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RECEPTACLE FOR CONTAINING AND DISPENSING A SUBSTANCE UNDER PRESSURE

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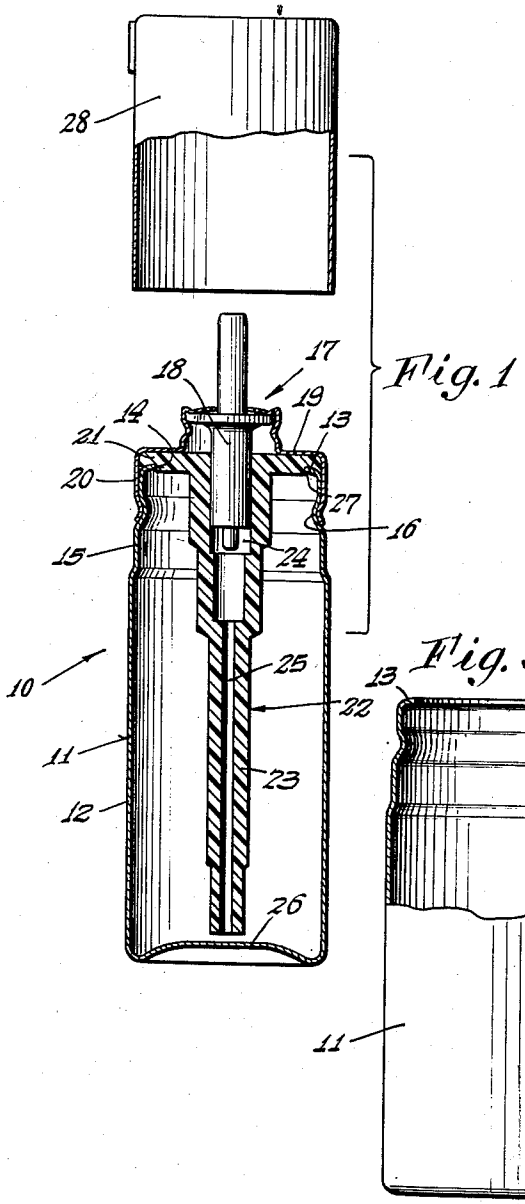


Fig. 1

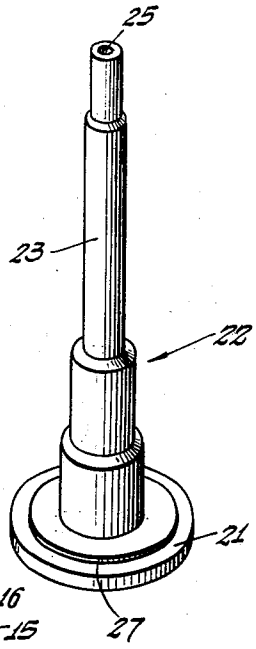


Fig. 2

Fig. 3

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RECEPTACLE FOR CONTAINING AND DISPENSING A SUBSTANCE UNDER PRESSURE

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8 Claims. (Cl. 222—394)

This invention relates to an article of manufacture and the method of making the same. More specifically, it pertains to an improved receptacle for containing and dispensing substances under pressure and to a method of constructing the same to render it leakproof and increase its operating efficiency.

The invention is directed to a species of the invention disclosed in my copending application Serial No. 563,567, filed February 6, 1956, now Patent No. 2,867,358, issued January 6, 1959, wherein I provided a receptacle, for containing and dispensing substances under pressure, with a leakproof seam between the valve unit and the container by turning in the upper end of the container to form a flange to cooperate with the valve unit to compress a resilient sealing means therebetween when the container and valve are connected. According to one form of the invention disclosed in the aforenoted application, the connection between the valve unit and the container was accomplished by rolling inwardly an integral portion of a depending flange, provided on a laterally extending portion of the valve unit, and a cooperating underlying portion of the wall of the container.

The instant invention is directed to a receptacle, wherein the container thereof is formed of a material which is not readily adapted to having a groove rolled into a portion of its outer wall, but which is adapted to have the valve unit connected in sealing relation therewith by bending a portion of the depending flange of the valve unit inwardly to engage a preformed groove in the wall of the container.

Accordingly, it is an object of the invention to provide a preformed container member for cooperation with a valve unit in forming a leakproof connection between the two, which includes an inturned edge adjacent an open end thereof forming a short annular flange for cooperating with a laterally extending mounting portion of the valve unit to compress a resilient sealing means therebetween, and an annular groove formed in the wall of the container and spaced from the short annular flange for receiving the inwardly bent portion of a depending flange provided in the valve unit.

A feature of the invention is the provision, in a receptacle for containing and dispensing substances under pressure, of a container member formed of materials which are difficult to manipulate and shape in the manufacture and sealing of an aerosol receptacle.

It is also an object of the invention to provide an aerosol containing member formed of steel which is adapted to have sealingly connected thereto a valve unit including a valve means and a laterally extending mounting portion provided with a depending flange.

It is also an object of the invention to provide an aerosol containing member, adapted to have sealingly connected thereto a valve unit including a valve means and a laterally extending mounting portion provided with a depending flange, which includes an annular wall having a portion thereof of reduced diameter adjacent the open end of the member.

Another feature, therefore, of the invention is the provision in an aerosol receptacle of a containing member having a wall portion of reduced diameter which is adapted to removably engage a cap member adapted to enclose the valve unit and provide an extension of the container member without substantially increasing the diameter thereof.

It is another object of the invention to provide a resilient dip tube and sealing means for use in aerosol receptacles that include a containing member and a valve unit.

Another feature of the invention is the provision of the integral dip tube and sealing means, which is adapted to seal the connection between the valve unit and the containing member and to function as a conventional dip tube, without permitting the leakage of gas or the substance under pressure into the dip tube between the latter and the sealing means and to positively position the end of the dip tube relative to the bottom of the container member.

With these and other objects and features in mind, reference is had to the attached sheet of drawings illustrating one form of the invention, wherein like characters represent like parts and in which:

Figure 1 is an exploded elevational view, partially in section, illustrating the features of the instant invention embodied in a receptacle for containing and dispensing substances under pressure;

Fig. 2 is a perspective view of the integral dip tube and sealing means of the instant invention; and

Fig. 3 is an elevational view, partially broken away, illustrating the improved containing member of the invention.

In my copending application (supra), I provided an improved receptacle by disposing between an inturned flange, on the wall of the container member, and a valve unit having a laterally extending mounting portion provided with a depending flange, a resilient sealing means which, when the container and valve unit were secured to one another by rolling inwardly a portion of the depending flange and a cooperating underlying wall portion of the container, forms a leakproof seal.

It has been found that certain materials such as steel and stainless steel, etc., which are desirable for use in aerosol receptacles, because of their characteristics of resistance to corrosion and strength, cannot be readily worked in the manufacture and sealing of aerosol receptacles. The edges of the walls of the steel container cannot be turned sharply inwardly, without costly annealing, to form an inwardly turned flange without cracking or otherwise destroying the material and steel and stainless steel cannot be rolled inwardly, along with the depending flange of a valve unit, to form a connection for securing a valve unit to the container with a resilient sealing means retained therebetween.

This invention is directed to a receptacle for containing and dispensing substances under pressure, which includes a steel, stainless steel or similar container having preformed thereon a short annular inturned flange for cooperation with the valve unit in retaining a resilient sealing means therebetween and a preformed annular groove in the wall of the container, spaced from the short inturned annular flange, for receiving an inwardly bent portion of the depending flange of the valve unit. The invention contemplates providing the containing member of an improved aerosol receptacle with an annular wall having a portion of reduced diameter, the reduced portion being adapted to removably engage a cap member which completely encloses the valve unit and provides an extension of the annular wall of the containing member without increasing its external diameter.

According to the invention the resilient sealing means, which is mounted between the inturned flange on the

container and the laterally extending mounting portion of the valve unit, is formed integral with the dip tube that is operably connected to the valve unit and disposed within the containing member. This improved structure is advantageous in a number of respects, among which, are the positive positioning of the dip tube with respect to the bottom of the container to insure a steady, even, controlled flow of the substance under pressure therefrom and the elimination of the leakage of gases from the container into the upper portion of the dip tube. In the prior art devices the dip tube, which was merely a piece of elongate tubing, was frictionally telescopically connected to the stem portion of the valve means in the valve unit and extended toward the bottom wall of the containing member. It often occurred in these devices that the dip tube shifted relative to the valve means, thereby altering its position with respect to the bottom of the container, permitting greater or lesser amounts of the substance under pressure to be forced therethrough. It was also not an uncommon occurrence for the gases contained within the containing member to leak into the dip tube through the frictional seal at the valve means thereby equalizing the pressure within the tube and the container and preventing the substance in the container from being dispensed therefrom.

Referring now to the drawings for a more detailed description of the invention, a receptacle for containing and dispensing substances under pressure is generally indicated by the numeral **10**. The receptacle, which may conveniently be utilized to dispense cosmetics, disinfectants, exterminating materials or other aerosol substances, comprises a containing member **11**, of steel, stainless steel or similar strong non-corrosive materials, having an annular wall portion **12** provided with an inturned edge **13** adjacent an open end **14** thereof forming a short annular flange. In turning in the edge of a steel or similar container it is desirable to avoid bending the steel to too great an extent, since excessive manipulating will often crack the material; it will be noted that the short annular flange **13** is slightly upturned to avoid cracking the material and to grip a resilient seal, as will hereinafter be described. The annular wall **12**, which is formed with a portion **15** of reduced diameter, for a purpose to be hereinafter explained, is provided with an annular groove **16** in such area of reduced diameter and may be formed on a transfer press, eyelet machine or other high speed production apparatus.

A valve unit, generally indicated by the numeral **17**, having a valve means **18**, of any type commonly known to the art, and a laterally extending mounting portion **19** provided with a depending flange **20**, is mounted on container **12** at the open end thereof to form a closure therefor. Seated between the laterally extending mounting portion **19** of the valve unit **17** and the short inturned annular flange **13** of the container is a resilient sealing means **21**, which forms part of an integral dip tube and sealing means unit, generally indicated by the numeral **22**. The unit, which may be formed of any resilient material not affected by the aerosol substance contained within the receptacle includes, as aforenoted, the resilient sealing means **21** and an integral elongate, substantially tubular dip tube **23**. The dip tube, as is common in the aerosol receptacle art, is adapted to be disposed within the containing member **12** and to operably engage a portion of valve means **18** for guiding the substance under pressure from the containing member to the valve means, through which the substance is dispensed. A chamber **24** may conveniently be provided in the dip tube to house the stem or other portion of valve means **18** and is connected to the interior of containing member **12** by a bore **25** of reduced diameter terminating at a point spaced from end wall **26** of the container. The sealing means **21** is provided with a shoulder **27** for frictionally engaging the edges of inturned flange **13** to lock the integral dip tube sealing means unit in position with respect to the container prior to mounting valve unit **17** thereon.

After integral dip tube sealing means unit **22** has been positioned in engagement with containing member **12** and valve unit **17** has been mounted on the containing member with the depending flange **20** overlying the wall of reduced diameter an intermediate portion of the depending flange is bent inwardly, as by rolling, to be retained in annular groove **16** of the containing member. In this manner valve unit **17** is secured in position with respect to the containing member and the sealing means **21** is compressed between short inturned flange **13** and laterally extending mounting portion **19**. When the resilient sealing means is compressed as aforenoted, integral dip tube **23** is positively positioned with respect to the containing member with the terminal end of bore **25** being properly spaced from end wall **26** thereof. In the operation of the receptacle the integral nature of the dip tube and sealing means prevents the escape of gas into the upper end of the dip tube, thus eliminating the possibility of malfunctions.

In many forms of aerosol receptacles it is unnecessary for a cap member or cover to be utilized to protect the valve unit and enclose the operating portions of the structure. In the illustrated embodiment of the invention, however, a cap member **28**, of the type found desirable in cosmetic aerosol receptacles, is shown. The cap member is adapted to removably engage the reduced wall portion **15** of container **11** to substantially completely enclose valve unit **17** and provide an extension of annular wall **12**, without increasing the external diameter of the receptacle.

Thus, among others, the several objects and features of the invention as aforenoted are achieved. Obviously, numerous changes in the structure may be resorted to without departing from the spirit of the invention as defined by the claims.

I claim:

1. An improved receptacle for containing and dispensing a substance under pressure comprising a one piece steel container having an annular wall portion provided with an inturned edge adjacent an open end thereof forming a short slightly upturned annular flange, said annular wall being formed with an annular groove adjacent said open end, a valve unit having a valve means and a laterally extending mounting portion to fit over the open end of the container to form a closure therefor, said laterally extending mounting portion being formed with a depending flange to fit over the annular wall of said container, a resilient sealing means disposed between said valve unit and container to form a seal therebetween, the portion of the depending flange remote from said laterally extending portion being bent into said annular groove to secure said valve unit in sealing relation with respect to said container and a dip tube operably associated with said valve unit and disposed in said container for directing said substance from the container to the valve unit.

2. An improved receptacle for containing and dispensing a substance under pressure comprising a one piece stainless steel container having an annular wall portion provided with an inturned edge adjacent an open end thereof forming a short slightly upturned annular flange, said annular wall being formed with an annular groove adjacent said open end, a valve unit having a valve means and a laterally extending mounting portion to fit over the open end of the container to form a closure therefor, said laterally extending mounting portion being formed with a depending flange to fit over the annular wall of said container, an annular resilient sealing means disposed between said laterally extending mounting portion and said short annular flange to form a seal therebetween, the portion of the depending flange remote from said laterally extending portion being bent into said annular groove to secure said valve unit in sealing relation with respect to

said container and a dip tube operably associated with said valve unit and disposed in said container for directing said substance from the container to the valve unit.

3. An improved receptacle for containing and dispensing a substance under pressure comprising a container having an annular wall portion provided with an inturned edge adjacent an open end thereof forming an annular flange, said annular wall being formed with an annular groove adjacent said open end, a valve unit having a valve means and a laterally extending mounting portion to fit over the open end of the container to form a closure therefor, said laterally extending mounting portion being formed with a depending flange to fit over the annular wall of said container, a resilient sealing means disposed between said laterally extending mounting portion and said annular flange to form a seal therebetween, and a dip tube formed integral with said resilient sealing means and operably connected to said valve unit and disposed in said container, the portion of the depending flange remote from said laterally extending portion being bent into said annular groove to secure said valve unit with respect to said container with said integral dip tube and sealing means retained therebetween.

4. An improved receptacle for containing and dispensing a substance under pressure comprising a one piece container having an annular wall portion provided with an inturned edge adjacent an open end thereof forming a short slightly upturned annular flange, said annular wall being formed with an annular groove adjacent said open end, a valve unit having a valve means and a laterally extending mounting portion to fit over the open end of the container to form a closure therefor, said laterally extending mounting portion being formed with a depending flange to fit over the annular wall of said container, an annular resilient sealing means disposed between said laterally extending mounting portion and said slightly upturned annular flange to form a seal therebetween, and a dip tube formed integral with said resilient sealing means and operably connected to said valve unit and disposed in said container, the portion of the depending flange remote from said laterally extending portion being bent into said annular groove to secure said valve unit in sealing relation with respect to said container with said integral dip tube and sealing means retained therebetween.

5. A method of forming a receptacle for containing and dispensing a substance under pressure comprising the steps of forming a one piece steel container having an annular wall portion and an open end and having an annular groove formed in said annular wall adjacent said open end, turning in the upper end portions of the wall of said container to form an integral short slightly upturned annular flange around said open end, mounting a valve unit having a valve means and a laterally extending mounting portion provided with a depending flange on said container to close said open end, positioning a resilient sealing member between said valve unit and container, operably engaging a dip tube with said valve unit to be disposed in said container and turning a portion of said depending flange into said annular groove so that said sealing member is wedged in sealing position and said valve unit is securely connected to said container to form a leakproof seal therebetween.

6. A method of forming a receptacle for containing and dispensing a substance under pressure comprising the steps of forming a one piece stainless steel annular container having an annular wall portion and an open end and having an annular groove formed in said annular wall adjacent said open end, turning in the upper end portions of the wall of said container to form an integral short slightly upturned annular flange around said open end, mounting a valve unit having a valve means and a laterally extending mounting portion provided with a depending flange on said container to close said open end, positioning an annular resilient sealing member between said valve unit and container, operably engaging a dip tube with said valve unit to be disposed in said container and turning an intermediate portion of said depending flange into said annular groove so that said sealing member is wedged in sealing position and said valve unit is securely connected to said container to form a leakproof seal therebetween.

7. In a receptacle for containing and dispensing a substance under pressure including a container having an annular wall portion provided with an inturned edge adjacent an open end thereof forming an annular flange and a valve unit having a valve means and a laterally extending mounting portion provided with a depending flange to fit over the open end of the container to form a closure therefor; the improvement in receptacles comprising an annular resilient sealing means retained between said laterally extending mounting portion and said annular flange, and a dip tube formed integral with said sealing means and disposed within said container for operable association with said valve means.

8. In a receptacle for containing and dispensing a substance under pressure including a container having an annular wall portion provided with an inturned edge adjacent an open end thereof forming an annular flange and a valve unit having a valve means and a laterally extending mounting portion provided with a depending flange to fit over the open end of the container to form a closure therefor; the improvement in receptacles comprising an annular resilient sealing means retained between said laterally extending mounting portion and said annular flange, and a resilient dip tube formed integral with said sealing means and disposed within said container for operable association with said valve means, said dip tube including a bore of reduced diameter adjacent the end directed away from said sealing means for controlling the flow of the substance under pressure therethrough.

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