Oct. 1, 1968 H. R. LANDIS ET AL 3,403,820

LIQUID DISPENSING APPARATUS

Filed May 3, 1965 2 Sheets-Sheet 1

Fig. 1

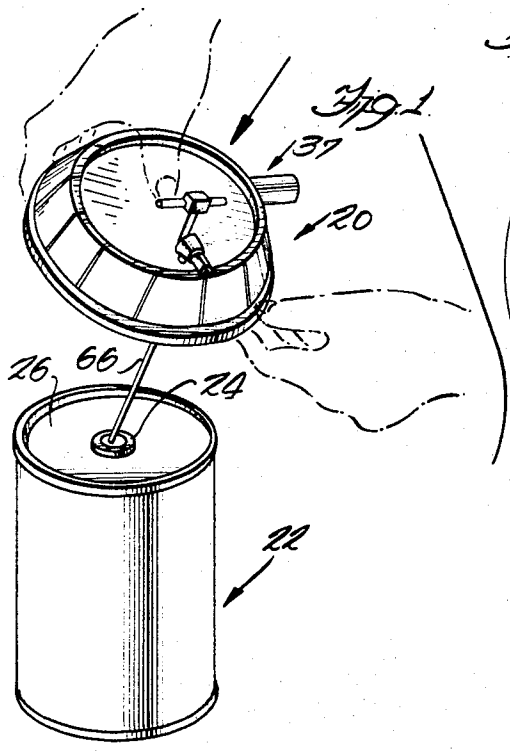


Fig. 2

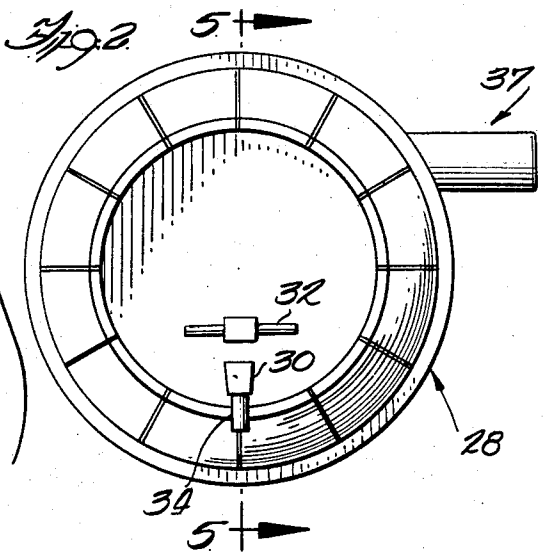


Fig. 4

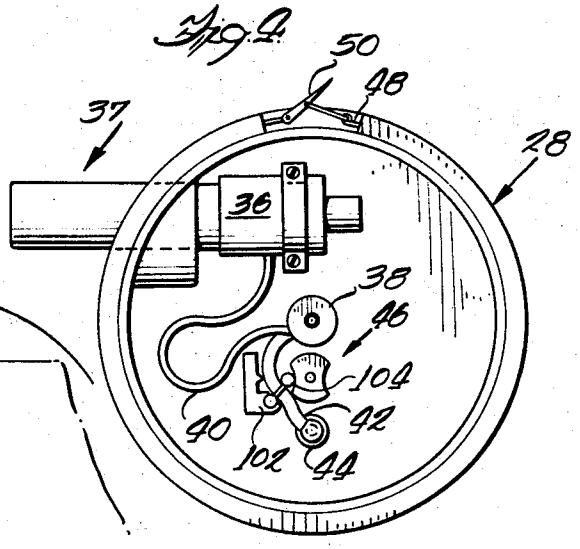
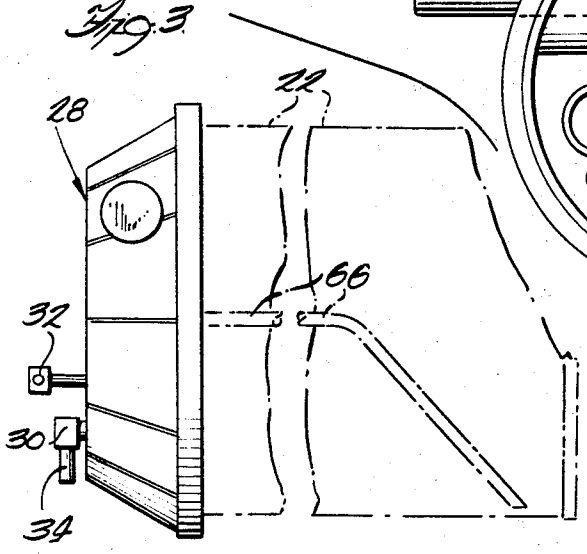


Fig. 3



Inventors
H. Richard Landis
Stanley J. Grzyck
Edwin F. Adams
Attorney

Oct. 1, 1968 H. R. LANDIS ET AL 3,403,820

LIQUID DISPENSING APPARATUS

Filed May 3, 1965 2 Sheets-Sheet 2

Fig. 5

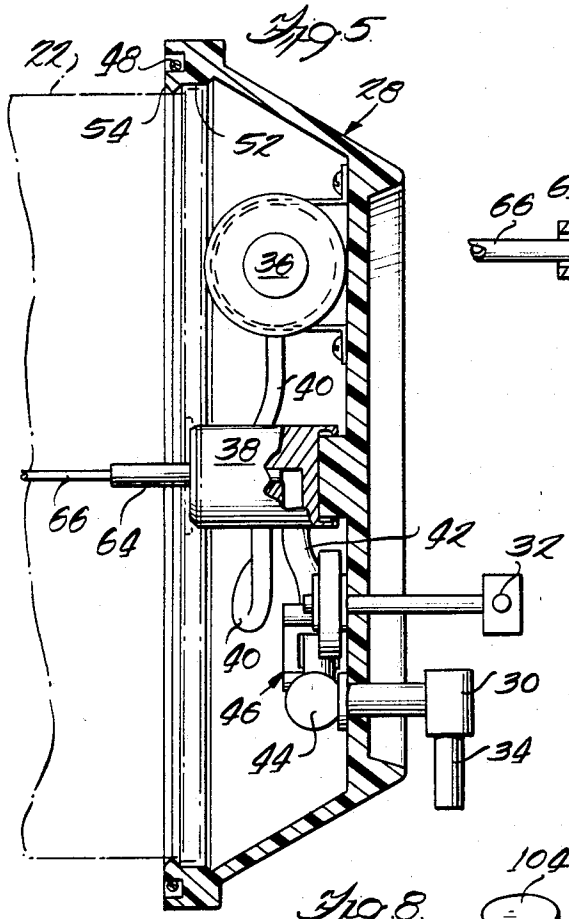


Fig. 6

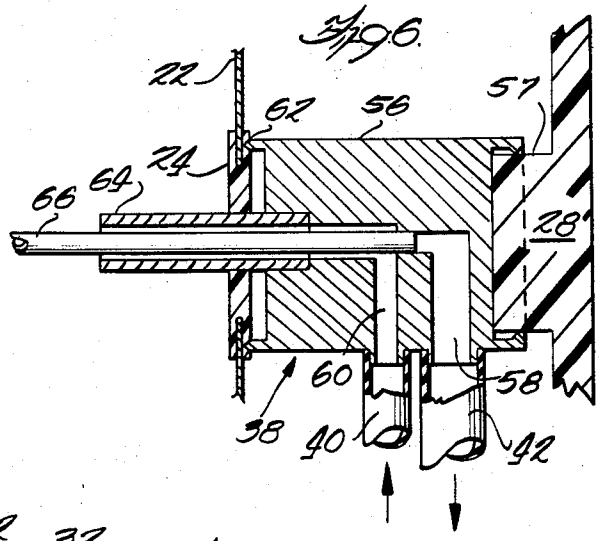


Fig. 9

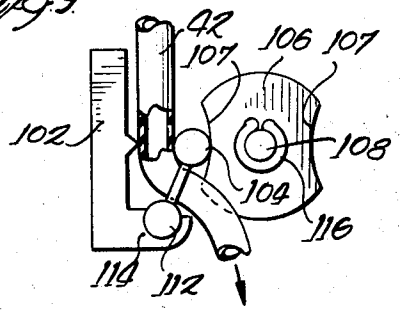


Fig. 8

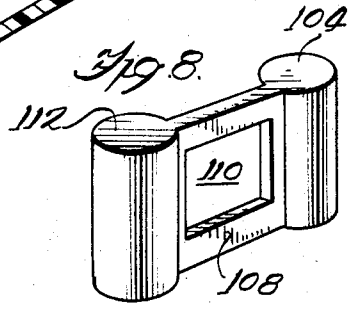


Fig. 10

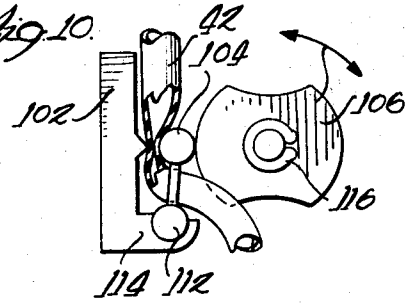
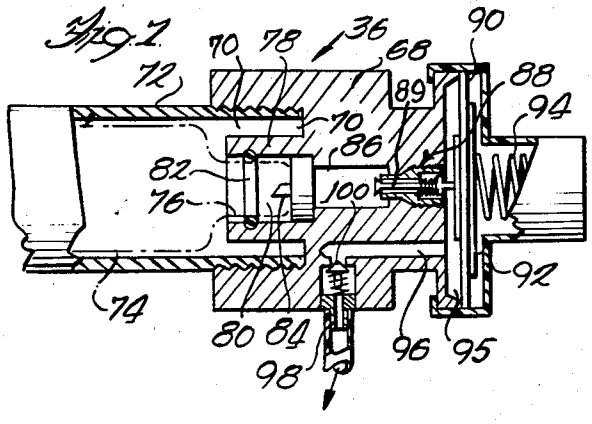


Fig. 7



Inventors
H. Richard Landis
Stanley J. Przyck
Leon F. Adams
Attorney

United States Patent Office 3,403,820 Patented Oct. 1, 1968

3,403,820

LIQUID DISPENSING APPARATUS

H Richard Landis, Oak Lawn, Ill., and Stanley J. Grzych, Schererville, Ind., assignors to Landis Tile & Manufacturing Corp., Chicago, Ill., a corporation of Illinois

Filed May 3, 1965, Ser. No. 452,799
1 Claim. (Cl. 222—61)

This invention relates generally to an apparatus for dispensing a liquid and more particularly to an apparatus for pressurizing a container of liquid and allowing the liquid to be selectively drawn.

There has recently developed a demand for draft beer which may be stored and served in the home. Present draft beer systems involve the use of kegs which are sold pressurized and are thus strong and heavy in construction. The market, however, for home use preferably requires a small expendable container. To dispense the beer from the container there is needed an inexpensive liquid dispensing apparatus which has a source of high pressure gas to dispense the liquid. A separate gas source obviates the requirement of a prepressurized container thus allowing the use of lightweight containers. While this invention was developed to fill the above-described need, it will be apparent that it may be generally used for dispensing liquids of any type.

One object of this invention is to provide an apparatus for pressurizing a container of liquid from a high-pressure gas source and allowing liquid to be selectively drawn from the container under a constant pressure.

Another object of this invention is to provide an apparatus of the above-stated type including a simple regulating means to subject the liquid to a substantially constant preselected gas pressure.

Still another object of the present invention is to provide an apparatus of the above-stated type wherein the gas source is in cartridge form and may easily be connected to the apparatus for operation and disconnected when expended.

A further object of the present invention is to provide an apparatus of the above-stated type which may be selectively but securely attached to the container so that the sealed fluid communication between the container and the apparatus may not be easily disrupted during operation.

A still further object of the present invention is to provide an apparatus of the above-stated type having a simple valve means for selectively opening and closing the liquid passage from the container to the spigot and which may be easily flushed out to prevent sediment from forming in the apparatus after it is used.

One more object of the present invention is to provide an apparatus of the above-stated type having a flexible gas-carrying hose connecting said high-pressure gas source and said container interior so that upon a malfunction creating an over-pressure, the hose will burst at a lower pressure than the container bursting pressure and thus act as a safety relief valve.

Still another object of the present invention is to provide an apparatus of the above-stated type wherein the bulk of the apparatus components may be formed of plastic material so as to minimize costs in material as well as manufacture.

For a better understanding of the invention together with other further objects thereof, reference should now be made to the following detailed description which is to be read in conjunction with the accompanying drawing in which:

FIGURE 1 is a perspective view showing a liquid dispensing apparatus being mounted on a cylindrical-shaped container:

FIGURE 2 is a front elevational view of the liquid dispensing apparatus;

FIGURE 3 is a side elevational view of the liquid dispensing apparatus shown mounted on a cylindrical-shaped container;

FIGURE 4 is a rear elevational view of the liquid dispensing apparatus;

FIGURE 5 is a sectional side elevational view of the liquid dispensing apparatus taken along line 5—5 of FIGURE 2;

FIGURE 6 is a detailed sectional view of the fluid distribution housing;

FIGURE 7 is a perspective view of a pivotal pinching element;

FIGURE 8 is a sectional side elevation view of a gas regulator;

FIGURE 9 is a plan view of the liquid dispensing apparatus valve means shown in the open position; and

FIGURE 10 is a plan view of the liquid dispensing apparatus valve means shown in the closed position.

Referring now to FIGURE 1, there is shown a liquid dispensing apparatus **20** being mounted on a cylindrical-shaped container **22**. Container **22** has a frangible sealing element **24** centrally located in the flat end **26** thereof. As seen in FIGURES 2 and 3, the liquid dispensing apparatus comprises a base **28** having a liquid dispensing spigot **30** and a valve handle **32** mounted on its front face. The spout **34** of the spigot **30** is mounted with respect to base **28** such that when the base **28** is in a vertical position the spout is downwardly directed.

In FIGURES 4 and 5 there is shown the rear face of base **28** on which is mounted, generally, gas regulating means **36**, a high pressure gas source **37**, a fluid distribution housing **38**, a fluid communication means or flexible hose **40** connecting the gas regulating means **36** and the housing **38**, a second flexible hose **42** connecting housing **38** and rear portion **44** of a spigot **30** extending from the rear face of base **28** and means **46** for preventing fluid flow through hose **42**. Base **28** is adapted to be secured over the flat end of a cylindrical-shaped container and held thereto by latch means including a ring **48** and over-center latch **50**. As seen best in FIGURE 5, the interior lip **52** of the base **28** has a circumferential sealing dimple **54** which is positioned concentrically within the securing ring **48** so that as the circumference of ring **48** is decreased by latch **50**, the sealing dimple **54** will securely grasp container **22**.

The fluid distribution housing **38** comprises a body **56** secured at one end to an extension **57** on the rear face of base **28**. Disposed within body **56** are two fluid passages **58** and **60**. The passages **58** and **60** are formed through one of the side walls of the body **56** to the center of the body and then along the axis thereof. The outer end of body **56** is formed with a sealing ring **62** thereon for sealing the housing **38** against the frangible sealing element **24** of the cylindrical-shaped container **22**. Fluid passage **60** is formed with an increased diameter at its one end so as to receive a gas carrying tube **64** which is adapted to extend through frangible sealing element **24** into the liquid container **22**. A liquid carrying tube **66** is concentrically mounted within gas carrying tube **64** and is connected at one end to fluid passage **58**. As seen in FIGURE 3, the tube **66** is of greater length than tube **64** and is bent so that it is free and is in proximity to the curved side well of container **22**. The passage **58** is connected to the flexible hose **42** for passing liquid from container **22** through tube **66** and passage **58** into hose **42**. The passage **60** is connected to a hose **40** so that the interior of cylindrical container **22** is in fluid communication through tube **64** and passage **60** with hose **40**. Since the tubes are concentrically positioned, only the larger diameter tube **64** need be sealed by frangible sealing element **24** so as to minimize any gas leakage from the container **22**.

The gas regulating means **36** comprises a body **68** hav-

ing an interiorly threaded chamber **70** for receiving a gas cartridge holder **72**. Gas cartridge holder **72** contains a high pressure carbon dioxide gas source in a cartridge **74** having a head portion **76** and an opening in head **76** sealed by a frangible element. Gas regulator body **68** includes a cylindrical portion **78** within chamber **70** having a chamber **80**. A sealing ring **82** is disposed on the inner surface of cylinder **78** and a cartridge piercing element **84** protrudes into the chamber **80**. A chamber **86** disposed within body **68** to the rear of chamber **80** and valve means **88** mounted at the rear of chamber **86** including a valve stem **89** normally biased in a closed position and one end thereof abutting a flexible diaphragm **90**. A stop element **92** is mounted on the opposite side of diaphragm **90** engaging a spring member **94**. Another chamber **95** defined in part by diaphragm **90** is in fluid communication with chamber **86** when valve stem **89** is opened and a fluid passage **96** connects chamber **95** with outlet **98** which is in fluid communication with the interior of container **22**. A spring mounted check valve **100** is positioned in passage **96** for preventing any liquid in container **22** from entering chamber **95** in the event that the gas in cartridge **74** is exhausted and the container is oriented so that liquid may enter tube **64**.

Means **46** for preventing fluid flow through hose **42** comprises a first pinching element **102** mounted on base **28**, a second pinching element **104** pivotally supported by base **28** and a cam element **106**. The first pinching element **102** is fixedly mounted on one side of flexible hose **42** and the second pinching element **104** is movably disposed on the other side of flexible hose **42** and opposite first pinching element **102**. The second pinching element **104** is supported by a frame **108** having an opening **110** therein through which flexible hose **42** passes. Frame **108** is connected to pivotal mounted element **112** within the lower portion **114** of first pinching element **102**. Cam **106** is mounted on a shaft **108** rotatably secured in base **28** and having one end extending from the front face of base **28** to which is attached handle **32** and the other end extending from the rear face of base **28** and carrying cam **106**. The cam **106** is secured to shaft **108** by means of a snap ring **116**.

The liquid dispensing apparatus is secured to the liquid container from which the liquid is to be dispensed and operated in the following manner. Tubes **64** and **66** are inserted in the passages **58** and **60** of fluid distribution housing **38**. Tube **66** is aligned so that the bent portion of the tube is in the same vertical plane as defined by the handle **32** and the spigot **30**. The free end of tube **66** is forced through frangible sealing element **24** so as to extend within container **22** and the apparatus **20** is fitted over the flat end **26** of container **22** such that gas carrying tube **64** also extends into container **22**. A latch **50** is secured so that ring **48** is tightened so as to firmly attach base **28** to the liquid container **22**. A gas cartridge **74** is inserted into holder **72** and the holder threadably engages housing **68** of gas regulating means **36**. As the holder **72** engages gas regulator body **68**, the threaded advancement forces piercing element **84** to open cartridge **74** so as to produce a gas flow. In the absence of gas pressure in container **22** (and chamber **95**), spring **94** normally biases diaphragm **90** so that valve stem **89** is in an open position whereby chambers **86** and **95** are in fluid communication. High pressure gas flowing from cartridge **74** will therefore fill chamber **95** from which the gas will flow past check valve **100** into container **22**. The force of spring **94** is predetermined so that when the pressure chamber **95** reaches the desired predetermined pressure, such pressure will overcome the force of spring **94** forcing diaphragm **90** to a normal position so as to close valve means **88**. When liquid is drawn from container **22**, the gas pressure in container **22** will be reduced so as to create a pressure differential across check valve **100** partially exhausting chamber **95** causing spring **94** to deform diaphragm **90** which will open valve stem **89** allowing high pressure gas to refill chamber **95** and container **22** to re-establish the predetermined pressure.

The liquid in container **22** is forced by the gas pressure through tube **66**, passage **58**, and into liquid carrying flexible hose **42**. To dispense liquid from spigot **30**, handle **32** is rotated so that the indented portions **107** of cam **106** are in contact with second pinching element **104**. In this position, as shown in FIGURE 9, liquid is free to flow through hose **42** through spigot **30** and out of spout **34**. To prevent fluid flow through tube **42**, the handle **32** is rotated so that the high portion of cam **106** forces the second pinching element **104** against hose **42** so as to collapse the latter between pinching element **104** and fixed pinching element **102**.

As liquid is removed from container **22**, the gas pressure in the container will temporarily decrease but such pressure differential will be immediately restored through gas regulating means **36** so that the pressure within container **22** is maintained constant. When used for dispensing draft beer, as recommended by most beer manufacturers, the gas regulating means **36** will maintain a constant pressure of 12 p.s.i. within container **22**.

As seen in FIGURE 3, the liquid dispensing apparatus will be normally positioned such that the liquid container **22** will rest on its curved side during the dispensing operation and thus the bend in tube **66** when properly aligned will insure the removal of all of the liquid from container **22**. When all of the liquid is dispensed, any residual gas in high pressure gas source **37** may be vented to the atmosphere and the cartridge **74** may be removed and thrown away. It will be apparent that the cartridge gas volume is suitably chosen with respect to the size of the liquid container, the desired pressure to be maintained within the container and other pertinent factors.

After using, the apparatus may be easily cleaned by removing tubes **64** and **66** and flushing out the liquid passage **58**, flexible hose **42** and spigot **30**. Unlike present beer dispensing apparatus, the simple valve arrangement of the present invention makes the return of the apparatus to the beer manufacturer for sterilization unnecessary.

The above-described embodiment of liquid dispensing apparatus is but the preferred form of applicants' invention, it being contemplated the applicants be limited only by the appended claim.

We claim:

1. An apparatus for dispensing liquid from a cylindrical-shaped liquid container having a frangible sealing element centrally located in the flat end thereof, comprising in combination:

(a) a circular-shaped base adapted to be secured to the flat end of the cylindrical-shaped liquid container having the frangible sealing element centrally located therein,

(b) means for detachably securing said base to the container,

(c) a spigot mounted on the outside surface of said base and a portion thereof extending through said base and protruding from the inside suface thereof,

(d) gas regulating means mounted on the inside surface of said base for maintaining a constant gas pressure within said container,

(e) a high pressure gas source mounted on the inside surface of said base and in fluid communication with said gas regulating means,

(f) a distribution housing carried by the inside surface of said base having two fluid passages formed therein,

(g) a gas carrying tube extending from a first of said fluid passages through the container frangible sealing element into the container,

(h) a liquid carrying tube extending from a second of said fluid passages concentrically through said gas carrying tube and into the container, said liquid carrying tube being longer than said gas carrying

tube and bent so that the free end thereof is proximate a curved side wall of the container,

(i) a check valve in fluid communication with said gas regulating means,

(j) a gas carrying hose connecting said check valve with said housing first fluid passage,

(k) a liquid-carrying hose interconnecting said spigot portion protruding from the inside surface of said base and said housing second fluid passage,

(l) a first pinching element fixedly mounted on the inside surface of said base on one side of said liquid carrying hose,

(m) a second pinching element pivotally mounted on the inside surface of said base on the other side of said liquid carrying hose and opposite said first pinching element,

(n) a shaft rotatably mounted through said base and extending from both surfaces of said base,

(o) a handle mounted on the end of said shaft extending from the outside surface of said base, and

(p) a cam mounted on the end of said shaft extending from the inside surface of said base, said cam being

rotatable by manually turning said handle and thereby selectively moving said second pinching element against said liquid carrying hose with sufficient force to collapse said liquid carrying hose between said first and second pinching elements whereby liquid is prevented from passing therethrough.

References Cited

UNITED STATES PATENTS

2,571,433	10/1951	Fine et al.	222—182
3,195,788	7/1965	Wilson	222—399
3,239,102	3/1966	Heydon et al.	222—399 X
3,240,392	3/1966	Nicko	222—82
3,243,085	3/1966	Wilson	222—399 X
3,291,343	12/1966	Tracy et al.	222—399 X

FOREIGN PATENTS

1,038,271	5/1953	France.

ROBERT B. REEVES, *Primary Examiner.*

F. R. HANDREN, *Assistant Examiner.*