

April 10, 1956

J. T. EFFORD ET AL
FLUID DISPENSING DEVICE

2,741,405

Filed Sept. 20, 1952

2 Sheets-Sheet 1

Fig. 1.

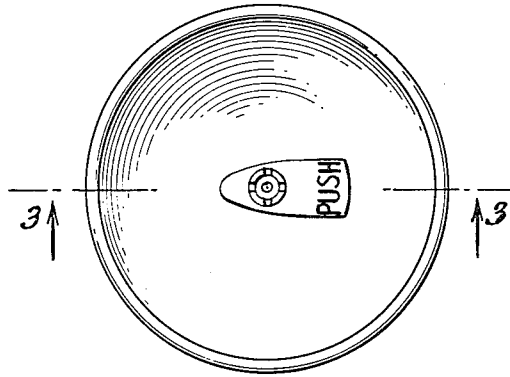


Fig. 2.

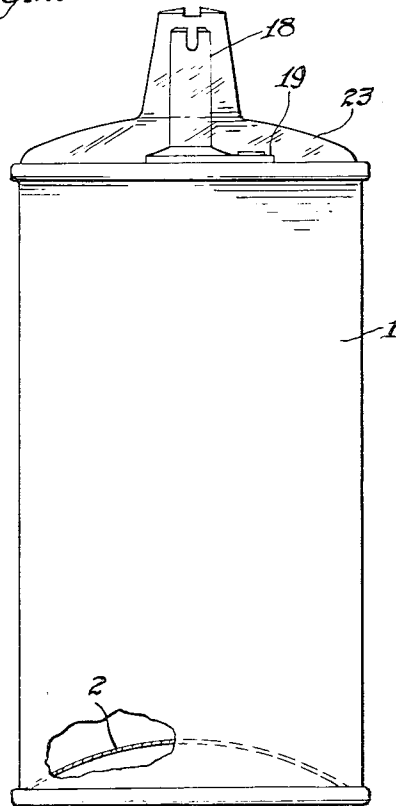
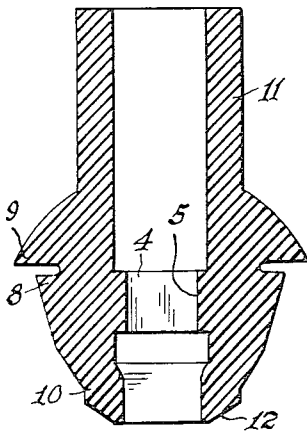


Fig. 5.



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Fig. 3.

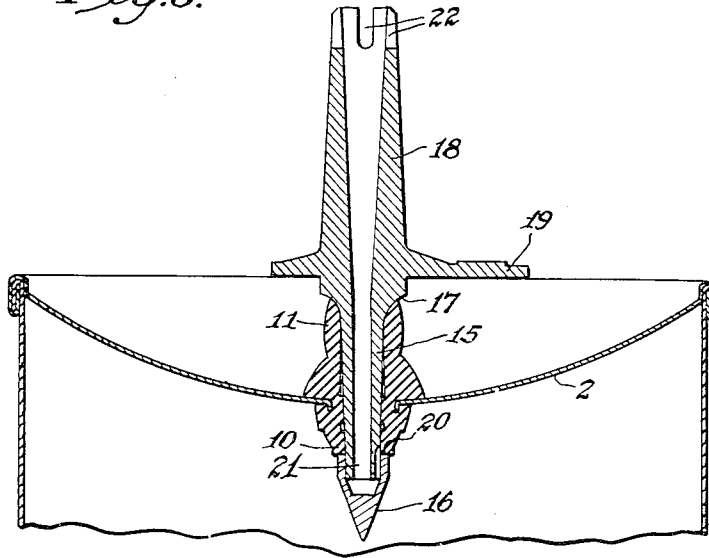
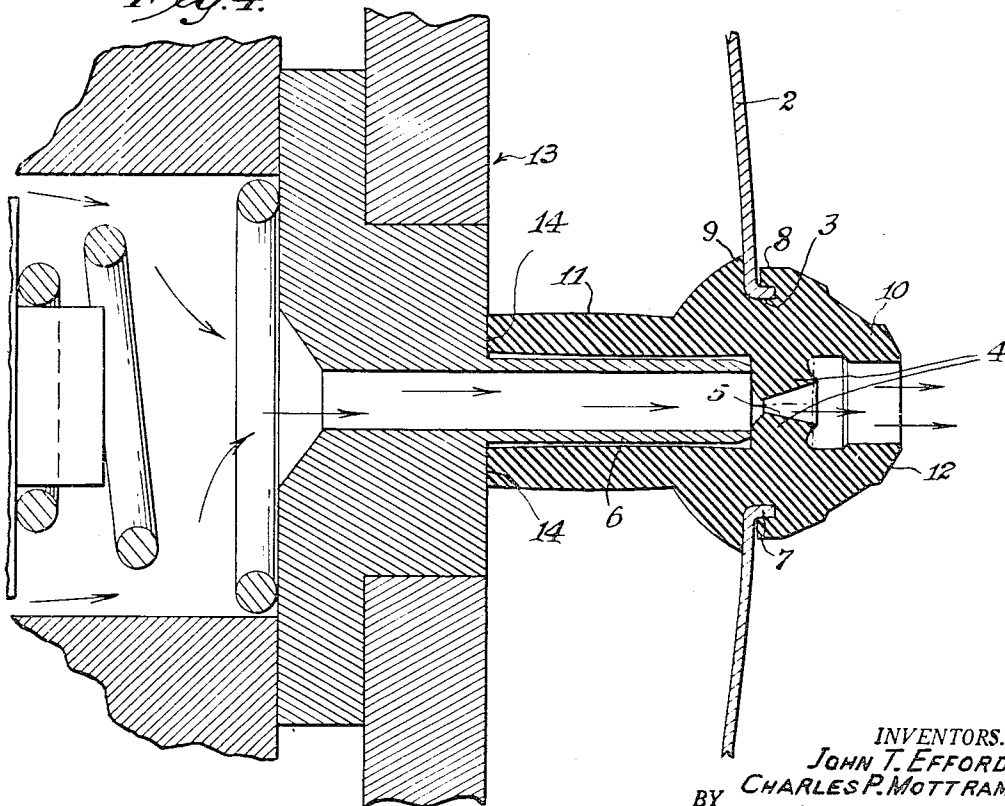


Fig. 4.



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FLUID DISPENSING DEVICE

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Application September 20, 1952, Serial No. 310,708

4 Claims. (Cl. 222—394)

This invention relates to a fluid dispensing device of the type including a container having a charging and dispensing opening closed by a dispensing valve device which is arranged for operation by the user to dispense fluid contents charged in the container.

One of the objects is to provide an arrangement permitting the manufacture of containers which may be charged with fluid either prior to or after the application of the dispensing valves. In other words, if desired, a merchandiser of fluid material may be provided with empty valved containers having interiors protected by being completely enclosed and be able to charge the container through the dispensing valves. Another object is to attain the first mentioned objective in such a manner as to permit the economical use of mass-production manufacturing methods and equipment. Another object is to provide for a fluid dispensing package which may be sold with a dispensing nozzle and valve operator provided as a separate element or as an installed part of the package itself. Still another object is to provide a dispensing valve device which is capable of consistently and securely maintaining the initially charged pressure in the packaged container in the case of compressed fluid packages.

This application is for an improvement on what is disclosed by an application filed by the present inventors on July 27, 1950, titled Valved Compressed Fluid Package and bearing Serial No. 176,108.

One specific example of a valved dispensing package incorporating the principles of the present invention is illustrated by the accompanying drawings, in which:

Fig. 1 is a top view;

Fig. 2 is a partly sectioned side elevation;

Fig. 3 is a cross section taken on the line 3—3 in Fig. 1;

Fig. 4 is a cross section showing the dispensing valve device with fluid being charged into the packaged container through this device; and

Fig. 5 is a cross section of the above device prior to its application to the container.

In this illustrated package the container is a sheet metal can 1 having inwardly domed or concave can ends 2 and otherwise generally adapted to contain fluid under pressure. A centrally located hole 3 is formed through one of the sheet metal ends. In this particular instance the can is of the twelve ounce standard can size and the package is intended to merchandise gassed cream which the package dispenses in the form of simulated whipped cream. However, the principles of the invention may be used regardless of whether or not the fluid is compressed or pressurized and regardless of the characteristics of the fluid to be dispensed.

The fluid dispensing valve device itself in its installed condition provides an elastically deformable web 4 positioned transversely in the hole 3 and substantially registered radially with the portion of the wall 2 surrounding this hole 3. The web is proportioned and arranged so that it is radially compressed by the just mentioned wall portion. The web is provided with a passage 5 which is

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normally urged closed by the radial compression of the portion of the wall surrounding the hole 3, the elastic deformability of the web 4 being adequate to permit the passage 5 to open when force is applied to the web. In Fig. 4 this passage is shown as being opened by a charging tube 6 pressed against one of the surfaces of the web 4 so as to elastically deform the latter.

The can end or wall 2 is formed of sheet metal, as described, and the gauge of this sheet metal is relatively light and therefore thin. However, compression is applied to the web 4 throughout a relatively large area because the can end wall 2 is provided with an annular depending or inwardly extending flange 7. Since this flange 7 extends transversely from the wall 2 its inner surface presents a cylindrical area of substantial length for the purpose of applying the radial compression to the web 4. This is an advantage because the web 4 is made substantially thicker than the thickness of the wall 2.

Elastically deformable flanges 8 and 9 connect with and extend radially from the web 4 and these flanges elastically clamp the opposite sides of the wall 2 therebetween. The flange 8 elastically deforms so it folds around and up behind the flange 7 of the can end and thus effects a secure anchorage.

Elastically deformable shanks 10 and 11 connect with and project oppositely from the web 4 and the flanges 8 and 9 and are both tubular whereby they form longitudinally extending bores which are substantially registered with the passage 5. The shank 10 is relatively short and has a bluntly conical or very sharply tapered end 12 which forms a valve head seat for reasons described hereinafter. The other shank 11 is tubular and is substantially longer than the shank 10.

All of the parts, other than the can parts, are illustrated as being integrally formed by a single body of elastically deformable material. The web 4 is positioned in the hole 3 by an intervening portion of this body and it is to be noted that the web 4 itself has a thickness substantially as great as its actual or effective radial or lateral extent. Furthermore, although substantially registered with the wall 2 the web 4 has its top or outer side substantially flush with the projected top surface of the wall 2, leaving the balance of the web 4 and its lower or inner side projecting below the web 2. The web has about half or more of its extent below the lower end of the flange 7. Thus more of the radial compression provided by the inner portion or surface of the flange 7 is applied to the upper portion of the web 4, thus facilitating opening of the passage 5 by pressure applied to the top of the web as is done by the tube 6 in Fig. 4. Reverse pressure on the inside of the can tends to push the bottom of the web 4 upwardly and bring more and more of the latter into this zone of heavier radial compression, thus most positively insuring a pressure-tight seal when the can contains compressed fluid. The radial pressure is applied to the web through the intervening mass of the unit and is therefore elastically applied.

The outside of the shank 10 is tapered from the flange 8 to the valve seat 12 so that the device may be pushed into the hole 3 forcibly with consequent momentary deflection of the flange 8 which then moves out to the position shown by Figs. 3 and 4. The flanges 8 and 9 are spaced apart a distance approximately equally or slightly less than the thickness of the can end 2 when the elastically deformable body providing these parts is unstressed or, in other words, prior to its insertion in the can end hole and as it is shown by Fig. 5.

The fluid merchandiser may be provided with the containers and dispensing valve devices of the character described, which act as plugs, and he can then fill the containers through the holes 3 and thereafter insert the plugs as stoppers. Such a merchandiser may provide his ul-

time customers with either a simple blunt ended tube, similar to the tube 6, for use in dispensing the fluid, or the more elaborate nozzle valve stem shown by Fig. 3 and described hereinafter. Alternately, the fluid merchandiser may be provided with the containers with the plugs already inserted. This assures that the insides of the containers remain as clean as when the containers were made. Then the fluid merchandiser may charge the containers in the manner shown by Fig. 4. With the tube 6 pushed against the top of the web 4 the usual filling cycles may be run through to completion, such as initial evacuation followed by fluid charging and later by gassing if desired, and the like.

In Fig. 4 the tube 6 is shown as part of a device, generally indicated at 13, and which may comprise any suitable mechanism for forcing fluid through the tube 6 while maintaining the tube 6 pressed against the top or other side of the web 4. The device 13 may include a surface 14 which simultaneously forces against the top or projecting end of the tubular shank 11, the latter being free to compress longitudinally since its external surface is free from restraint and can bulge to permit compressional shortening of the shank 11 as required to bring the end of the tube 6 into forcible engagement with the outside of the web 4 where the tube seals with the web. This provides for further sealing during the fluid charging and helps maintain hygienic conditions such as are particularly important in the case of gassed cream or other food products. As shown by Fig. 5 the shank 11 is substantially cylindrical when in its unstressed condition. It is also possible to install the described dispensing valve device in the hole 3 in the described can with the can containing a preliminary fluid which may be under pressure if desired, and to then ship the can to the fluid merchandiser who may charge it with a second fluid so as to produce a package containing a mixture or solution of the two fluids.

The combination nozzle valve stem shown in Fig. 3 includes a tapered shank 15 having a pointed end 16 and an outwardly flaring or concave shoulder 17. An upwardly projecting nozzle 18 extends from this shoulder 17 and a laterally extending or transverse finger lever 19 is positioned between the parts 17 and 18. This entire device may be formed by a relatively rigid plastic molding. The pointed end 16 provides a shoulder 20 and functions as a valve head, and a passage 21 opens from inside of this shoulder and extends longitudinally up through the members 15 and 18 in a gradually flaring manner to the upper or outer end of the nozzle 18 which is deeply castellated so as to provide a plurality of circumferentially spaced longitudinally extending slots 22. After the package is charged the described nozzle valve stem may have its pointed end 16 pushed against the top of the web 4 so that the latter's passage 5 opens and permits the point of the end 16 to wedge through the passage 5 completely until the shoulder or valve head surface 20 seats against the valve head seat 12 previously described.

The distance between the shoulder 20 and the shoulder 17 is substantially less than the distance between the valve seat 12 and the projecting end edge of the shank 11. Therefore, when inserting the pointed end 16 the shoulder 17 compresses the shank 11 considerably so as to cause it to bulge laterally outwardly which is possible because the outer surface of the shank 11 is not restrained and is free to bulge. Due to the elastic deformability of the shank 11 its projecting end elastically deforms and fits or molds itself to the concave or flaring contour of the shoulder 17 so as to produce the result shown by Fig. 3. When unstressed the outer end of the shank 11 forms a square edge as is shown by Fig. 5. Preferably the described nozzle valve stem is installed by the fluid merchandiser when he makes up the complete package and it may thereafter be protected by a plastic protecting cap 23 as is illustrated by Fig. 2.

The ultimate user removes the cap 23 and presses down on the lever 19, this tilting the nozzle valve stem and causing its shoulder 20 to unseat slightly from the seat 12, the fluid then passing through the passage 21 so as to be dispensed. In the case of gassed cream the castellated end providing the slots 22 in conjunction with the generally expanding contour of the passage 21 assures the production of a product having the appearance and texture of real whipped cream even though the cream may be gassed at the low pressure required to permit it to be shipped under the Interstate Commerce Commission classification of a low-pressure compressed fluid dispensing device such as permits the use of the sheet metal can illustrated. In the case of products other than whipped cream a different contour of the nozzle may prove to be more desirable.

It is to be noted that when the nozzle valve stem is not used the dispensing valve device is secure and capable of positively holding pressure in the can for long periods of time adequate to meet the requirements of shipping and storage conditions. The same thing is true after the described nozzle valve stem is installed, the elastically deformed shank 11 functioning as a strong compression spring continually pulling the shoulder 20 up against the elastically deformed valve seat 12. This shoulder 20 is a right angular shoulder and it deforms the conical seat 12 so that the latter fits this shoulder, the proportioning of the shank 11 being such as to provide enough force for this purpose. Deformation of the projecting end of the shank 11 by the shoulder 17 assures complete fluid tightness at this point. It follows that whether or not the nozzle valve stem element is used this new dispensing valve device effectively seals the hole 3 in the can end 2. As previously noted deformation of the shoulder 8 assures substantially complete and permanent fluid tightness respecting the hole 3.

The manufacture of the described can may be carried out by any of the automatic can machines for making this kind of can. The elastically deformable plug providing the described device may be molded by mass-production methods out of either a suitable rubber or plastic composition provided the material in its finished condition is deformable by manual finger pressure and has good elastic properties throughout its necessary deformation movement. The described nozzle valve stem may be produced by mass-production methods through the use of the injection molding process or otherwise. All of the parts are relatively inexpensive and there are no problems connected with the insertion of the dispensing valve device in the can end holes, since they may simply be pushed into place.

We claim:

1. A dispensing valve device including a substantially rigid wall having a hole formed therethrough and an elastically deformable web positioned transversely in said hole and substantially registered radially with the portion of said wall surrounding said hole and radially compressed thereby, said web having a passage therethrough which is normally urged closed in radial alignment with said wall portion by the radial compression of said portion of said wall and the elastic deformability of said web permitting said passage to open when force is applied to said web, said wall being made of sheet material and said web being substantially thicker than said wall, said portion of said wall comprising a flange extending transversely from said wall, and elastically deformable flanges extending radially from said web and clamping the opposite sides of said wall therebetween with the one of said elastically deformable flanges adjacent to said wall's flange folding around the latter, said passage comprising a slit formed transversely through said web, and elastically deformable shanks projecting oppositely from said web and said deformable flanges and having longitudinally extending bores substantially registered with said passage, the projecting end of one of said shanks

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forming a valve head seat and the other of said shanks being tubular and substantially longer than the shank having the end forming said seat.

2. A dispensing valve device including a substantially rigid wall having a hole formed therethrough and an elastically deformable web positioned transversely in said hole and substantially registered radially with the portion of said wall surrounding said hole and radially compressed thereby, said web having a passage therethrough which is normally urged closed in radial alignment with said wall portion by the radial compression of said portion of said wall and the elastic deformability of said web permitting said passage to open when force is applied to said web, said wall being made of sheet material and said web being substantially thicker than said wall, said portion of said wall, comprising a flange extending transversely from said wall, and elastically deformable flanges extending radially from said web and clamping the opposite sides of said wall therebetween with the one of said elastically deformable flanges adjacent to said wall's flange folding around the latter, said passage comprising a slit formed transversely through said web, and elastically deformable shanks projecting oppositely from said web and said deformable flanges and having longitudinally extending bores substantially registered with said passage, the projecting end of one of said shanks forming a valve head seat and the other of said shanks being tubular and substantially longer than the shank having the end forming said seat, and a substantially rigid valve stem positioned through said bores and said slit and having a valve head on one end engaging said seat and shoulder spaced from said valve head and engaging the projecting end of said longer shank and compressing the latter longitudinally and bulging it radially, said valve stem providing a passage from the inside of said valve head and extending longitudinally therefrom to beyond the outer end of said longer shank.

3. A dispensing valve device including a substantially rigid wall having a hole formed therethrough and an elastically deformable web positioned transversely in said hole and substantially registered radially with the portion of said wall surrounding said hole and radially compressed thereby, said web having a passage therethrough which is normally urged closed in radial alignment with said wall portion by the radial compression of said portion of said wall and the elastic deformability of said web permitting said passage to open when force is applied to said web, said wall being made of sheet material and said web being substantially thicker than said wall, said portion of said wall comprising a flange extending transversely from said wall, and elastically deformable flanges extending radially from said web and clamping the opposite sides of said wall therebetween with the one of said elastically deformable flanges adjacent to said wall's flange folding around the latter, said passage comprising a slit formed trans-

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versely through said web, and elastically deformable shanks projecting oppositely from said web and said deformable flanges and having longitudinally extending bores substantially registered with said passage, the projecting end of one of said shanks forming a valve head seat and the other of said shanks being tubular and substantially longer than the shank having the end forming said seat, and a substantially rigid valve stem positioned through said bores and said slit and having a valve head on one end engaging said seat and a shoulder spaced from said valve head and engaging the projecting end of said longer shank and compressing the latter longitudinally and bulging it radially, said valve stem providing a passage from the inside of said valve head and extending longitudinally therefrom to beyond the outer end of said longer shank, said shoulder flaring from said stem and said projecting end of said longer shank being elastically deformed to fit said shoulder.

4. A dispensing valve device including a substantially rigid wall having a hole formed therethrough and an elastically deformable web positioned transversely in said hole and substantially registered radially with the portion of said wall surrounding said hole and radially compressed thereby, said web having a passage therethrough which is normally urged closed in radial alignment with said wall portion by the radial compression of said portion of said wall and the elastic deformability of said web permitting said passage to open when force is applied to said web, said wall being made of sheet material and said web being substantially thicker than said wall, said portion of said wall comprising a flange extending transversely from said wall, and elastically deformable flanges extending radially from said web and clamping the opposite sides of said wall therebetween with the one of said elastically deformable flanges adjacent to said wall's flange folding around the latter, said passage comprising a slit formed transversely through said web, and elastically deformable shanks projecting oppositely from said web and said deformable flanges and having longitudinally extending bores substantially registered with said passage, the projecting end of one of said shanks forming a valve head seat and the other of said shanks being tubular and substantially longer than the shank having the end forming said seat, said web being positioned with its side towards said longer shank substantially aligned with the adjacent surface of said wall, said flange extending oppositely from said longer shank, and the opposite side of said web projecting beyond the projecting end of said flange.

References Cited in the file of this patent

UNITED STATES PATENTS

2,513,272	Bowen	July 4, 1950
2,612,292	Michel	Sept. 30, 1952