Jan. 2, 1940. D. K. McINNIS ET AL 2,185,796

CONTAINER

Filed Aug. 1, 1936 2 Sheets-Sheet 1

Fig. 1.

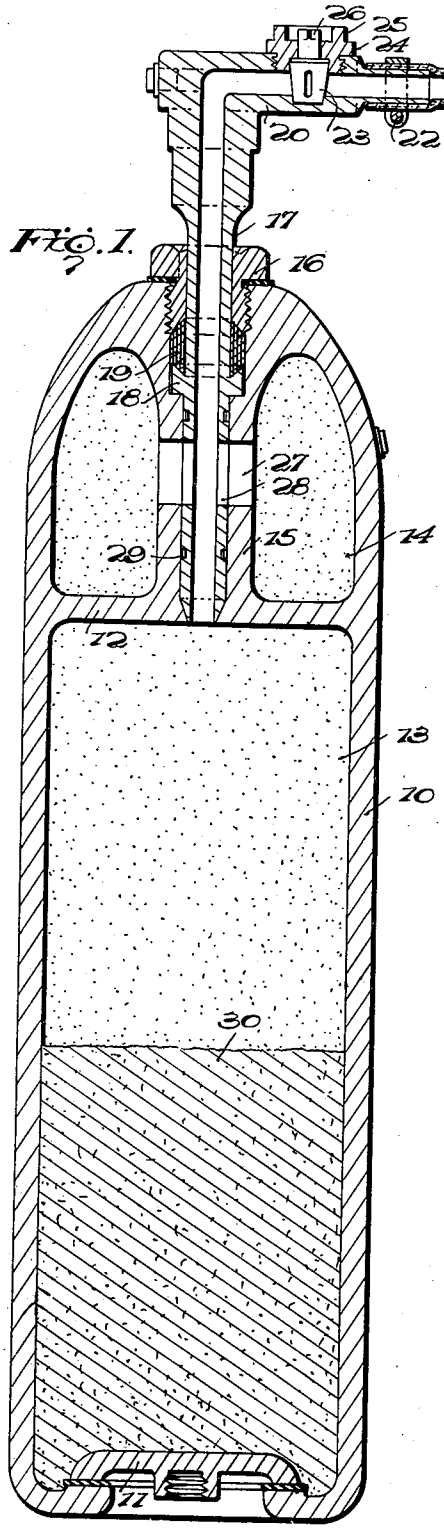



Fig. 2.

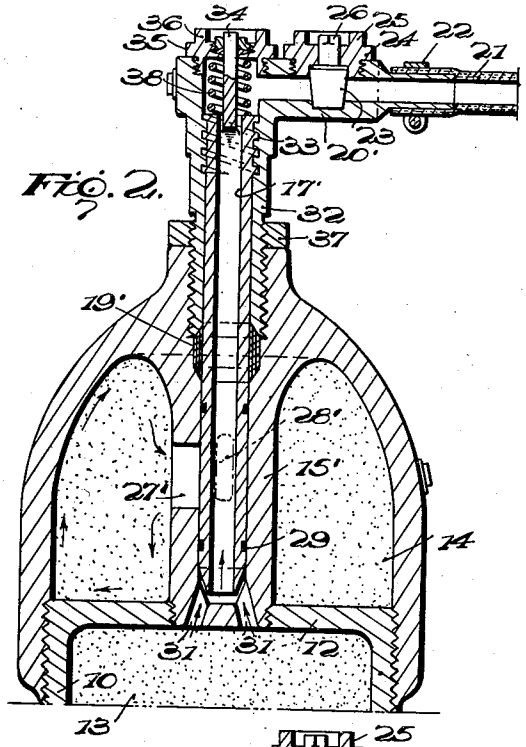
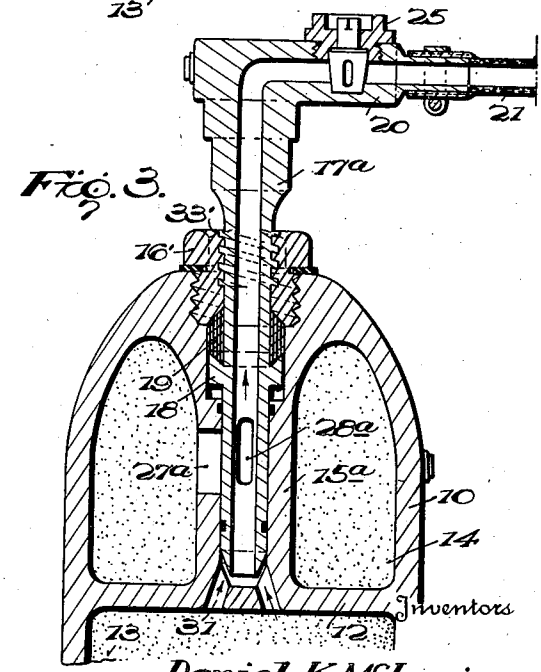



Fig. 3.




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Jan. 2, 1940. D. K. McINNIS ET AL 2,185,796

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Filed Aug. 1, 1936 2 Sheets-Sheet 2

FIG. 4.

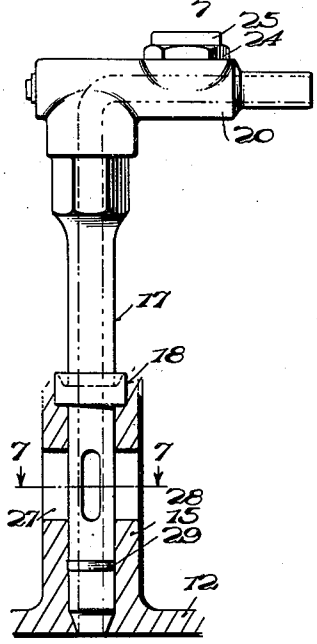



FIG. 5.

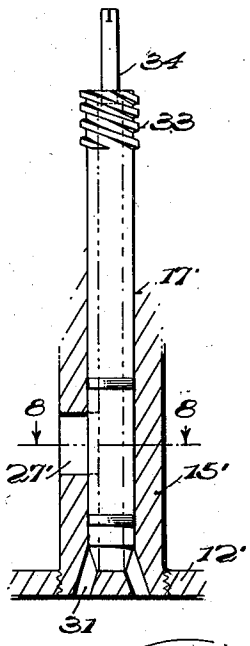



FIG. 6.

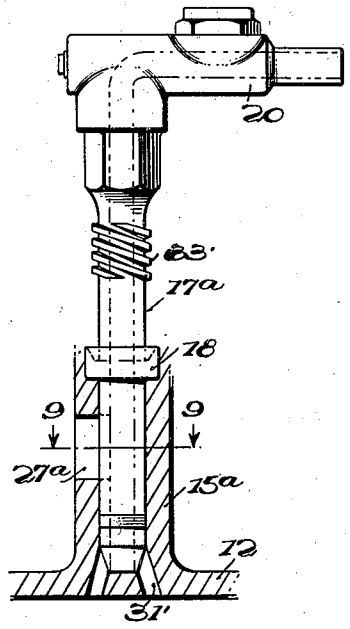



FIG. 7.

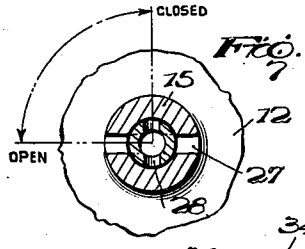



FIG. 8.

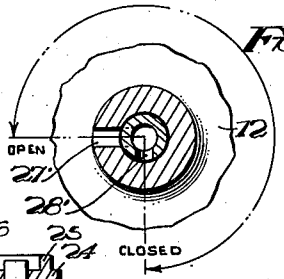



FIG. 9.

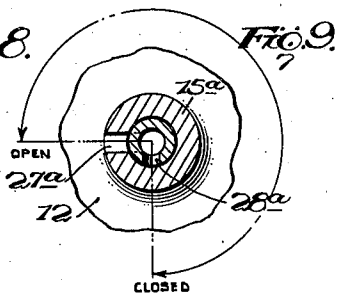
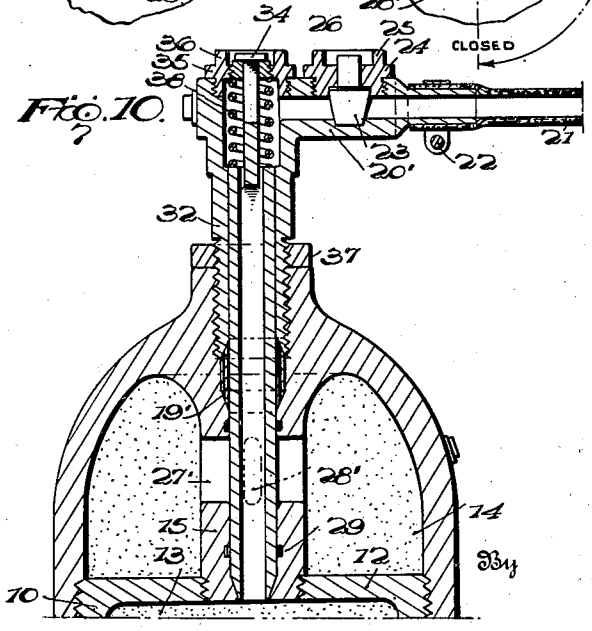



FIG. 10.




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# UNITED STATES PATENT OFFICE

2,185,796

## CONTAINER

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New Orleans, La.

Application August 1, 1936, Serial No. 93,912

10 Claims. (Cl. 137—21)

Our invention relates to containers and more particularly to containers for gases such as carbonic acid gas, although capable of use with other gases or fluids.

An important object of our invention is the provision of a container having a reserve compartment which is normally closed but which may be opened to release the gas stored therein for use when the main compartment supply becomes exhausted.

Another object of our invention is to provide a valve mechanism to control delivery of the gas from the two container chambers and to control communication between the two container chambers.

A further object of our invention is to provide a container of this character which is inexpensive to manufacture, which is durable in use and which can be used to distribute gas or the like with a minimum of cost and effort.

Other objects and advantages of our invention will be apparent during the course of the following description.

In the accompanying drawings which form a part of this specification and wherein like characters of reference denote like parts throughout,

Figure 1 is a vertical sectional view through a container embodying our invention,

Figure 2 is a similar view of the upper portion of a modified form of our invention,

Figure 3 is a similar view of a still further modified form of our invention,

Figure 4 is an elevation of the valve member shown in Figure 1, showing its position with respect to the valve portion of the container,

Figure 5 is a similar view of the valve shown in Figure 2,

Figure 6 is a similar view of the valve shown in Figure 3,

Figure 7 is a transverse sectional view taken on the line 7—7 of Figure 4,

Figure 8 is a transverse sectional view on the line 8—8 of Figure 5,

Figure 9 is a similar view taken on the line 9—9 of Figure 6 and

Figure 10 is a sectional view of a further modification of our invention.

In the drawings, wherein for the purpose of illustration is shown a preferred embodiment of our invention the numeral 10 designates a container which is usually of elongated generally cylindrical shape and of metal of substantial thickness to withstand the relatively high pressures of the gas stored therein. Our invention is particularly applicable to such containers as are used to store carbonic acid gas for use with soda fountains, beer dispensing systems, air conditioners or the like, although not necessarily restricted to this use. A door or gate 11 is provided in the bottom of the container and preferably opens inwardly so that pressure within the container tends to maintain the gate in its closed position. A transverse partition 12 is arranged in proximity to the top of the container and divides the container into a lower main compartment 13 and an upper reserve compartment 14 of substantially smaller capacity than the main compartment. A centrally arranged tube 15 connects the partition 12 to the top of the container. The container 10 with partition 12 and tube 15 may be formed in any suitable manner, as by securing the parts together by machine threads, by welding or by other suitable means. Welding the parts together produces an integral structure, as indicated in Figure 1 but the particular method of forming the container forms no part of the present invention.

The bore of the tube 15 is somewhat restricted at its lower end and is enlarged at its upper end, the upper portion of the enlargement being internally screw threaded to receive the threaded stem of a packing nut 16. A cylindrical sleeve valve 17 fits snugly for rotation in the bore of tube 15 and extends through the enlargement of the bore of the tube and through the center of packing nut 16. A flange 18 extends radially from the sleeve valve 17 and normally rests in the lower end of the enlarged portion of the bore of tube 15 below the packing nut 16. Suitable packing 19 is arranged between the flange 18 and packing nut 16, and when the nut 16 is tightened, packing 19 not only prevents escape of gas from around the valve but also forces the valve sleeve securely down in the tube and secures it in position therein, by reason of the flange 18, which may be undercut as shown to be firmly engaged by the packing. The flange 18 may be secured to valve 17 in any suitable manner, as by welding after the nut 16 is in place on the sleeve. In place of welding, threading, bolting or other suitable connection may be used.

The sleeve valve 17 extends above the nut 16 for a substantial distance and is provided at its upper end with a right angle extension 20 having a reduced end portion adapted to extend into the end of the flexible hose or conduit 21 secured thereto by a suitable clamp 22. The conduit 21 is connected to the dispensing equipment or to any other point where the gas is desired. A suitable cut-off valve 23 is arranged in the member 20 and is preferably journaled in a removable plug 24 having an upstanding annular flange 25. The valve 23 has a stem 26 the upper end of which is polygonal in cross-section and arranged concentrically with the flange 25, terminating below the top of the flange to prevent inadvertent operation of the valve. The valve may be rotated by means of a socket wrench inserted over the stem 26 within the confines of flange 25.

A pair of diametrically opposed vertically elon-

gated ports 27 are arranged in the tube 15 at a point spaced above partition 12 and similar ports 28 are arranged in sleeve valve 17. The valve 17 can be rotated to move ports 28 out of communication with ports 27, as in Figures 4 and 7 or in communication with ports 27, as in Figure 1. In order to rotate the valve 17, nut 16 is loosened and the valve rotated by the extension 20, acting as a lever, the flexible conduit 21 permitting such movement. Where the coupling or conduit will not permit such rotation, the entire cylinder or container 10 may be rotated about the valve. Suitable packing rings 29 may be arranged around the valve sleeve 17 above and below the ports 27 and 28 if desired.

In operation, valve 17 is moved into the position shown in Figure 1 with the ports 27 and 28 in registration, valve 23 is closed and the container 10 charged with gas. A solid material such as dry ice 30 may be broken up and inserted through gate 11 which is then closed, and sealed by the pressure within the container. A liquid or gas may be charged through extension 20 instead of through gate 11. Gas from the dry ice or other material fills main compartment 13 and passes up through valve 17 and ports 27 and 28 into the reserve compartment 14. After an interval sufficient to allow for a state of equilibrium being reached within the container, the valve 17 is rotated through an arc of 90° to move the ports 27 and 28 out of registration, and the container is ready for use. When delivered at the point of use it is readily coupled to the hose 21 or other conduit, and it is only necessary to turn the small valve 23 to tap the gas supply. When the gas in the main compartment 13 is exhausted, nut 16 is loosened and valve 17 rotated to bring ports 27 and 28 into registration and nut 16 is then tightened to hold the valve in reserve position. The reserve supply of gas is then ready for use, and the operator can call his distributor and have a new charged cylinder on hand before the reserve supply is exhausted.

In Figure 2 a modified construction is shown. The cylinder 10, partition 12, main compartment 13 and reserve compartment 14 may be the same as shown in Figure 1 or the top of the cylinder above the partition 12 may be attached by machine threads to the body of the container. The construction of the tube 15' and valve 17' varies from that shown in Figure 1, however, in order to shut off the reserve compartment from the main compartment when the reserve supply is being used. In this form of the invention the bore of tube 15' is closed at its lower end and provided with inclined ports 31 connecting the main compartment 13 with the sides of the lower end of the tube 15'. When the tapered lower end of valve sleeve 17' is firmly seated in the bottom of the tube 15' the ports 31 are closed by the valve. In place of the packing nut 16 a tubular inverted L-shaped sleeve 32, having its lower end screw threaded, is received in the threaded upper end of the bore of tube 15' and snugly receives the upper end of sleeve valve 17'. Packing 19' is arranged between the end of the sleeve 31 and the lower end of the enlarged portion of the bore of sleeve 15'. The upper end of valve 17' terminates short of the top of sleeve 32 and is provided with screw threads 33 of the screw jack type with a large pitch which engage similar threads in the upper end of sleeve 32. A stem 34 is secured to the open upper end of the valve 17' and extends through a stuffing box or the like in a removable plug 35 on the top of sleeve 32. An annular flange 36 is arranged on the upper side of the plug and is concentric to the end of stem 34 which is polygonal in shape to facilitate turning of the stem and valve with a socket wrench. A valve 23 and plug 24 are arranged in the extension 20' of sleeve 32 which is connected to conduit 21 as in the form of the invention shown in Figure 1.

A single port 27' is arranged in the sleeve 15' and is adapted to cooperate with a single port 28' in the valve 17' to connect the reserve chamber 14 with the interior of the valve. Suitable packing rings 29 are arranged on the valve above and below port 28'. A lock nut 37 may be employed to secure the sleeve 32 in place on the cylinder.

In this form of the invention, the valve has three operative positions. In the charging or filling position the valve is in its extreme upper position with the ports 27' and 28' in registration and with the lower end of the valve spaced from the closed lower end of the tube 15' to uncover ports 31. When dry ice or other solid is placed in compartment 13, or a liquid or gas is charged through portion 20' of sleeve 32, the main compartment and reserve compartment will be filled with gas. Valve 17' is then rotated, by means of a wrench applied to stem 34, to the position shown in Figures 2 and 8 which shuts off the reserve compartment but which leaves the main compartment in communication with the valve 17'. When the main supply is exhausted, valve 17' is rotated until it seats tightly against the lower end of tube 15' when the ports 27' and 28' are again in registration but ports 31 are closed to prevent escape of the reserve supply of gas into the main compartment, as seen in Figure 5. A complete revolution of the valve separates its charging position from its reserve position.

A coil spring 38 may surround the stem 34 and press against the top of valve 17'. If it is not desired to separate the reserve compartment from the main compartment when using the reserve supply of gas, the lower end of tube 15' may be left open as in Figure 1, threads 33 dispensed with and spring 38 relied upon to seat the valve as illustrated in Figure 10. The annular flanges 25 and 36 prevent inadvertent operation of the valves 17' and 23.

In Figures 3, 6 and 9 is shown the type of valve illustrated in Figure 1 modified to separate the main compartment from the reserve compartment in the reserve position of the valve. The container is formed as in Figure 1 with the lower end of the tube 15a closed and provided with ports 31'. A single port 27a connects the reserve chamber 14 with the bore of sleeve 15a, and valve 17a is provided with a single port 28a adapted to register with port 27a in two of the three positions of the valve. The bore of packing nut 16' is provided with threads of large pitch and of the screw jack type which are engaged by similar threads 33' on the valve 17a. Rotation of valve 17a raises and lowers the valve through the medium of the threads 33'. With the exception of the single port 28a and threads 33' valve 17a is identical with valve 17 of Figure 1. The valve is rotated by means of extension 20, and has the same three operative positions as the valve of Figures 2, 5 and 8. In Figure 3 the main compartment is open for use through the valve while in Figure 6 the reserve compartment is open for use and the main compartment closed by the valve. One complete revolution of the valve from Figure 6 brings the valve into its charging or

filling position with ports 27a and 28a in registration and ports 31' open. When the valve is held stationary and nut 16' tightened, pressure of packing 19 on flange 18 firmly secures the valve in its adjusted position. The threads which secure nut 16' in the bore of the tube have the same pitch as threads 33'.

While the container is particularly applicable to use with carbonic acid gas it may obviously be used for other gases or materials.

Any suitable form of relief or safety valves may be arranged in communication with the two compartments to prevent damage by excessive pressures. The connection with hose 21 is illustrative only, and any other connection may be employed. In practice the valve may be connected to flexible metallic conduits or to any other type of conduit available by means of any suitable union or connection.

While we have shown and described the preferred embodiment of our invention it is to be understood that various changes in the size, shape and arrangement of parts may be resorted to without departing from the spirit of our invention or the scope of the subjoined claims.

Having thus described our invention, what we claim and desire to protect by Letters Patent is:

1. A gas container having a main compartment and a reserve compartment, a tube having ports communicating with said reserve and main compartments, a conduit communicating with said tube, and a valve in said tube, said valve having ports adapted to register with the tube ports to connect the main compartment with the conduit in one position and the reserve compartment with the conduit in another position while disconnecting said main compartment from the conduit.

2. A container having a main compartment and a reserve compartment, a tube having ports communicating with each of said compartments, a valve arranged in said tube and having ports adapted to cooperate with the ports in the tube, the bore of the tube having an enlargement, packing material arranged in said enlarged portion of the tube bore, and means to press said packing against said valve to maintain the valve in adjusted position and to seal the tube against the escape of fluid from the container.

3. A gas container having a main compartment and a reserve compartment, a tube having ports communicating with each compartment, a valve arranged in said tube and having ports adapted to cooperate with the ports in the tube, the bore of the tube having an enlargement, an annular flange on the valve arranged in the enlarged portion of the tube, packing material arranged in said enlarged portion of the tube bore and engaging the flange on the valve, and means to force said packing material against said flange to maintain the valve in adjusted position and to seal the tube against the escape of gas from the container.

4. A gas container having a main compartment and a reserve compartment, a tube extending through the reserve compartment having ports communicating with each compartment, a valve arranged in said tube, said valve being adapted in one position to uncover the ports communicating with each compartment, in another position to uncover the port communicating with the main compartment while closing the port to the reserve compartment, and in another position to uncover the port communicating with the reserve compartment while closing the port to the main compartment.

5. A gas container having a main compartment and a reserve compartment, a tube having ports communicating with each compartment, a valve operatively arranged in said tube for rotary and axial movement, said valve having ports adapted to cooperate with the tube ports, the rotary movement of the valve serving to cover and uncover the tube port to one compartment and the axial movement of the valve serving to cover and uncover the port to the other compartment, and a conduit communicating with said valve.

6. A gas container having a main compartment and a reserve compartment, a tube having ports communicating with said main and reserve compartments, a valve operatively arranged in said tube and having ports adapted to cooperate with the tube ports, means to rotate said valve to cover and uncover the port to one of said compartments, and means to translate said rotary motion to axial motion to control the opening and closing of the port leading to the other compartment.

7. A gas container having a main compartment and a reserve compartment, a tube having ports opening into both of said compartments, an extension secured to said tube, a sleeve valve arranged for rotation in said tube and extension, said valve having ports to cooperate with the ports of the tube, a conduit connected to said extension, a shut-off valve in the extension between the sleeve valve and conduit, means to rotate the sleeve valve, and means to translate the rotary motion of the sleeve valve into axial movement.

8. A gas container having a main compartment and a reserve compartment, a tube having ports communicating with said compartments, a sleeve valve in said tube, a conduit connected to said valve, means to shut off communication between the valve and conduit, said valve being rotatable to cover and uncover the port to one of said compartments, said tube having an enlarged bore, packing material in said bore surrounding the valve, a follower adjustably secured in the enlarged bore of the tube, and cooperating cam members carried by said follower and valve to translate rotary motion of the valve into axial movement thereof.

9. A gas container having a main compartment and a reserve compartment, a tube having ports opening into both compartments, an extension secured to said tube, a sleeve valve longitudinally arranged in the tube for rotation in said tube and extension, said valve having ports to cooperate with the ports of the tube, a conduit connected to said extension, resilient means forcing the valve sleeve into the tube, and means to rotate the sleeve valve.

10. A gas container having a main compartment and a reserve compartment, a tube having ports opening into both compartments, an extension secured to said tube, a sleeve valve arranged for rotation in said tube and extension, said valve having ports to cooperate with the ports of the tube, a conduit connected to said extension, resilient means forcing the valve sleeve into the tube, means to rotate the sleeve valve, and a shut off valve in the extension between the sleeve valve and conduit.

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