Oct. 15, 1968 J. E. LENZ ET AL 3,405,844

CARTRIDGE DISPENSER

Filed June 6, 1966 2 Sheets-Sheet 1

FIG. 1

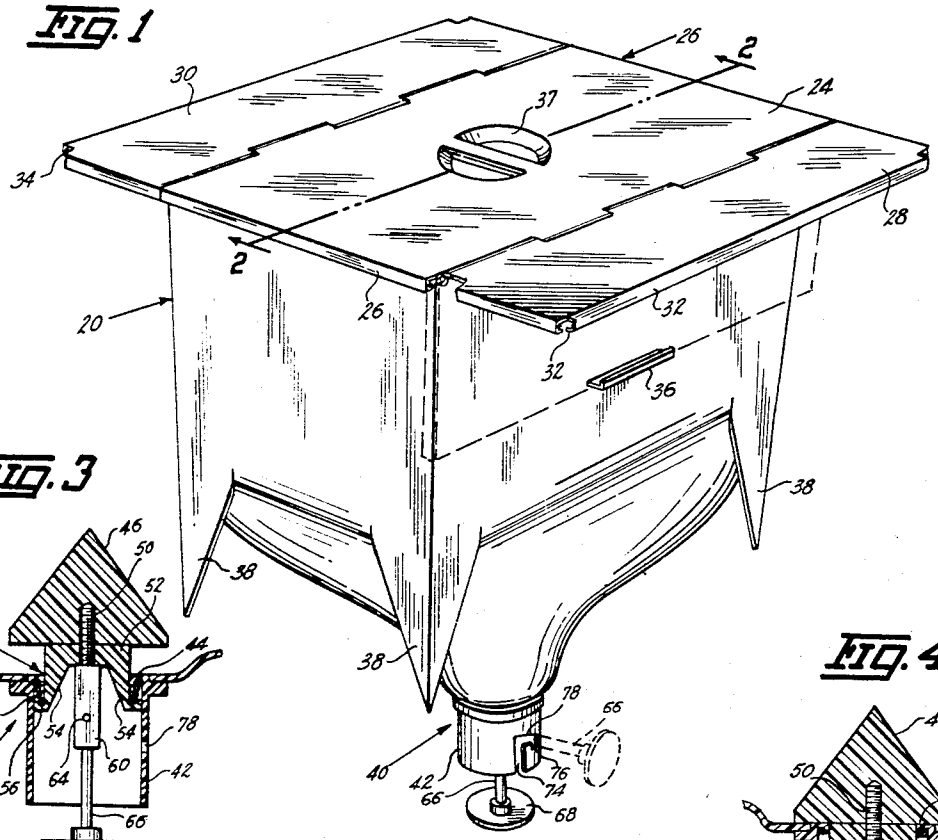


FIG. 3

FIG. 4

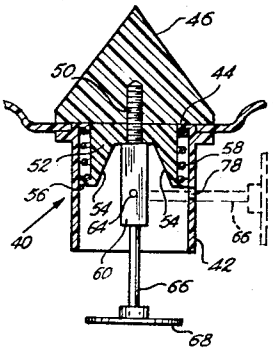


FIG. 5

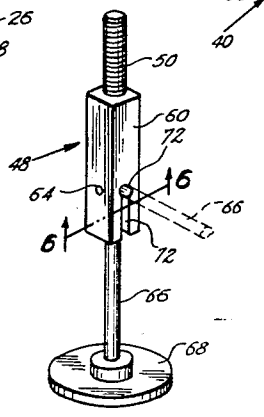


FIG. 6

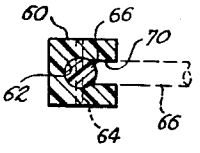
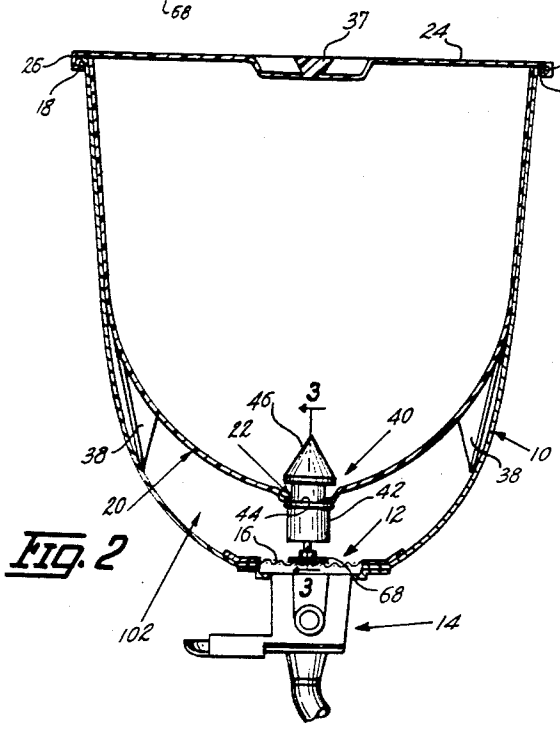


FIG. 2



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CARTRIDGE DISPENSER

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FIG. 7

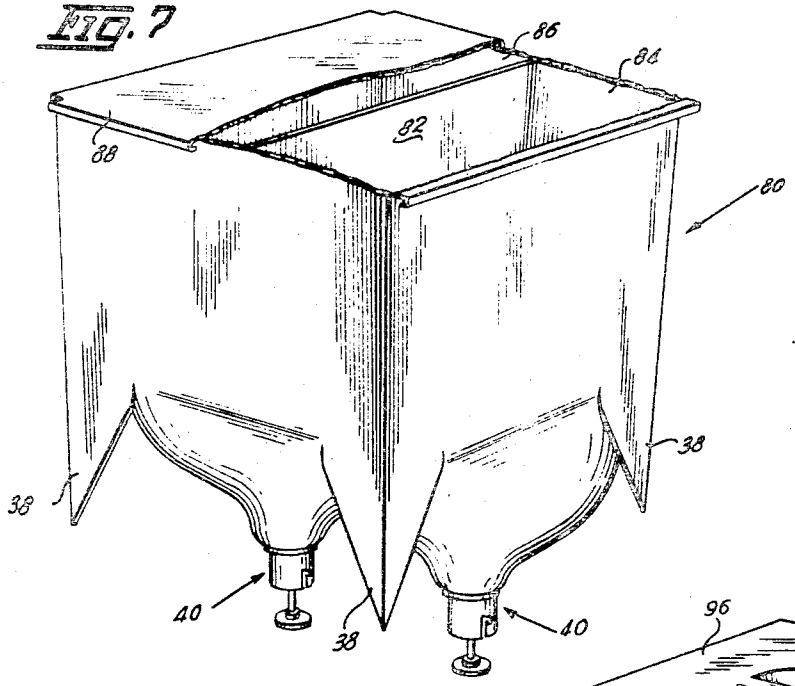


FIG. 8

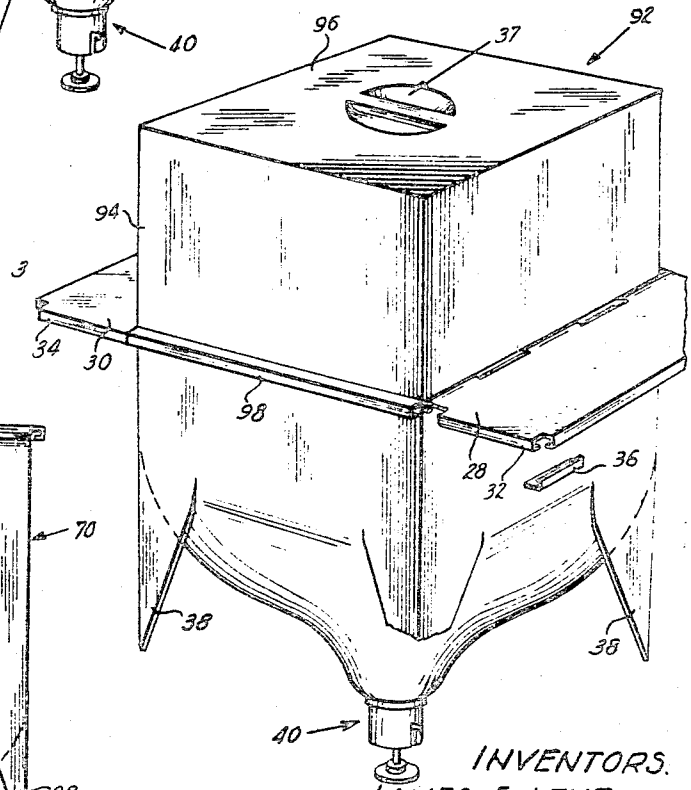
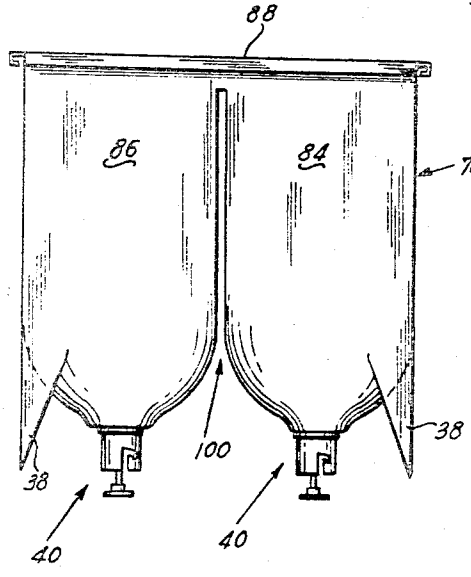


FIG. 9



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United States Patent Office 3,405,844 Patented Oct. 15, 1968

3,405,844

CARTRIDGE DISPENSER

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Filed June 6, 1966, Ser. No. 555,485
8 Claims. (Cl. 222—162)

This invention relates to improvements in apparatus for dispensing materials that preferably are in granular or powder form or the like, and more particularly it is concerned with an expendable, throw-away cartridge container having dispensing means associated therewith.

One of the important objects contemplated by this invention is the provision of an expendable cartridge as indicated above whereby the contents of such cartridge can be stored, transported and dispensed without the necessity of being touched or handled by any person or persons who may be involved with the use thereof.

While the present invention will be susceptible of use with a variety of materials including fluids, as will later appear, it has special utility for use with such materials as insecticides and herbicides where contact of such materials with a persons' skin or the breathing of dust therefrom is very deleterious to human health. The use of these materials is very widespread particularly in agricultural areas but also in urban areas on a more limited scale, and while there are many advantages to their use, the dangers to human health is so vital and important that much publicity has been generated on what should be done after a person has been exposed to contamination. The health of many persons is seriously affected every year from exposure to and contact with insecticides and herbicides because presently such materials are packaged in bags that cannot only become easily torn or ruptured so as to spill their contents but from which the contents must be poured into one of many different dispensing and metering application devices that are available. Invariably in the physical handling of these materials as presently required, one is more likely than not to come in contact with them by touch or breathing and suffer considerable injury to their health.

With these observations in mind this invention contemplates overcoming these disadvantages in the handling of materials of the type referred to by providing a new throw-away type of cartridge container which has a single valved opening that can be used for both filling the cartridge where the materials are manufactured or prepared and for dispensing them at the point of use.

A further object herein is to provide a cartridge dispenser of the above class which is designed for use with dispensing and metering applicator devices already available for the materials indicated. In this regard, a further object is to provide that our new cartridge may be easily placed into and removed from such dispensing and metering applicator devices and by reason of a novel valved opening, such opening is automatically opened when the cartridge is placed in the applicator whereby the contents of the cartridge are dispensed into such applicator.

A still further object is to provide that the opening in the cartridge is automatically closed when the cartridge is removed from the applicator.

Additionally, it is an object of this invention to provide a cartridge as set forth which is water and moisture tight for the purposes of eliminating spoilage and damage to the contents from such causes.

Still another object contemplated herein is provision of a valve locking means to lock the valve in closed position against accidental actuation in situations where such opening should be closed such as in storage or transportation.

A further feature of this invention resides in the design of our cartridge being such that it includes an integral

cover which is adapted to provide a tight closure over the applicator in which this cartridge is used.

To attain these objects and such further objects as may appear herein, or be hereinafter pointed out, reference is made to the accompanying drawings forming a part hereof, in which:

FIG. 1 is a perspective view of a preferred embodiment of the cartridge of this invention,

FIG. 2 is a cross sectional view taken on the line 2—2 of FIG. 1 but showing the cartridge of FIG. 1 nested within a material applicator device of a well known design.

FIG. 3 is an enlarged sectional view of the valved opening in this cartridge shown in open position,

FIG. 4 is similar to FIG. 3 but showing the valve closed,

FIG. 5 is an enlarged fragmentary perspective view of the valve actuating assembly shown in operable position in solid lines and shown in locked position in broken lines,

FIG. 6 is a cross sectional view taken on the line 6—6 of FIG. 5,

FIG. 7 is similar to FIG. 1 but illustrating this cartridge with two partitioned chambers each having a respective valved opening,

FIG. 8 is a perspective view similar to FIG. 1 but showing a modification to permit the cartridge to have a greater capacity, and

FIG. 9 is similar to FIG. 7 except that the double cartridges are slightly spaced apart over the major extent of their height rather than partitioned as in FIG. 7 and is for the purpose of use with applicator devices that have partitions or dividers.

Referring to the drawings, a hopper 10 represents generally one of many well known hopper components on a material metering and dispensing applicator for insecticides and herbicides. Such hoppers as presently used may be of different shapes such as generally rectangular or square; will be an open top type of container and will terminate at the bottom in a dispensing opening 12 which will communicate with appropriate metering and dispensing apparatus illustrated schematically and in part at 14 as is well known and to which no invention is claimed. Hole 12 is customarily covered with a screen 16 and according to present practices, material to be metered is poured or dumped in the hopper 10. A detachable snap on cover (not shown) is usually provided for hopper 10 to engage the peripheral curled lip 18 at the top but such a separate cover is no longer required with our cartridge as will later appear.

With reference now more particularly to FIGS. 1 and 3–6, our new cartridge is designated generally by the numeral 20. No specific shape is required for cartridge 20 and we have preferably made it generally rectangular and since it is designed to be placed within a hopper 10, it will be understood that the overall dimensions of the cartridge will be such as to permit its use in this manner. The bottom of the cartridge 20 converges in a more or less funnel-like manner to an opening 22 to assure the flow therethrough by gravity of the contents of the cartridge. The top of cartridge is sealed by the integral panel 24 which includes two opposed folded under edges 26—26 for a snap-on fit with two opposed lips 18 on hopper 10. If cartridge 20 is designed for a specific hopper, or vice versa, all four sides of panel 24 may have the fold 26, but where this may not be the case, additional panels 28 and 30 are hingedly attached to panel 24 and provided with respective folded edges 32 and 34. It is the purpose here to provide that panels 24, 28 and 30 in combination will cooperate to provide a suitable snap-on cover for the hopper in which cartridge 20 is used. Such panels as 28 and 30 are hinged to permit of folding to the broken line position in FIG. 1 for purposes of storage and transportation and edges or lips 32 and 34 can be releasably locked in folded position by engage-

ment with the beads **36** on the side of cartridge **20**. To facilitate the handling of this cartridge, a suitable handle means is provided on panel **24** as illustrated at **37**.

Cartridge **20** is made from a light weight material such as plastic, Styrofoam or the like and is preferably of a rigid character as distinguished from a collapsible bag type container. Also it is preferably of water proof material although this is not required if, in its use, the waterproof charcteristic is not desired or required. In general, cartridge **20** should be adequate for its intended use, but sufficiently economical that it can be discarded once the contents are emptied.

Tapered leg members **38** depend from each bottom corner of cartridge **20** and serve to stabilize the cartridge when it is being used. However, this cartridge may be used without such legs, if desired.

Fitted into opening **22** so as to depend therefrom is the valve assembly **40** which includes a sleeve **42** secured therein in any suitable manner. The inserted end of sleeve **42** defines an inwardly extending annual shoulder **44** for which the top side within the cartridge serves as a valve seat. A cone shaped valve **46** with its apex end disposed toward the top of the cartridge is seatable on seat **44** and vertically movably relative thereto as follows: A valve actuating plunger assembly **48** as best seen in FIG. 5 includes a stationary rod portion **50** for threadable attachment at its upper end to valve **46** and to a spider member **52**. Spider **52** includes a plurality of legs **54** having hooked ends **56**, and a spring **58** abuts the hook ends **56** and the other end abuts the underside of shoulder **44**. Thus far described, spring **58** normally urges valve **46** into closed position and in this regard, it will be understood that seat **44** may be provided with an O-ring or the like if desired.

The bottom end of rod **50** is secured to a lock block or lock mount **60** having the longitudinal bore **62**. Pivotally connected by pin **64** to the lower end of the stationary rod **50** so that it can be aligned axially therewith in bore **62** or moved angularly in relation thereto as will appear, is the movable portion of the plunger actuating rod **66** which terminates in a disc-like or flange-like plate **68**. The bottom of block **60** is provided with a key hole slot **70** (FIG. 6) and rod **66**, when in the position shown in FIG. 5 where the plane of plate **68** is below the bottom plane of legs **38**, is locked in slot **70** in axial alignment with rod **50** whereby pressure on plate **68** will effect the longitudinal movement of rods **66** and **50** and the corresponding opening of valve **46**. Likewise, removal of pressure on plate **68** will cause spring **58** to return valve **46** to closed position. In this regard, it will be understood that plate **68** is below legs **38** a sufficient distance to permit the operation of valve **46** as described.

Slot **70** communicates with a like key hole slot **72** in the bottom side portion of block **60** so that rod portion **66** can be pivoted relative to rod **50** and moved out of slot **70** and into slot **72** where it is locked at an angular position to rod **50** as seen in FIG. 5.

With reference now to FIGS. 3 and 4 it will be seen that the bottom of block **60** is well recessed within sleeve **42** and such sleeve is provided with a bayonet slot **74** communicating with the bottom end of such sleeve as seen in FIG. 1 and in registration with slot **72** in block **60**. Thus, when rod **66** is moved into slot **72** in block **60**, it also moves into slot **74** in sleeve **42** and it will be understood that at such time valve **46** is in closed position and plate **68** is now positioned above the bottom edge of block **60** so that rod **66** abuts the top of slot **74** whereby plunger assembly **48** cannot be moved upwardly to open valve **46**. Also, since the entire plunger assembly **48** and valve **46** are rotatable, rod **66** can be easily moved laterally for locking engagement in the recess **76** of slot **74** whereby rod **66** is not only prevented from an accidental downward movement back to operable position, but by providing a slight downwardly incline of portion **78** of slot **74** leading to recess **76**, a downwardly pressure is exerted on spring **58** which enhances the sealing contact of valve **46** on seat **44**.

With reference now to FIGS. 7–9, we have illustrated certain variations of fee cartridge which are functionally the same as described above but vary in design as follows wherein like parts will be given like numerals. The cartridge unit **80** is similar to cartridge **20** but is divided by partition **82** into the two material receiving chambers or compartments **84** and **86**, each of which is provided at the bottom with a valve assembly **40** as described. The purpose of cartridge **80** is merely to provide means for handling different materials at the same time, if desired and, of course, it will be appreciated that if such materials are not used simultaneously, one valve assembly **40** can be open and one locked in closed position. Cartridge **80** also represents a unit adapted to fit a particular applicator whereby a single integral cover **88** is provided for a suitable snap-fit attachment to such applicator.

The cartridge unit **92** of FIG. 8 is similar to FIG. 1 but is designed for a greater material capacity by the addition of portion **94** which rises above the plane of the cover panels **28** and **30**. Portion **94** has the top **96** as shown and lips **98** are provided on the cartridge body to complement lips **32** and **34** in providing a cover on the applicator with which such cartridge will be used.

FIG. 9 is substantially the same as FIG. 7 with like numerals applied to like parts but the compartments **84** and **86** are separated by the spacing **100** rather than a partition **82**. The purpose of this arrangement is to accommodate this new cartridge unit to those type of applicators which may have a center partition as a part of its basic design.

Operation

In describing the operation of this invention, reference will be made to cartridge **20** and it will be understood that the variations illustrated will operate in the same manner.

Cartridge **20** will be filled at the source of manufacture or processing for the material to be used and such filling will be accomplished through opening **22** which, as pointed out, is the only opening in the cartridge. It will be appreciated that such filling may be accomplished in a variety of ways and by reason of the locking facility afforded to valve assembly **40**, this may be a vacuum process so that the contents will be safe from deterioration pending use. Such cartridges when filled, can be easily stored and transported and if made of waterproof material, the contents will not suffer from moisture or water if they should become exposed thereto.

To use the cartridge **20**, it is inserted into an applicator as seen in FIG. 1 and before doing this, rod **66** will be moved to its operable position shown in FIG. 5 where valve **46** is still closed but ready for actuation. Legs **83** may bear against the inner sides of the applicator to aid in holding the cartridge upright although this is not necessarily required as the panels **28** and **30** will serve the same purpose. However, in the use of successive cartridges in any given applicator, there may be a residue of material in the bottom of the applicator and the pointed ends of legs **38** tend to penetrate such residue and aid in properly seating the cartridge as follows.

In inserting cartridge **20** into the applicator as described, plate **68** will come to rest on screen **16** as seen in FIG. 1 and as the cartridge is then depressed to clamp panels **28** and **30**, plunger assembly **40** will move upwardly to open valve **46** whereby the material in the cartridge will flow through opening **22** into the applicator. It will be noted that the bottom of cartridge **20** is spaced above the bottom of the applicator to provide a material accumulation or reserve chamber **102** from which the material will flow into the metering and dispensing unit **14** in a well known manner. It might also be mentioned that some applicators are of transparent material so that the level in chamber **102** can be visually observed. Thus far described, it will be appreciated that the contents of cartridge **20** can be effectively loaded into the applicator

and dispensed therefrom without any necessity for physical contact therewith by any personnel and likewise no dust is created which can affect such personnel as pointed out earlier.

In removing a cartridge after it is completely empty or even partially empty, it is merely lifted out and as this is done, spring **58** will automatically close, valve **46** while it is still in the area defined by chamber **102**. If the cartridge is empty, it is discarded, and if not empty, the valve assembly **40** can be washed or hosed off, rod **66** moved to a locked position as described and the cartridge can be retained for further use, if desired.

The advantages of this cartridge in handling materials such as insecticides and herbicides which can be very harmful to humans should be obvious from the foregoing description but it will be apparent that such cartridges can be used with many other materials including liquids that may be supplied to metering and dispensing apparatus therefor. One such example of further use for this cartridge is to provide a premeasured amount of pre-packaged corn seed to conventional corn planting devices. Such devices presently use large supply containers into which the seed is placed for processing through the planter and such seeds usually require several days after planting to start germinating. With our cartridge, seeds can be processed to the point of germination, vacuum packed in one of these new cartridges and then when dispensed into the planter and planted, germination will start almost immediately and thus save several days of time over present methods.

From the foregoing it is thought a full understanding of construction and operation of this invention will be had and the advantages of the same will be appreciated.

It will be understood that the phraseology employed herein is for the purpose of description and not for limitation and that modifications and changes in the construction and arrangement of this invention can be made within the scope of what is claimed, without departing from the spirit and purpose thereof. It is thus intended to cover by the claims, any modified forms of structure or mechanical equivalents which may be reasonably included within their scope.

We claim:

1. A cartridge dispenser apparatus comprising:
an enclosed container having a top and a bottom and provided with an opening in said bottom,
a normally closed valve assembly carried by said container,
said valve assembly including:
a valve seat disposed in said opening,
a valve seated on said valve seat,
a spring loaded slidable plunger rod assembly connected to said valve and having a member depending below the bottom of said container,
the placement of said container on a supporting surface causing said depending member to engage said supporting surface whereby said member is retracted to unseat said valve,
upon the removal of said depending member from said supporting surface, said plunger rod assembly acts to automatically re-seat said valve,
a sleeve secured to the bottom of said container so as to encase said plunger rod assembly,
said plunger rod assembly including:
a fixed rod member secured at one end to said valve,
a lock block secured to the other end of said fixed rod member and movable therewith and recessed within said sleeve,
a movable rod member pivotally attached at one end to said other end of said fixed rod member,
means on said lock block locking said movable rod member in axial alignment with said fixed rod member whereby the other end of said movable rod member projects downwardly from said sleeve for engagement with said supporting surface,
means on said lock block affording movement of said movable rod member out of axial alignment with said first rod member to an inoperable position above the plane of the bottom of said sleeve and out of contact position with said supporting surface, and
said last mentioned means also serving to lock said movable member in inoperable position.

2. A device defined in claim **1** including locking means carried by said valve assembly to render said depending member immobile.

3. A device as defined in claim **1** wherein said container is of waterproof material and said valve is in water and air tight sealing engagement with said valve seat.

4. A device as defined in claim **1** wherein said sleeve is provided with bayonet notch communicating with the bottom of said sleeve and said movable rod member is engaged in said notch to be held against accidental movement to an axially aligned position with said fixed rod member.

5. A device as defined in claim **1** wherein said notch includes a vertical portion and a lateral portion and said lateral portion is inclined downwardly to apply a downward pressure on said plunger rod assembly and enhance the sealing contact of said valve on said valve seat.

6. An expendable material containing cartridge to be inserted into apparatus for metering and dispensing the contents of said cartridge, said apparatus being of the type defining an open top hopper-like body with metering and dispensing mechanism in the bottom thereof; said cartridge comprising,
an enclosed container having a top and a bottom and provided with an opening in said bottom,
said opening serving both as the port for the filling of said cartridge and as the port for the dispensing of the contents of said cartridge,
a valve assembly disposed in said opening so as to normally close the same,
said valve assembly including a movable valve actuating member which in operable position projects downwardly from the bottom of said container,
the placement of said container on a supporting surface causing said depending member to engage said supporting surface whereby said member is retracted to unseat said valve,
upon the removal of said depending member from said supporting surface, said plunger rod assembly acts to automatically re-seat said valve, and
the top of said container defining a cover means for releasable attachment to the top of said hopper-like body to serve as a closure therefor.

7. A device as defined in claim **6** including locking means carried by said valve assembly to render said valve actuating member inoperable.

8. A cartridge dispenser apparatus comprising:
an enclosed container having a top and a bottom and provided with an opening in said bottom,
said opening serving both as the port for the filling of said cartridge and as the port for the dispensing of the contents of said cartridge,
a valve assembly disposed in said opening so as to normally close the same,
said valve assembly including a valve normally in closed position relative to said opening and a spring loaded plunger rod assembly connected to said valve for unseating the same,
said plunger rod assembly including first and second rod members of which said first rod member is fixedly attached at one end to said valve and one end of said second rod member is pivotally attached to the other end of said first rod member,
means on said valve assembly locking said rod members in axial alignment whereby a force applied to

the free end of said second rod member will be transferred through said first rod member to unseat said valve, and

means carried by said valve assembly for locking said second rod member in an angular position relative to said first rod member whereby said first rod member is prevented from acting on said valve.

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