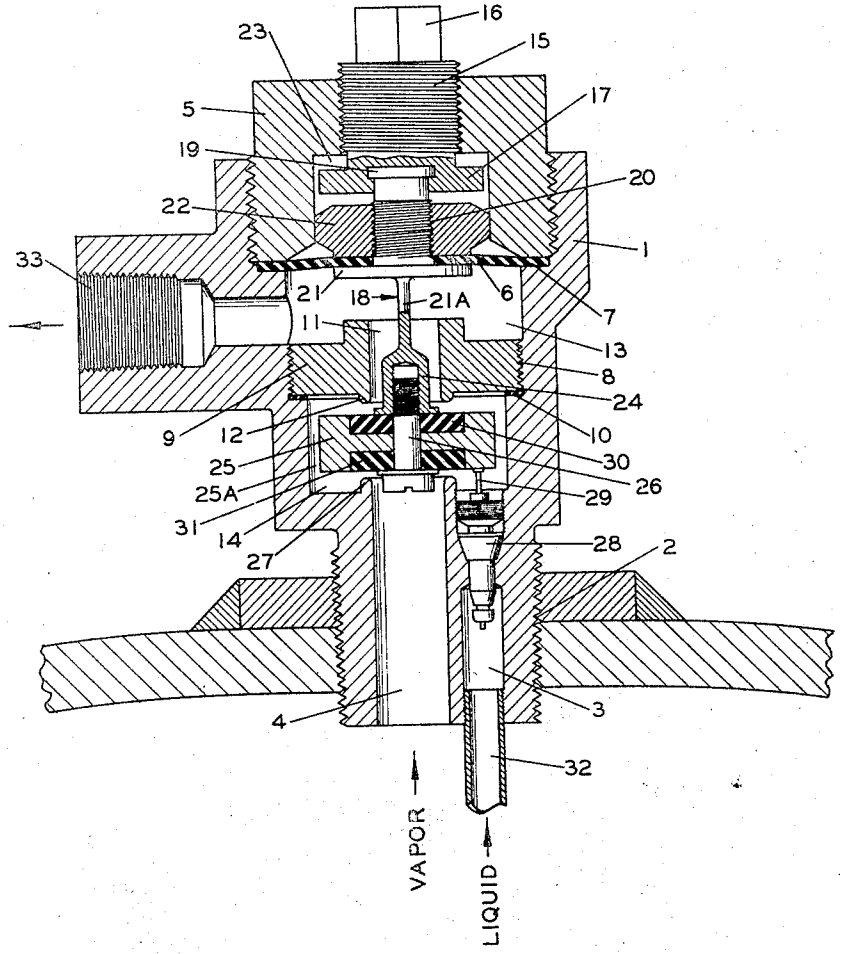
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VALVE

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VALVE

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This invention relates to a multi-purpose valve particularly adapted for controlling the flow of dissimilar fluids such as liquid and vapor from a common source. The structure may also find general application for controlling flow of similar fluids from dissimilar sources, for instance as a manually operable change-over valve for two drum bottled gas dispensing systems or, in fact, any system where it is found economical and convenient to control flow of a plurality of fluids by a single valve.

Liquefied petroleum gases have recently found wide utility as a fuel for internal combustion engines. The fuel is ordinarily stored in a container or tank under pressure and separate valves and eduction lines are usually provided for the withdrawal of the fuel in liquid and vaporous state. The valves are mounted on the top of the high pressure storage tank, the vapor valve connecting with the vapor space above liquid level and a tube extends to the bottom of the tank from the liquid valve for the withdrawal of the liquid fuel. In changing from liquid to vapor feed it is necessary to close the liquid valve and open the vapor valve and vice versa. By virtue of my invention a single valve suffices for the selective withdrawal of both liquid and vaporous fuel and a consequent savings effected by the use of a single valve body and outlet connection where two valves and outlet connections have heretofore been employed. Further savings result from the use of a single tapping and container boss.

A primary object of this invention is the provision of a valve structure for controlling the flow of more than one fluid. A further object is the development of an efficient and economical arrangement for withdrawing high pressure fuels from storage containers. Another object is the provision of a single valve for multiple fluid control which is characterized by simplicity of construction and ease of manipulation.

The drawing illustrates diagrammatically one structure embodying the principles of the present invention.

Referring to the drawing, the numeral 1 designates the valve body provided at the bottom with a threaded section 2 for attachment to the tank and having liquid and gaseous eduction passages 3 and 4, respectively. The upper part of the valve casing is interiorally threaded for the reception of a bonnet 5 and a flexible diaphragm 6 of synthetic rubber or other hydrocarbon resistant material which is clamped between the bonnet and a circumferential shoulder 7 within the body. The interior of the valve body is also threaded at 8 for the reception of an insert 9 which is made fluid tight with respect to the valve body by means of a washer 10. The insert has a central passage 11 and is formed on its lower face with a projecting upper valve seat 12. The insert 9 divides the interior of the valve body into upper and lower chambers 13 and 14, respectively, the liquid and gaseous eduction passages entering the lower chamber. The bonnet 5 has a central threaded passage through which is rotatably threaded a valve stem 15 having a squared upper section 16 for attachment of an operating handle or similar device. A left-hand thread is preferably provided between the stem and bonnet so that full rotation of the stem to the left will close the vapor passage. The lower portion of the valve stem is provided with a socket for the reception of the upper enlarged portion of a riser designated generally by the numeral 18. The riser structure comprises an enlarged upper section 19 rotatably received by the correspondingly shaped socket in the valve stem, a threaded section 20, a flange 21 and a lower portion 21A of relatively smaller cross section. A combined clamping and guide nut 22 is secured to the threaded section 20 and guides the riser with respect to the interior 23 of the bonnet which may be multi-sided or cylindrical. The diaphragm 6 is securely clamped to the riser between the nut 22 and the flanged portion 21 thereof and insures against leakage of gas or liquid through the upper part of the assembly. The lower end of the riser terminates in a relatively enlarged portion 24 provided with an interiorally threaded socket. A double faced valve disk 25 is firmly secured to the riser by a bolt 26, the end of which is threaded to the socket in the enlarged lower end of the riser. The valve disk 25 is of materially smaller diameter than the chamber 14 to provide a passage 25A for the passage of liquid and/or gaseous constituents to the central passage 11 of the insert. A lower valve seat 27 projects into chamber 14 from the gaseous passage 4. A valve 28 is threaded to the interior of the liquid passage 3 in the upper portion thereof in such a position that the valve stem 29 will normally project above the lower valve seat 27 allowing the core valve to close. The valve 28 may be of the tire core type or an ordinary back pressure valve where a larger flow area is desired with the stem extended beyond the lower main valve seat. The valve disk 25 is provided with upper and lower faces 30 and 31 of synthetic rubber or other hydrocarbon resistant material for fluid tight engagement with the

upper and lower valve seats 12 and 27, respectively. A conduit 32 is secured in the lower part of the liquid passage 3 and extends to the bottom of the storage tank, not shown. A common outlet 33 is provided for the liquid and gaseous constituents.

The operation of the valve is fairly obvious from an inspection of the drawing. Complete rotation of the valve stem to the right brings the valve disc 25 into contact with the upper seat 12, fully closing the valve, while extreme rotation of the stem to the left moves the disc into its lowest position, opening the core valve in the liquid passage and contacting the lower valve seat 27 to close off vapor flow. The latter movement will initiate the flow of liquid in the eduction conduit 32 through the passage 25A in the lower chamber, the central passage 11 in the insert, the upper chamber and finally to the line through the common outlet 33. When vapor flow is desired the stem is rotated to a point midway between the full right and full left positions allowing the core valve stem 29 to rise and close off liquid flow, while initiating vapor flow from the eduction conduit 4 through the passage 25A, the passage 11, upper chamber and to the line through the common outlet 33. In some cases it may be desirable to allow simultaneous flow of two fluids, gases or liquids from common or foreign sources and my valve is likewise capable of this operation by three quarter rotation to the left which depresses the core valve stem partially but maintains eduction through the conduit 4.

It is to be noted, however, that when the device is used for vapor and liquid withdrawal from a high pressure storage tank the tire core valve in the liquid passage may be omitted entirely without the sacrifice of satisfactory operation. In this case vapor flow will take place with the main valve in any intermediate position between the upper and lower valve seats. Liquid flow through the common outlet is initiated when the lower face of the valve engages the lower valve seat.

Operation of the valve is simplified by providing threads on the valve stem of sufficient pitch and a pointer on the handwheel or operating handle. Suitable indicia on the valve body may be supplied to indicate the position of the valve for any degree of rotation.

I claim:

1. A valve for controlling vapor and liquid eduction from a pressure storage tank comprising a valve casing, liquid and vapor inlet passages in said casing, the liquid passage communicating below the surface of liquid in the tank, a common outlet passage in the casing, valve seats for the outlet passage and vapor inlet passage, and a valve selectively movable into engagement with said valve seats.

2. A valve for controlling vapor and liquid eduction from a pressure storage tank comprising a valve casing, liquid and vapor inlet passages in said casing, the liquid passage communicating below the surface of liquid in the tank, a common outlet passage in the casing, valve seats for the outlet passage and vapor inlet passage, said last named passage and the outlet passage being aligned and oppositely disposed and a valve selectively movable into engagement with said valve seats.

3. A valve for controlling vapor and liquid eduction from a pressure storage tank comprising a valve casing, liquid and vapor inlet passages in said casing, the liquid passage communicating below the surface of liquid in the tank, a common outlet passage in the casing, a check valve in the liquid inlet passage, valve seats for the outlet passage and vapor inlet passage, said last named passage and the outlet passage being aligned and oppositely disposed and a valve selectively movable into engagement with said valve seats.

4. A valve for controlling vapor and liquid eduction from a pressure storage tank comprising a valve casing, liquid and vapor inlet passages in said casing, the liquid passage communicating below the surface of liquid in the tank, a common outlet passage in the casing, a check valve in the liquid inlet passage, an operating arm on the check valve, valve seats for the outlet passage and vapor inlet passage, said last named passage and the outlet passage being aligned and oppositely disposed, a main valve selectively movable into engagement with said valve seats, said main valve in engaging the vapor inlet valve seat also engaging the operating arm on the check valve to open the liquid inlet passage for liquid eduction.

5. A multi-purpose valve comprising in combination a body having a chamber, said body having a first passage entering said chamber at one side of said chamber, a second passage entering said chamber at the opposite side of said chamber from the first passage and a third passage entering said chamber, a valve head in said chamber spaced from the walls of said chamber to permit communication between the passages and movable in one direction to close said first passage and in the opposite direction to close said second passage, a normally closed check valve in said third passage, an operating member on the check valve disposed upon engagement to open said check valve, said valve head being disposed to engage said operating member and open said check valve in the movement of said valve head to close said first passage, and operating means secured to said valve head and extending to the exterior of said body for moving said valve head in said passage closing movements.

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