

[54] APPLICATOR FOR DISPENSING SUBSTANCES

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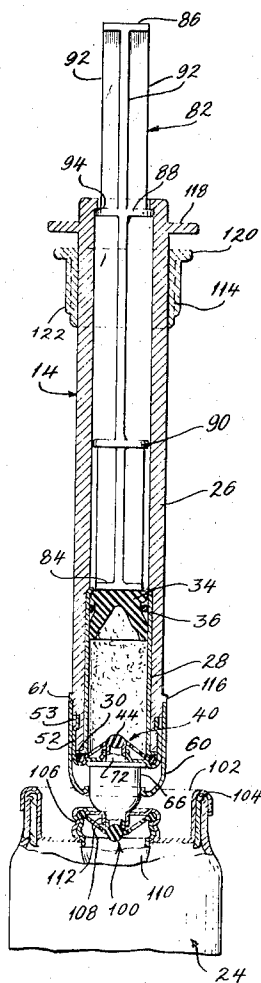
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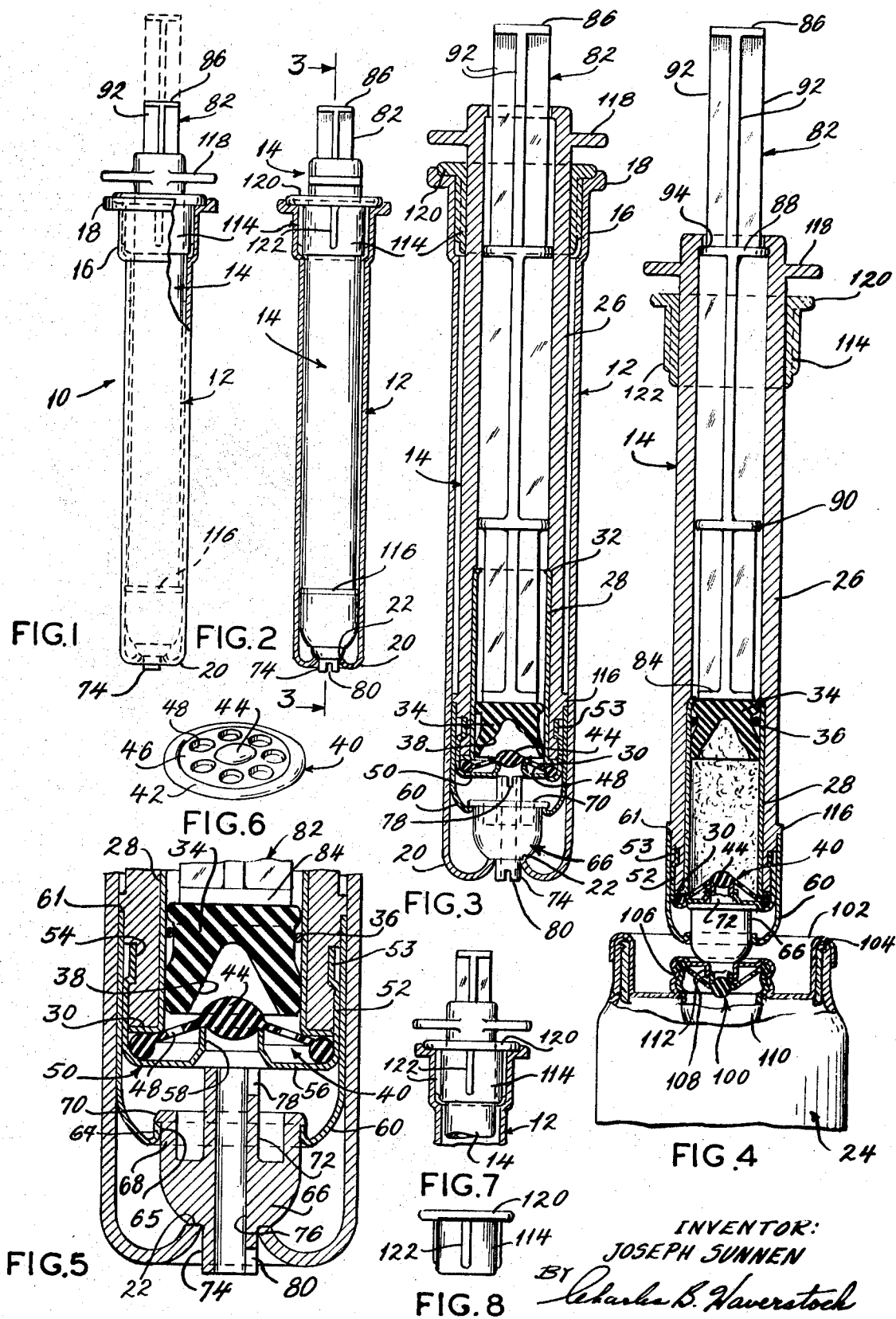
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[57] ABSTRACT

Improvements in an applicator for dispensing substances including pressurized substances and substances in a foam or foam-like condition including an applicator for discharging such substances wherever needed including into body cavities or elsewhere including a tubular holder partially open at one end and a tubular applicator including a tubular housing adapted to be positioned in the holder, said housing having normally closed valve means at one end male operator means on the applicator constructed to cooperate with means formed on the partially closed end of the holder when pressed thereagainst to open the valve means and permit dispensing of the contents thereof, said operator means being constructed to engage the valve means and also to cooperate with normally closed female-type valve means on an aerosol container to establish communication between the inside of the aerosol container and the inside of the applicator housing during filling and charging of the application, and a piston slidably and sealably positioned for movement in the applicator in a direction to permit material from the aerosol container to flow into the applicator during filling and charging and to be moved in the opposite direction during a dispensing operation when the applicator is positioned in the tubular holder.

8 Claims, 8 Drawing Figures





APPLICATOR FOR DISPENSING SUBSTANCES

Applicators of various kinds have been devised and used heretofore for dispensing many different substances including medicinal and other substances confined under pressure, and some of the known applicators have been designed and constructed particularly for dispensing substances into body cavities. There are also known applicators for use in dispensing substances in a foam or foam-like condition such, for example, as the applicators disclosed in applicant's United States Letters Pat. No. 3,220,413, dated Nov. 30, 1965, and in applicant's copending application, Ser. No. 698,465, filed Jan. 17, 1968, now U.S. Letters Pat. No. 3,540,448, issued Nov. 17, 1970. The devices covered by applicant's patents, like the present device, include means that cooperate with the valve means on an aerosol container to open the valve means and to receive a charge from the container, which charge can thereafter be dispensed from the applicator onto the place where it is to be applied. In the construction covered by U.S. Pat. No. 3,220,413 the charge received in the applicator is an uncompressed charge which is in a foam condition, and in the construction disclosed in copending application, Ser. No. 698,465, the charge received in the applicator is in a compressed condition which is also true of the present construction. Other applicators have also been devised for dispensing individual dosages of products including some which employ individual precharged containers or cartridges having valves which cooperate with means on separate appliance devices used in conjunction therewith to direct the product under pressure to the place where it is to be applied. Such one-shot devices are not readily rechargeable by the user, it is not possible to completely dispense their contents, they are messy and wasteful to use, they are expensive and inconvenient because they are not easily rechargeable, and with the known one-shot devices the user must keep a supply of charged cartridges on hand to avoid running out. Precharged one-shot measured dosage cartridges have the further disadvantages that they tend to lose or dissipate their charges thereby limiting their shelf life, and in some such devices the charge itself may undergo changes in characteristics with time such as a change in strength and/or consistency. For these and other reasons the known devices are unsuitable and unreliable for many purposes.

The present invention overcomes these and other disadvantages and shortcomings of the known devices by teaching the construction and operation of an improved rechargeable applicator which can be recharged at any time directly from a charged source such as from an aerosol container or similar device, and with the present device the desired charge in the applicator can be assured because it can be quickly and accurately equalized to the charge in the aerosol container used for filling and charging it. Also, if an applicator charged in the manner disclosed herein is not used for an extended period, its pressure can be restored to the desired pressure quickly and easily as required and with little or no additional material being required from the charging container and without waste.

The subject applicator is designed and constructed so that the charges dispensed therefrom can be dispensed directly onto the area or surface on which it is to be applied in any desired form such as in the form of a stable foam or foam-like substance or the like and this can be done without requiring any intermediate steps, and without trapping or wasting any substantial amounts of the substance in the process. The present applicator is also constructed so that the valve means on the aerosol container used to charge it can be made to be relatively tamperproof and to minimize the possibility that the contents of the aerosol container will be dispensed accidentally or inadvertently as by dropping the container or by having unauthorized persons play with it. In addition to these advantages and benefits, the subject applicator is easy to use, is constructed to reduce waste and is also easy to clean and maintain in a sanitary condition.

It is therefore a principal object of the present invention to provide improved applicator means for dispensing substances and particularly substances in a foam or foam-like condition.

Another object is to provide improved means for charging an applicator with an accurately measured dosage under pressure.

Another object is to provide accurate means for measuring dosages of substances to be dispensed and for transferring such dosages under pressure from a pressurized container to a dosage applicator.

Another object is to provide a relatively simple and inexpensive rechargeable applicator particularly for use in applying substances into body cavities.

Another object is to minimize waste in the dispensing of substances and to make the dispensing thereof less messy.

Another object is to overcome shelf-life problems associated with products to be dispensed from pressurized applicators in measured dosages.

Another object is to improve the properties of substances dispensed or applied in a foam condition.

Another object is to provide means for easily and accurately charging an applicator.

Another object is to provide a more tamperproof aerosol type container.

Another object is to provide improved piston means for an applicator used to dispense products in a foam or foam-like condition.

Another object is to provide applicator means which are relatively easy to clean and maintain.

These and other objects and advantages of the present invention will become apparent after considering the following detailed specification and the accompanying drawing which discloses a preferred embodiment thereof, and wherein:

FIG. 1 is a side elevational view partly in section of an applicator constructed according to the present invention;

FIG. 2 is a side elevational view partly in section showing the same applicator in a product dispensing condition;

FIG. 3 is an enlarged cross-sectional view of the subject applicator;

FIG. 4 is a fragmentary cross-sectional view showing the subject applicator cooperatively engaged with valve means on an aerosol container during filling and charging thereof; FIG. 5 is a further enlarged fragmentary cross-sectional view showing more of the details of the valve and piston portions of the subject applicator;

FIG. 6 is an enlarged perspective view of a flexible valve member employed in the subject applicator;

FIG. 7 is a fragmentary view partly in section showing the operator end portion of the subject applicator; and,

FIG. 8 is a side elevational view of a sleeve member for use with the subject applicator.

Referring to the drawings more particularly by reference numbers, number 10 refers to an applicator constructed according to the present invention. The applicator 10 includes two separable parts or components including an outer tubular member 12 and an applicator portion 14 which is constructed to be positioned in the member 12 for cooperation therewith as clearly shown in the drawing.

The tubular member 12 has an enlarged portion 16 at one end which includes an outwardly extending annular flange 18. The opposite end of the tubular member 12 is partially closed by an annular inwardly extending flange portion 20 which is curved as shown and terminates at an abutment surface 22 that faces generally back toward the opposite or open end of the member 12.

The tubular member 12 is a holder for the applicator portion 14 when the applicator is being used to dispense a substance, but the holder 12 is not needed when the applicator is being filled and charged as will be explained. FIGS. 1, 2, 3, and 5 show the applicator 14 positioned in the holder 12, and FIG. 4 shows the applicator 14 out of the holder 12 and engaged with an aerosol container 24 during filling and charging thereof. Both conditions of the applicator will be described in detail.

Referring to FIG. 3, the applicator 14 includes a tubular member 26 the lower end of which receives a thin walled tubular sleeve member 28 formed of some material such as

metal. The member 28 is positioned in an oversized portion of the tubular member 26, and the member 28 has a flange 30 on its lower end which cooperates with the lower end surface of the member 26. The opposite or upper end of the sleeve member 28, as shown, is curved slightly inwardly at 32, and the inner surface of the member 28 is preferably made relatively smooth so that it will slideably and sealably cooperate with piston means to be described.

One form of the movable piston means are shown in FIG. 4 and include a member 34 having an outside groove with an O-ring 36 mounted therein, which O-ring is compressed between the members 34 and 28. The piston means are preferably formed of a plastic or rubber substance and the O-ring is optional and can be eliminated in a piston construction such as the one piece construction shown in FIG. 3. The piston member 34 also preferably has a recess or cavity 38 formed in the lower surface.

A round one piece flexible valve member 40 (FIGS. 5 and 6) which includes an annular peripheral bead 42, a relatively round central valve portion 44 and a web 46 with spaced perforations 48 therethrough is mounted with one side of the bead portion 42 adjacent to the flange 30, and the opposite side thereof pressed into engagement with a closure member 50 to form a seal therebetween.

The closure member 50 is attached to the member 26 by crimping or otherwise attaching it adjacent to one end of the tubular applicator member 26, and the member 50 includes a sidewall portion 52 crimped at 53 which is where a groove 54 is formed in the member 26. The closure member 50 also has an integral annular end wall portion 56 with a central opening therethrough formed by an annular flange 58. The free inner end of the flange 58 normally engages the valve member 40 on or adjacent to the rounded central portion 44 thereof to seal the applicator 14 in a normally closed condition as shown in FIGS. 3 and 5. In this condition the inside of the applicator 14 is sealed against the loss of its contents.

Another flanged member 60 is mounted on the same end of the applicator 14 as the closure member 50 and surrounds and encloses the member 50. The member 60 is also mounted on the outer surface of the tubular applicator member 26 and may be crimped thereto, if desired. The member 26 may also have an outside shoulder 61 formed thereon to limit movement of the member 60 when it is installed. The portion of the member 60 that is mounted on the member 26 is cylindrical in shape and is connected to another flanged end portion 64 which has a central opening 65 therethrough. An operator or button member 66 shown defined by a cylindrical side portion 68 having an annular outwardly extending bead 70 formed on one end is positioned for limited free movement in the opening 65. The operator member 66 also includes aligned connecting and communicating tubular stem portions 72 and 74 which extend from opposite ends thereof and which communicate through a passage 76. The stem portion 72 has one or more notches 78 formed in its free end, and the stem 74 likewise has one or more notches 80 formed in its free end. In the inoperative position of the applicator 14, which is the position when the applicator is not being used either to dispense a substance or to receive a charge from an aerosol container, the operator member 66 will be in a free open ended position as shown in FIGS. 3 and 5.

In addition to the features described above, the applicator 14 has an elongated operator member 82 which is slidably positioned in the tubular member 26. One end 84 of the operator member 82 is positioned to engage one end surface of the piston member 34, and the opposite or free end 86 of the member 82 is located outside of the applicator 14 in position so that the user of the device can apply thumb or finger pressure against the end 86 which in turn is applied against the piston 34. Such pressure is applied when operating the subject device to dispense its contents as will be explained. The operator member 82 also has spaced portions or lands 88 and 90 at the intermediate locations shown. All four operator portions or lands 84, 86, 88 and 90 are connected by longitudinally ex-

tending ribs 92 which extend substantially the full length of the member 82. The parts or the ribs 92 that extend between the lands 84 and 90 and between the lands 86 and 88 are preferably somewhat narrower than the rib parts that extend between the lands 88 and 90, and the land 88 is made to be large enough in diameter so that it will engage but not pass through an annular flange 94 formed at the upper end of the member 26. This therefore limits how far the member 82 can move out of the member 26 and prevents it from coming out altogether. This is clearly illustrated by the two extreme positions of the member 82 as shown in FIGS. 3 and 4, FIG. 3 showing an inoperative position of the member 82 when the applicator is sealed closed but is empty, and FIG. 4 showing the position of the member 82 when the applicator is full after having been filled and charged from the aerosol container 24.

The applicator 14 is filled from the aerosol container 24 when it has been separated or removed from the holder 12. To accomplish this the aerosol container 24 includes an especially constructed female type valve means which are constructed to cooperate with the tubular portion 74 of the operator member 66 as shown in FIG. 4. The particular construction of the valve means on the aerosol container 24 as shown is preferred because this construction discourages unauthorized tampering and accidental discharge of the contents of the aerosol container 14.

The valve means on the aerosol container 24, like the valve means on the applicator 14 include a flexible valve member 100, similar to the valve member 40 shown in FIG. 6, which member is mounted in a flanged closure member 102 so as to normally sealably close the upper end of the container 24. The closure member 102 includes a peripheral portion which is crimped onto or otherwise sealably attached to the upper edge of the container by suitable means which may include sealing means 104. The closure member 102 also has a central portion 106 including a central flanged portion 108 that accommodates the valve member 100 in such a way that the outer peripheral edge or bead portion is compressed between the flanged central portion 106 of the closure member 102 and the upper end of a dip tube assembly 110 which is also crimped or otherwise attached to the closure member 102. The central rounded portion of the valve member 100, or the portion adjacent thereto, is normally biased into engagement with edge 112 on the flanged portion 108 to form a seal therewith in a well known manner.

The dip tube assembly 110 extends from adjacent to the valve member 100 at one end thereof to the opposite or lower end of the container 24. It can therefore be seen that with the present container valve construction there is nothing that projects above the container closure member 102 to be accidentally bumped or operated to discharge the contents of the container 24. This makes the container relatively unattractive to children or others who may desire to tamper with it, and it also means that if the container should fall on its upper surface, the valve means will not open accidentally because there are no projecting parts to cause this. This is highly desirable especially when the subject containers are used for medicinal, pharmaceutical, paints and other products and substances which if they escape can cause loss and damage.

As already stated, FIG. 4 shows the applicator 14 in position cooperatively engaging the valve means on the aerosol container 24 during filling and charging of the applicator 14. During this operation, some of the pressurized contents of the aerosol container, including the substance confined under pressure and the propellant, will move up from near the bottom of the container 24 through the dip tube assembly 110 and will pass through the communicating valve means on the container and on the applicator, both of which are open during filling and charging, and into the applicator. This condition is obtained by placing the male portion 74 of the applicator operator member 66 in the central flanged portion 108 of the closure member 102 on the container and applying sufficient pressure thereagainst so that the portion 72 on the operator 66 moves against and opens the applicator valve member 40

while the portion 74 simultaneously moves against and opens the container valve member 100. When this happens the material that flows up through the dip tube 110 will pass through the perforations in the valve member 100, through the notch or notches 80 in the portion 74, through the passage 76 in the member 66, out through the notch or notches 78 in the portion 72, and finally through the perforation 48 in the valve member 40 into the applicator chamber. Material from the aerosol container will continue to flow into the applicator through the passageway just described, and will be applied against the lower surface or cavity 38 in the piston member 34 causing the piston and the associated O-ring 36, if used, to move away from the valve member 40 toward the opposite or upper end of the applicator. The piston 34 will continue to move in this manner until it is stopped either by engagement with the turned in portion 32 of the member 28 or by the land 88 on the operator member 82 engaging the shoulder 94 whichever occurs first. When the piston 34 stops, the communication between the applicator and the aerosol container which has been established should be maintained for a time long enough to permit the pressure inside of the applicator to equalize itself to the pressure inside of the aerosol container. This usually takes only a relatively short time and is highly desirable to do since it assures that the applicator will be filled and charged to predetermined and accurately determinable condition. This combined action of filling and charging the applicator therefore very accurately and precisely measures each dosage.

Once the applicator 14 has been filled and charged in the manner described, it is ready for use, but before it can be used it must be repositioned in the holder 12 as shown in FIGS. 1-3. The operator member 66 will now engage the surface 22 on the flanged portion 20 of the holder 12, and in this position the device including the holder is positioned or aimed at the area where the contents are to be applied. This may include inserting the device into a body cavity such as a vagina or other cavity, or the device can be used by applying its contents to some external or other surface as desired. The actual application is accomplished by holding and supporting the instrument, including the applicator and holder, with the index and center fingers straddling the flange 18 on the holder, and applying thumb or other pressure against the free end portion or land 86 of the operator member 82 in a direction to move it toward the piston 34. This force tries to move the piston 34 toward the valve member 40 and the same time presses the member 66 against the shoulder 22 on the holder 12. This in turn presses the portion 72 of the member 66 against the round central portion 44 of the flexible valve member 40 causing the valve to open. The pressurized condition of the material in the applicator is then combined with the force applied on the piston 34 to discharge the contents of the applicator 14. The dispensing operation takes only a very short time and is completed when the piston member 34 has been moved to the end of its travel adjacent to the valve member 40.

The tubular portion 74 of the member 66 preferably should not extend substantially beyond the end of the holder 12 when the applicator is in the holder 12 to minimize projection of the portion 74 and to prevent any relatively sharp edges from coming in contact with and possibly causing damage or bruising the tissue adjacent to where the application is made. This is especially important when the device is used for applying substances into body cavity where the tissue is delicate and sensitive. The extent of projection of the portion 74 is illustrated in FIG. 3. When the contents of the applicator have been exhausted the applicator is removed from the location where the application is made and is separated from the tubular member for cleaning and maintenance.

It is important to note that once the subject applicator has been filled and charged from an aerosol container it will remain so indefinitely. However, if some leakage should occur to reduce the pressure and/or the charge it is an easy matter to recharge the applicator to its desired condition using exactly the same procedure discussed above. Furthermore, this can be

done without any substantial waste since it is not necessary in order to recharge the applicator that its contents be discharged.

In the particular form of the device as shown, a collar member 114 (FIGS. 3, 4, 7 and 8) is positioned on the applicator portion 14 and is relatively freely slidable therealong, being prevented from sliding off one end of the member 26 by a flange 116 (FIG. 3) and off the other end by a pair of outwardly extending portions 118. The collar 114 has an annular flange 120 at one end, and one or more outwardly extending ribs or other similar means 122 which cooperate with the inner surface of the enlarged portion 116 of the holder 12 to provide a frictional connection therewith when the applicator is positioned in the holder 12. This holds the applicator 14 and the holder 12 together as a unit and restricts undesirable movement therebetween when not being used. This enables a person to carry such a device in a purse or other container without having it come apart or accidentally be discharged by pressure applied against the member 66. At the same time, the frictional engagement described permits the applicator to move or slide longitudinally in the holder through the member or collar 114 when the device is to be used. The collar 114 therefore provides a means for maintaining the applicator and holder assembled as a unit and yet does not prevent its operation when needed. Also the collar does not prevent separation of the applicator from the holder when necessary to do so. The collar 114 may also be of some help to the user when holding and supporting the applicator during filling and charging thereof.

There has thus been shown and described novel rechargeable applicator means which fulfill all of the objects and advantages sought therefor. Many changes, alterations, modifications, and other uses and applications of the subject device will, however, become apparent to those skilled in the art after considering this specification and the accompanying drawing which discloses a preferred embodiment thereof. All such changes, alterations, modifications, and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention which is limited only by the claims which follow.

What is claimed is:

1. A dosage applicator comprising a tubular member closed at one end by normally closed valve means, a piston constructed of a relatively resilient material slidably and sealably positioned in said tubular member to define therewith and with the valve means an expandable chamber adapted to be substantially filled with a liquified substance under pressure to be dispensed therefrom, an operator member mounted for limited movement on said applicator, said operator member having a first portion engageable with the applicator valve means and a second portion opposite to said first portion, said first and second portions having a communicating passageway therethrough, a holder constructed to receive said applicator, said holder having means thereon engageable with said operator member adjacent to the said second portion thereof when dispensing the contents of the applicator, means on said applicator by which a force can be applied against the piston in a direction to move the piston inside the tubular applicator member toward the valve means, said force also being applied through the holder and through the operator member engaged therewith against the applicator valve means in a direction to open the applicator valve means so that the contents of the applicator can escape through the communicating passageway in the operator member.

2. The dosage applicator defined in claim 1 including housing means for mounting said operator member on said applicator, said housing means permitting limited movement of the operator member between a first position engaging and opening the applicator valve means and a second position permitting the applicator valve means to close.

3. The dosage applicator defined in claim 1 wherein said resilient piston is slidably and sealably engageable with the inside of the tubular applicator member, and means limiting

movement of the piston in the applicator between a position adjacent to the applicator valve means and a position in which the piston is spaced a predetermined distance from the applicator valve means.

4. The dosage applicator defined in claim 1 wherein said piston includes a member having an outside groove formed therein, and an O-ring mounted in said groove and compressed thereon between the said piston member and the inner surface of the tubular applicator member.

5. The dosage applicator defined in claim 1 wherein said tubular applicator member has a metal sleeve member positioned in the end thereof adjacent to the applicator valve means, said piston being positioned for sliding movement in said sleeve member.

6. An applicator for receiving a charge from an aerosol container having closure means on one end thereof including normally closed valve means and a dip tube assembly associated therewith, said applicator including an applicator body portion having normally closed valve means on one end thereof and operator means mounted for limited movement on said applicator, said operator means having a first portion adapted to cooperate with the valve means thereon and a second portion adapted to simultaneously cooperate with the valve means on the aerosol container during filling and charging of the applicator therefrom, said applicator including a tubular member closed at one end by the said applicator valve means, a resilient piston slidably and sealably positioned in the tubular member and movable therein from a position adjacent to the applicator valve means to a position spaced a predetermined distance therefrom to define an expandible applicator chamber which controls and limits the amount of charge that can be contained therein, and a passageway through said operator means for establishing communication between the first and second portions thereof and between the inside of the applicator and the inside of the aerosol container when pressure is applied on the applicator and on the operator means mounted thereon in a direction to simultaneously open the valve means on the applicator and on the aerosol container.

7. The applicator defined in claim 6 wherein the valve

means on the applicator are female type valve means, said first and second portions of the operator means including spaced and opposed male portions adapted to cooperate respectively with the said applicator and aerosol container valve means.

8. A dosage applicator comprising a tubular member closed at one end by normally closed valve means, a piston slidably and sealably positioned in said tubular member to define therewith and with the valve means an expandible chamber adapted to be substantially filled with a liquified substance under pressure to be dispensed therefrom, an operator member for said applicator, said operator member having a first portion engageable with the applicator valve means and a second portion opposite to said first portion, said first and second portions having a communicating passageway therethrough, a holder constructed to receive said applicator, said holder having means thereon engageable with said operator member adjacent to the said second portion thereof when dispensing the contents of the applicator, means on said applicator by which a force can be applied against the piston in a direction to move the piston inside the tubular applicator member toward the valve means, said force also being applied through the holder and through the operator member engaged therewith against the applicator valve means in a direction to open the applicator valve means so that the contents of the applicator can escape through the communicating passageway in the operator member, and housing means for mounting said operator member on said applicator, said housing means permitting limited free movement of the operator member between a position engaging the applicator valve means and a position spaced therefrom, said operator member including a member having a central portion, and said first and second operator member portions include opposed tubular portions smaller in diameter than the central portion, said housing means for mounting said operator member on the applicator including means whereby one of said opposed tubular end portions is positioned to cooperatively engage the applicator valve means, the opposite tubular end portion of said operator member extending through said housing means.

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