out of the path of one of the devices the elements are restrained against further movement and in which the valve opening devices comprise independently operable levers, the shiftable elements comprising aligned axially movable cylindrical rods the ends of which are truncated.

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