May 20, 1969 G. C. BULL 3,445,043

DISPENSING APPARATUS

Filed Jan. 12, 1967

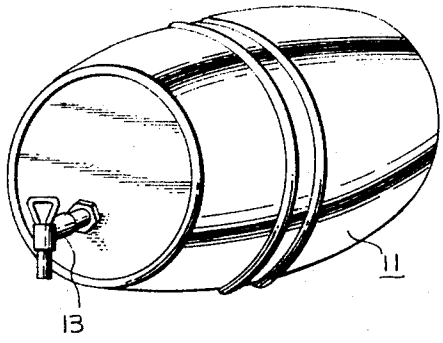


FIG. 1

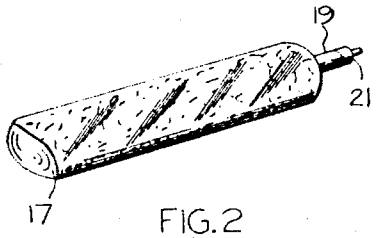


FIG. 2

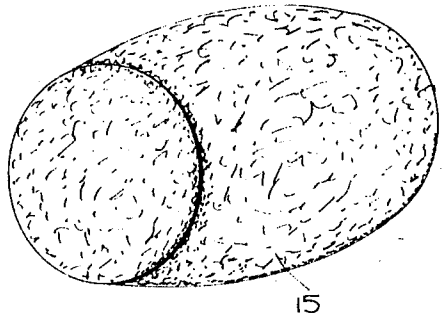


FIG. 3

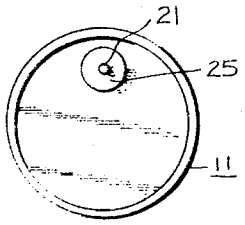


FIG. 4

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DISPENSING APPARATUS

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U.S. Cl. 222—386.5 9 Claims

ABSTRACT OF THE DISCLOSURE

A container for fluent materials includes a compressible mass for exerting controllable pressure on the fluent material for dispensing said material; an impervious flexible barrier being also provided to prevent intermingling of the fluent material and compressible mass.

This invention relates to storage containers and to dispensers for fluent materials contained therein.

By way of example, the invention will be described in its applications to the dispensing of a beverage, such as beer. A compressible mass, for example a polyurethane sponge, is disposed in a flexible impervious bag which is fitted with a closure or a valve. The combination sponge and bag are compressed or rolled up, as much as 30–1, e.g., thereby decreasing the sponge volume and normal volume of air in the bag.

The valve is closed and the bag and sponge remain in the compressed condition. This structure is then inserted inside the beverage container with the valve being sealed therethrough for operation externally of the container. When it is desired to apply pressure to the fluent material in the container, the valve is simply opened to the atmosphere and the air rushes in to replace the displaced air and the sponge expands toward its orginial condition so that pressure is more or less uniformly applied to the fluent material for dispensing purposes. The compressible mass would normally expand to substantially the same volume as the container in order that all of the fluent material would be dispensed. However, compressible masses of several times the volume may be employed to increase the dispensing pressure.

The subject invention is an improvement over by Patent No. 3,235,138 entitled "Dispensing Container" and issued Feb. 18, 1966. In the referenced patent, I dispense fluent materials such as paint, wherein the materials are employed to compres the compressible mass which is exhausted to atmosphere. Dispensing pressure provided by the potential energy of the compressed mass endeavoring to expand itself to its original condition is stored in the compressed mass and exerts continuous pressure on the fluent material in the container. In this patent, there is disclosed no arrangement for compressing the compressible mass in the bag and retaining the same in such reduced size as to permit the insertion of the bag and mass into a container with the valve externally accessible or operable in order that the purchaser or user may open the valve and apply the dispensing pressure, at will.

Thus, the present invention enables the employment of mass production techniques to manufacturing and/or for inserting the dispensing means for the dispensing of fluent materials, such as beverages from containers. It is possible to compress and lock the compressible mass in the bag automatically and aso insert the structure within the container with or without the sealing operation for exposing

the valve to atmosphere and making it accesible externally or exteriorly of the container.

It may thus be appreciated that it is entirely unnecessary to compress the compressible mass through pressure applied by the fluent material to be dispensed, and of course, the invention permits the handling of the stored energy dispenser independently such that tremendous compressing pressures may be employed to increase the amount of available stored energy for dispensing purposes. The invention also enables control of when the ultimate user may actuate the valve to apply the dispensing pressure.

With the foregoing features in mind, it is an object of the invention to provide a stored and locked energy dispenser.

A further object is the provision of such a dispenser capable of extreme compression through the use of an automatic machine and the locking of the compressible mass in such a compressed state.

It is another object of the invention to provide dispenser means which are effective by virtue of air removal resiliency for triggering expansion of the mass to apply dispensing pressure.

Another object of the invention is the provision of such dispensing means wherein the time of application of the dispensing pressure may be determined at will.

With the foregoing in mind, the invention will be described in detail in connection with the drawing wherein:

FIG. 1 shows a typical beer container in perspective,

FIG. 2 illustrates the compressible mass rolled up or compressed in the bag in it stored energy state,

FIG. 3 shows the compressible mas expanded to substantially the size of the container of FIG. 1 and,

FIG. 4 is a rear view of the container of FIG. 1 to show in a preferred embodiment, a valve exposed to the atmosphere and a manner of introducing the sponge or mass and bag into the container.

Referring now to the drawing, there is shown a container **11** having a spigot **13**, for draining the contents therefrom. It is desired that the beverage always be under pressure at the spigot **13** in order that it may be drawn, with or without a head thereon, to empty the contents of the barrel **11**.

It is for this purpose that the sponge **15** is provided. While the sponge **15** is shown of generally the configuration of the barrel **11**, this is not necessarily a requirement but it is a feature which enables the fluent material to be totally or almost totally dispensed from barrel **11**. The sponge material **15** may initially, if desired, be several times the size of the container **11** to apply maximum pressure to the fluent material to be dispensed therefrom and to assure removal of all of the contents from the container. It depends upon the density and material employed, how much pressure can be potentially stored in the compressed sponge **15**. For example, polyurethane is employed in the manufacture of sofas. Such sofas may be purchased with a very soft cushion or a very hard cushion, usually the greater the energy required to compress the material, the greater the potential or stored energy for expansion.

A sponge **15** may be manufactured from such materials as polyurethane, polythene, polyvinyl chloride or other synthetic, natural, or plastic materials which provide sufficient storage pressure for the dispensing operation.

For example, certain materials are satisfactory for substituting for the gas in aerosol containers for dispensing fluent materials of low viscosity and other heavier duty

sponges are required for fluent materials of higher viscosity. The materials of the sponge **15** are commercially available and it is simply a matter of selecting the particular type for the purpose to be performed.

The sponge **15** is inserted in a plastic or Mylar bag **17** preferably provided with a neck **19** and a stem closure or valve **21**. The use of such materials as mylar is recommended because they are inert, substantially impervious and do not contaminate the beverage or fluid to be dispensed. Preferably, the sponge **15**, is sealed within the bag **17** and the neck and the valve **19** and **21** are sealed to the bag **17** to permit communication with the interior thereof. Often, it is desirable to employ a relatively long neck **19**, particularly where automatic machines are used for compressing the mass **15** within the bag **17** and/or rolling up the combination prior to sealing the valve **21**. This facilitates retaining the reduced air volume content in the bag **17** while capping the expandable means in order that when the valve is removed or the bag opened, there may be a sudden in-rush of air to initiate the expansion. In any event, dispensing pressure becomes effective when communication is established from atmosphere to the interior of the bag. Expansion may be realized at that time, if there is any air space in the container or if there exists a partial vacuum in the bag and the air therein is further compressed by atmosphere or if the container includes a carbonated beverage which admits of slight compression because of the carbonated gas therein, or the like. The pressure is effective, regardless of any initial expansion, such that opening of the spigot dispenses the fluent material through expansion of the sponge in the bag.

The valve may be of any conventional type including merely a cap or plug for the neck **19** through a tire valve. In certain applications thee neck **19** may be sealed as by heat sealing or the like and then simply cut or broken off to admit the atmosphere when pressure is required. Such applications normally contemplate disposal of the container **11** along with the bag **17** and sponge or mass **15**, but it may me readily appreciated that the sponge and bag may be used repeatedly, as well as the container **11** if it is not made for a single use and thus disposable.

It is, of course, necessary that the valve **21** be exposed exteriorly of container **11** and a convenient method for achieving this is to employ a removable plug or disk **25**, preferably at one end of the container **11** which is sufficiently large to admit the bag and sponge in compressed condition. Then if the disk **25** is provided with an opening for the valve **21**, it facilitates manual introduction of the compressed means into the container **11**. In such instances, the neck **19** may be heat sealed or otherwise fixed or glued in the disk **25** and the plug or disk **25** is then screwed or otherwise secured into container **11** with the valve exposed externally thereof.

It should be understood that the valve may be disposed adjacent to the spigot **13** or at any other location and the barrel may be opened to receive the dispensing means as desired.

The principle of the invention may be conveniently carried out in the preferred embodiment herein described. However, it should be apparent that the principle is also applicable, through slight structural variations, wherein it is still the establishing of communication from atmosphere to the compressed mass in the bag which enables the dispensing pressure. Thus, for example, the bag may be affixed to the interior of the container, against a pin hole through the container, such that puncture or rupture of the bag would still establish communication between atmosphere and the bag interior for the purposes herein related. On the other hand, the employment of a valve in this path of communication will permit regulation of the pressure applied as desired, i.e., the sponge may be allowed to expand only partially and the valve closed and, subsequently when additional pressure is required, the valve opened to permit further expansion. Another pressure influencing arrangement is the combination of two or more sponges of different materials or different resiliencies such that the combined pressures may vary in time of application or pressure effectiveness from that of a single sponge. Further, more than a single bag may be used for like or unlike sponges.

Also, a fluid control device, pigtail or other flow insuring means may be employed at the outlet spigot to prevent the bag from closing the outlet orifice or orifices.

Other and further objects and advantages of the invention may occur to those skilled in the art from a reading hereof within the principles taught, and accordingly it is intended that the invention be limited only by the scope of the appended claims.

What is claimed is:

1. In combination with a container having fluent contents therein, an impervious flexible bag within the container having a volume when expanded substantially equal to that of the container, the exterior of the flexible bag being in contact with the contents of the container, means including closure means for establishing commuication between the interior of the bag and the atmosphere exterior of the container, a compressible mass of intersticed open-celled sponge material in said bag, said bag and mass being initially positioned in the container in a compressed condition with air removed therefrom and the interior of said flexible bag being in communication with the atmosphere only through said closure means, whereby opening of the closure means permits expansion of the compressible mass to force the fluent contents from the container under pressure exerted by the expanding mass.

2. The apparatus of claim **1** wherein said flexible valve means is shaped in substantial conformance with the interior of the container and is at least as large as the volume of the container.

3. The apparatus of claim **1** wherein the container is apertured to expose the bag to atmosphere and the valve means is sealed to the container about the aperture to preclude atmosphere from the contents.

4. In combination with a dispensing container having an outlet for fluent material therein, an impervious flexible bag having a volume substantially equal to that of said container, a second opening in said container, a compressible intersticed open-celled mass partially filling said bag when compressed and said bag is collapsed upon said mass, a portion of said bag being exposed to the exterior of the container through said second opening in said container to permit communication between the interior of the bag and the atmosphere when said exposed portion of the bag is perforated thereby permitting entry of air to the bag to enable expansion of the mass to expel said fluent material through said outlet, said mass being initially positioned in said container in a compressed condition with air removed from the bag

5. The apparatus of claim **4**, further comprising a removable section in the container spaced from the outlet, said bag having a neck and said neck penetrating the container via said section in sealing engagement therewith.

6. The apparatus of claim **4** wherein the bag is at least as large as the container volume and the normal volume of the mass when expanded is larger than the container volume.

7. In combination with a container for fluent contents, a first opening in said container for dispensing said fluent contents and a second opening in said container for communication with the atmosphere, an impervious flexible bag in said container having a volume when expanded to expel contents from the container through the first opening and in communication with said second opening, a compressible mass of intersticed open-celled spongy material within said bag, said spongy material having a volume when expanded to displace said contents, said bag being collapsible and said mass being compressible to expel atmospheric gas from the interior thereof through said second opening to receive fluent contents in the con-

tainer, and closure means for sealing the interior of said bag when the compressible mass is in the compressed condition to prevent entry of air into the bag from the atmosphere for expansion of said mass so long as said closure means is effective, said closure means being in communication with said second opening in the container to permit the entry of atmospheric gas to the interior of said mass when it is desired to expel contents from the container and only when so desired.

8. The invention as defined in claim **7**, wherein said closure means includes a portion of the surface of said bag, said portion being disposed adjacent said second opening, whereby said surface of the bag may be pierced from the exterior of the container.

9. The invention as defined in claim **8**, wherein said portion of the bag protrudes through said second opening.

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