Aug. 31, 1965 D. FARANDATOS 3,203,592

FLUID DISPENSER

Filed Oct. 4, 1963

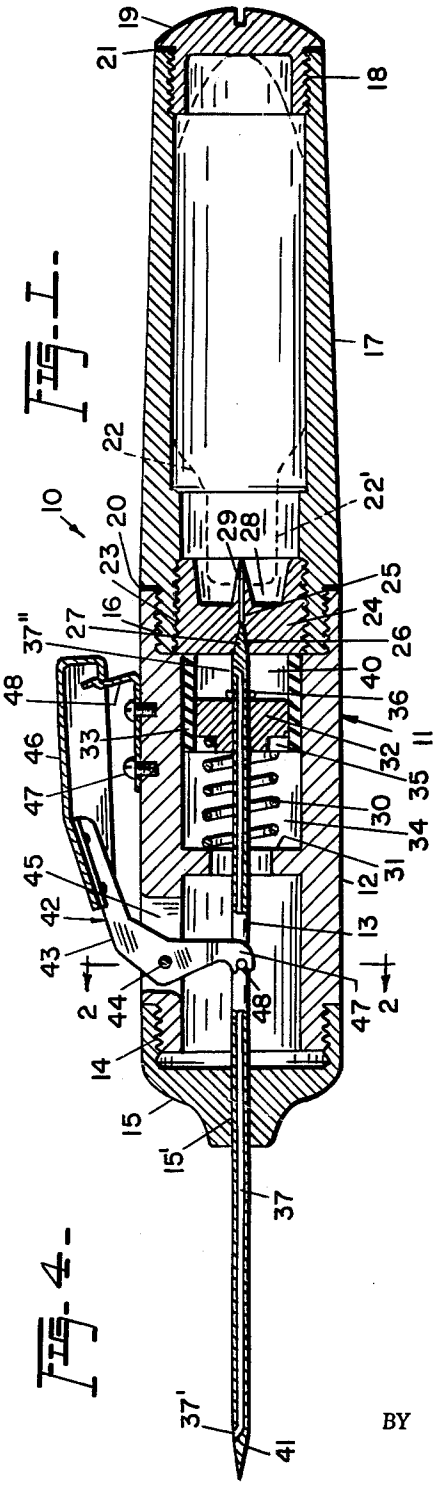

FIG. 1

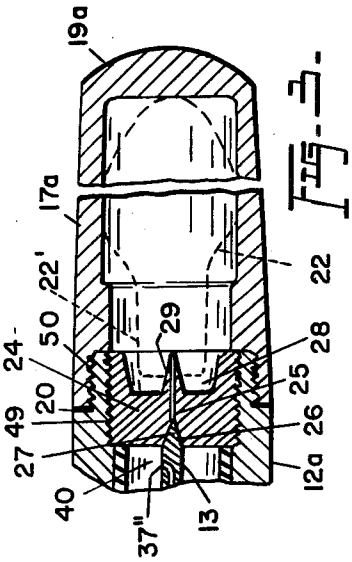

FIG. 3

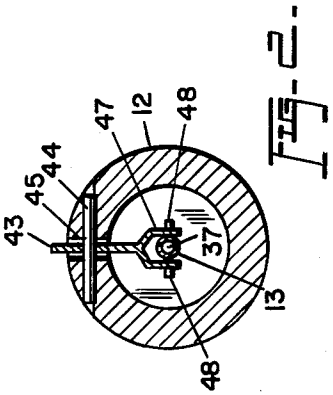

FIG. 2

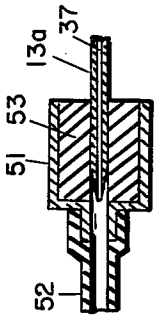

FIG. 4

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FLUID DISPENSER

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6 Claims. (Cl. 222—5)

The present application is a continuation-in-part of my application Serial No. 298,739, filed July 30, 1963, which is a continuation-in-part of my application Serial No. 149,276, filed November 1, 1961, now abandoned, which in turn is a continuation of my earlier application Serial No. 778,335, filed December 5, 1958, also now abandoned.

The present application is also a continuation-in-part of my application Serial No. 17,550, filed March 25, 1960, now abandoned.

The invention relates to fluid dispensing means and particularly to apparatus for dispensing compressed fluid in measured quantities from a cylinder containing compressed fluid.

The invention has among its objects the provision of a novel, simple and economical fluid dispenser.

Another object of the invention lies in the provision of a fluid dispenser which is simply operated to open an initially sealed supply of fluid under pressure and is simply controlled thereafter so as selectively to dispense predetermined quantities of fluid. Another object is to dispense fluid from high pressure cylinders safely and to provide pressure reducing means acting as a safety valve.

Another object of the invention resides in the provision of a fluid dispenser of the above indicated character which is compact, easily portable, safe and durable.

Another object of the invention is to supply oxygen as needed where needed.

It is known to compress gases within small metal cylinders and to penetrate these cylinders to release the gases into other chambers for use. Examples of this practice are the impregnating of water with carbon dioxide to make the charged water called club soda and, as discussed in my prior Patent No. 2,729,124, dated January 3, 1956, to remove corks from bottles without disrupting the cork.

It is an object of this invention to improve upon my own prior apparatus for dispensing compressed fluids in selected quantities from cylinders containing fluids under pressure.

Another object is to provide fluid dispensing apparatus which is readily dismantled and is composed of readily replaceable parts.

Another object of the invention is to utilize pressure fluid cylinders to atomize liquids. For example, when it is desired to spray a room with an insecticide or a disinfectant the standard method is to use an atomizer actuated by a squeeze bulb, a method imperfect in itself because it does not produce a continuous and even atomization, and which is ineffective when the space to be filled is large.

Another example of the novel use is in the operation of garden sprays. A standard method now used is to partly fill a large can with the liquid spray, then manually pump up the remaining spaces with air under pressure, then dispense the spray as long as the pressure lasts. This is intermittent and relatively unsatisfactory.

The invention is applicable to all such uses and provides improved operation in each of them, delivering gas in whatever quantities are needed, as needed and always under the control of the operator.

The above and further objects and novel features of the invention will more fully appear from the following description when the said description is read in connection with the accompanying drawings. It is to be expressly understood, however, that the drawings are for the purpose of illustration only and are not intended as a definition of the limits of the invention.

In the drawings, wherein like reference characters refer to like parts throughout the several views:

FIG. 1 is a longitudinal sectional view of a fluid dispenser in accordance with the invention;

FIG. 2 is a cross-sectional view, taken substantially in the plane of the line 2—2 in FIG. 1;

FIG. 3 is a fragmentary longitudinal sectional view showing a modified embodiment of the invention; and

FIG. 4 is a fragmentary sectional detail showing the needle valve member connected to a hose adapter.

Referring now to the accompanying drawings in detail, more particularly to FIGS. 1 and 2, the fluid dispenser is designated generally by the reference numeral **10** and comprises an elongated casing generally designated **11**, which includes a body or valve housing portion **12** adapted to receive and house an axially reciprocable needle valve member **13** which is normally biased to closed position. One end portion of the body **12** is screw-threaded as at **14** to receive an end cap **15** having a central bore **15'** through which an extension of the hollow needle valve member **13** slidably projects outwardly from the casing, as shown. The other end portion of the valve housing portion **12** is screw-threaded as at **16** to receive an elongated cap or cartridge housing member **17**, the outer end of which, in turn, is screw-threaded as at **18** to receive an end cap **19**. Suitable gaskets **20**, **21**, respectively, are provided between the cartridge housing member **17** and the valve housing member **12**, and between the cap **19** and the elongated cap member **17**.

The elongated cap member **17** serves as a housing for a conventional cartridge **22** (shown by dotted lines), containing fluid under pressure, such as CO^2, which fluid is adapted to be released from the cartridge in controlled quantities by retraction of the normally closed needle valve member **13** against the action of suitable biasing means.

The end portion of the cartridge housing member **17** which is threadedly connected at **16** to the valve housing body portion **12** is internally screw-threaded as at **23** to receive a plug or abutment **24**, formed with a central fluid passage or conduit **25** having a frusto-conical end portion which forms a seat **26** for a tapered, pointed end portion **27** of the hollow needle valve member **13**. The side of the plug **24** facing the cap member **17** is provided with a recess **28** to receive the neck **22'** of the cartridge **22**, the recess **28** being annular and surrounding a piercing point or needle **29** which is formed integrally with the plug **24** and has the aforementioned fluid passage **25** extending therethrough. With the plug **24** in position in the elongated cap member **17**, when the cartridge **22** is inserted in said cap member and the end cap **19** is screwed home, the point **29** will pierce the usual, rupturable diaphragm or end wall (not shown) in the neck **22'** of the cartridge, so that the compressed fluid in the cartridge may escape through the passage **25** in plug **24**, subject to flow control by the needle valve member **13** in cooperation with its seat **26** in the plug **24**.

The needle valve member **13** is normally biased toward its seat **26** by suitable biasing means, herein shown as a compression spring **30**, one end of which abuts an annular shoulder **31** provided in the body **12**, while its other end bears against a piston **32** which is slidable in a tubular liner **33**, disposed in a cylindrical cavity **34** which exists in the body **12** between the shoulder **31** and the plug **24**. As shown, the piston **32** is provided with an annular seat **35** to receive the spring **30**. The spring **30** urges the piston **32** against a keeper ring **36** which is seated in an annular groove (not shown) formed in the outer surface of the needle valve member **13**, thus biasing the pointed

end portion 27 of the needle valve member against the tapered seat 26.

It will be observed that the needle valve member 13 is provided with an axial passage 37, the outer end of which opens laterally to provide a fluid discharge port 37' while its inner end similarly opens laterally to provide a fluid receiving port 37'' communicating with the interior or chamber 40 of the tubular liner 33, between the piston 32 and the plug 24. Thus, when the needle valve member 13 is drawn against the action of the spring 30 so as to unseat the pointed end portion 27 of the neeedle valve members from the seat 26, fluid under pressure will flow from the cartridge 22 through the passage 25 into the chamber 40 and through the lateral needle opening 37'' into the needle passage 37, for discharge at the outer end of the needle through the lateral opening 37'. As shown, the outer end portion of the needle valve member 13 is pointed as at 41 to facilitate penetration of corks, tire casings, et cetera, to which the fluid dispenser is applied.

Sliding of the needle valve member 13 against the action of the spring 30 to unseat the valve means 26, 27 is effected by retracting means indicated generally by the numeral 42, the same comprising a lever 43 which is pivotally mounted on a transverse pin 44 in the body 12. The pin 44 traverses a slot 45 through which the lever 43 projects outwardly from the body 12, the outer end of the lever having fixed thereto a suitable finger-piece 46 adapted for manual actuation. The inner end of the lever 43 is bifurcated to form a yoke 47 to engage a pair of pins 48 which project diametrically to opposite sides from the needle valve member 13, it being apparent that when the finger-piece 46 is depressed or pressed toward the body 12, the needle valve member 13 will be retracted against the action of the spring 30 so as to unseat the needle portion 27 from the seat 26. By depressing the finger-piece 46 to a greater or lesser extent, the unseating of the needle valve member may be effectively controlled, so as to increase or decrease the rate of flow of fluid from the cartridge 22, or to completely stop such fluid flow when the needle valve member is fully engaged with the seat 26 by the spring 30.

The outer surface of the body 12 may have secured thereto, as by screws 47, a suitable resilient clip or keeper 48, adapted to engage the finger-piece 46 in its undepressed position and safeguard the same against accidental depression, such as would cause undesired or unnecessary escape of fluid from the cartridge 22. However, when the device is to be operated and manual pressure is applied to depress the finger-piece 46, the resilient yieldability of the clip or keeper 48 makes retraction of the needle valve member possible.

The modified embodiment of the invention shown in FIG. 3 is substantially the same as that already described, with the exception that the outer end of the cap member 17*a* has a closed end wall 19*a*, rather than being provided with a removable, screw-threaded end cap 19 as is the cap member 17 in the embodiment of FIGS. 1 and 2. In the instance of the embodiment of FIG. 3, the plug 24 is screw-threaded as at 49 into the valve housing member of body 12*a* rather than into the cartridge housing or cap member 17*a*, and the cap member 17*a* is screw-threadedly conected to the body 12*a* as at 50. This arrangement permits the cap member 17*a* to be separated from the body 12*a* while the plug 24 remains in place in the body, whereupon the cartridge 22 may be inserted in the cap member 17*a* so that when the cap member is subsequently screwed onto the body, puncturing of the cartridge by the plug point 29 will take place. The functional distinction arising from this structural modification is that the elongated cap member 17*a*, when turned by hand, offers a greater gripping facility for forcing the point 29 to puncture the cartridge, than is provided by the relatively smaller end cap 19 in the embodiment of FIGS. 1 and 2.

FIG. 4 illustrates a needle valve member 13*a* with an axial fluid passage 37 extending therethrough, the passage being open at the pointed end of the needle valve member. The pointed end portion of the latter may be inserted in a suitable adapter 51 connected to a hose or the like 52, which in turn may be connected to an atomizer, life preserver, or other apparatus designed to use fluid under pressure received from the cartridge 22. As shown, the adapter 51 is provided with a rubber insert 53 having a passage extending therethrough and connected at one end with the hose passage and at its other end adapted to snugly receive the pointed end portion of the needle valve member 13*a*.

Operation

The operation of the device will be largely apparent from the foregoing specific description of parts; a suitable cartridge containing fluid under pressure having been inserted in the housing portion 17 or 17*a* of the tubular dispenser casing 11 and said cartridge housing portion having been assembled by screwing the same into the valve housing portion 12 of the dispenser, a fluid tight fit is provided. The penetrable end of the cartridge having been punctured fluid can escape only through the passage 25 in the plug 24 after the tapered needle valve portion 27 has been withdrawn against the biasing force of the spring 30. When the needle valve 27 has been withdrawn in whole or in part a predetermined quantity of fluid passes into chamber 40 and thence through the port or opening 37'' into the axial conduit 37 passing through the hollow stem portion of the needle valve member 13 and out through the lateral opening 37' which, it will be noted, is outside the dispenser casing 11. The pointed portion 41 at the exterior end of the needle valve member 13 may be used to penetrate a cork or the like as in my prior Patent No. 2,729,124, and thus the device is adapted to serve as a cork extractor in the manner set forth in said patent.

If desired the dispensing device may be used with an adapter as illustrated in FIG. 4, and thus may be employed as or in connection with an atomizer to spray insecticide, disinfectant or other suitable fluid, either gaseous or liquid, as may be desired.

The invention has been described in detail for the purpose of illustration, but it will be obvious that numerous modifications and variations may be resorted to without departing from the spirit of the invention as defined in the following claims.

What is claimed is:

1. Apparatus for dispensing controlled quantities of fluid under pressure from a cartridge having a penetrable end, said apparatus comprising a housing including a valve housing portion and a portion adapted to receive and support a cartridge with its penetrable end directed toward the valve housing portion, a sealing plug in said housing intermediate the valve housing and cartridge supporting portions, said plug having a passage extending axially therethrough and having a hollow puncturing needle disposed toward the penetrable end of the cartridge and in axial alignment with said passage, means for moving said cartridge axially relative to the needle to penetrate said penetrable end, spring biased valve means within said valve housing portion, including a tapered end portion adapted in one position to snugly fit said passage through said plug to close the same, and means for retracting said valve means against the force of said spring any predetermined distance, whereby accurately controlled quantities of fluid may be released from said cartridge, said valve means including a dispensing tube terminating at one end in said conical valve member, a piston on said tube in sealing engagement with the valve housing portion of said housing member and in spaced relation to said conical valve member, and port means in said dispensing tube between the piston and said valve member.

2. An apparatus for dispensing controlled quantities of high pressure fluid from a cartridge having a penetrable part end, said apparatus comprising a housing member including a cartridge holding portion and a valve housing portion, said cartridge holding portion being adapted to support said cartridge axially within the housing with the penetrable end directed toward the valve housing portion, a transverse plug in said housing intermediate the cartridge holding and valve housing portions, said plug having a passage extending axially therethrough and a hollow port puncturing needle member communicating with said passage and directed toward the penetrable port end of the cartridge when mounted in said housing, means for moving said cartridge toward the needle to effect puncture of the port end of the cartridge, and spring biased valve means for opening and closing the passage through said plug including an axially reciprocable conical valve member adapted in one extreme position to snugly fit in the passage of said plug to close the same under the influence of said spring, and adapted in another position to permit fluid to flow through the passage through said plug, said spring serving to normally hold the valve snugly in said passage, and means for retracting said conical valve member any desired distance against the bias of said spring, whereby accurately controlled quantities of fluid under pressure may be dispensed from said cartridge, said valve means including a dispensing tube terminating at one end in said conical valve member, a piston on said tube in sealing engagement with the valve housing portion of said housing member and in spaced relation to said conical valve member, and port means in said dispensing tube between the piston and said valve member.

3. Gas dispensing apparatus comprising a housing having a cylindrical part adapted to receive a gas container, a cap means adapted to force a gas container forward in the said part, an abutment, removably mounted in the cylindrical part opposite the cap means, having penetrating means projecting from one face toward the cap means, a valve seat in the opposite face of the abutment and conduit means extending from the valve seat through the penetrating means, valve means comprising a cylindrical body adapted to be joined hermetically to the housing and including a dispensing tube having an end portion in sealing engagement with the valve seat in the closed position of said valve means, a piston mounted on the tube in sealing relation with the cylindrical body and in spaced relation to the valve seat, port means in the dispensing tube between the piston and the said end portion, spring means bearing on the piston and loading the valve to closed position, and valve operating means comprising a lever mounted on the valve body operatively connected to the dispensing tube and adapted to overcome the spring means and open the valve.

4. Gas dispensing apparatus comprising a housing having a cylindrical part adapted to receive a gas container, a cap means adapted to force a gas container forward in the said part, an abutment, removably mounted in the cylindrical part opposite the cap means, having penetrating means projecting from one face toward the cap means, a valve seat in the opposite face of the abutment and conduit means extending from the valve seat through the penetrating means, valve means comprising a cylindrical body adapted to be joined hermetically to the housing and including a dispensing tube having an end portion in sealing engagement with the valve seat in the closed position of said valve means, a piston mounted on the tube in sealing relation with the cylindrical body and in spaced relation to the valve seat, port means in the dispensing tube between the piston and the said end portion, spring means bearing on the piston and loading the valve to closed position, and valve operating means engaged with the valve means.

5. Gas dispensing apparatus comprising a housing having a cylindrical part adapted to receive a gas container, a cap means adapted to force a gas container forward in the said part, an abutment, removably mounted in the cylindrical part opposite the cap means, having penetrating means projecting from one face toward the cap means, a valve seat in the opposite face of the abutment and conduit means extending from the valve seat through the penetrating means, valve means comprising a cylindrical body adapted to be joined heremetically to the housing and a dispensing tube having an end portion in sealing engagement with the valve seat in the closed position of said valve means, a piston mounted on the tube in sealing relation with the cylindrical body and in spaced relation to the valve seat, port means in the dispensing tube between the piston and the said end portion, means bearing on the piston and loading the valve to closed position, and valve operating means engaged with the valve means.

6. Gas dispensing apparatus comprising a housing having a part adapted to hold a gas container, an abutment removably mounted in the said part having penetrating means projecting toward the container, means adapted to force a gas container against the penetrating means, a valve seat in the opposite face of the abutment and conduit means extending from the valve seat through the penetrating means, valve means comprising a cylindrical body adapted to be joined hermetically to the housing and a dispensing tube having an end portion in sealing engagement with the valve seat, a piston mounted on the tube in sealing relation with the cylindrical body and in spaced relation to the valve seat in the closed position of said valve means, port means in the dispensing tube between the piston and the said end portion, means bearing on the piston and loading the valve to closed position, and valve operating means engaged with the valve means.

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