Nov. 14, 1972 R. F. EWALD 3,702,669

AEROSOL CONTAINER

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Fig. 1

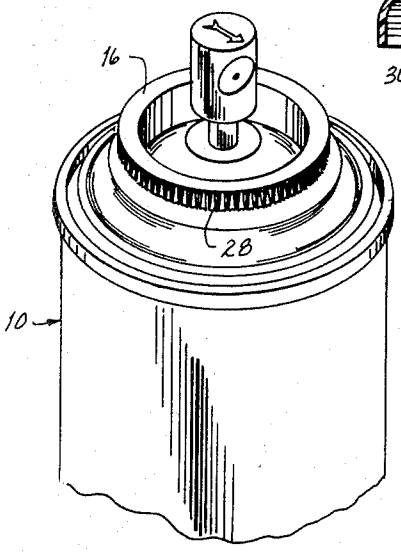

Fig. 2

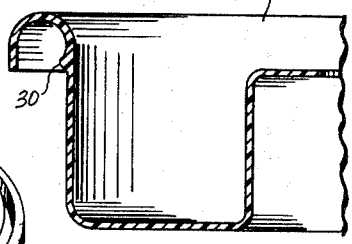

Fig. 3

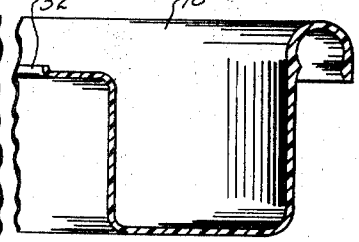

Fig. 4

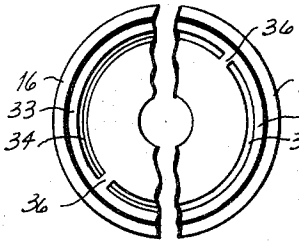

Fig. 5

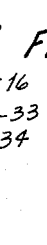

Fig. 6

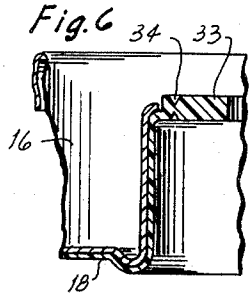

Fig. 7

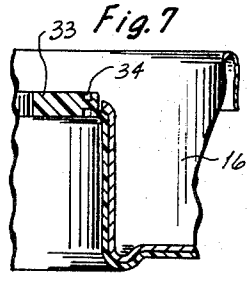

Fig. 8

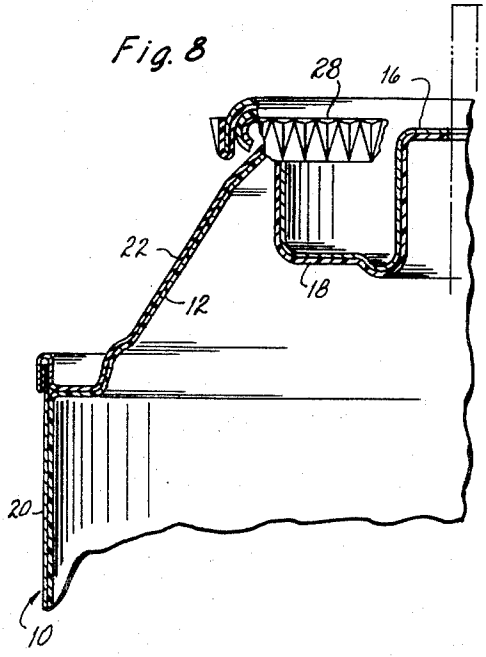

Fig. 9

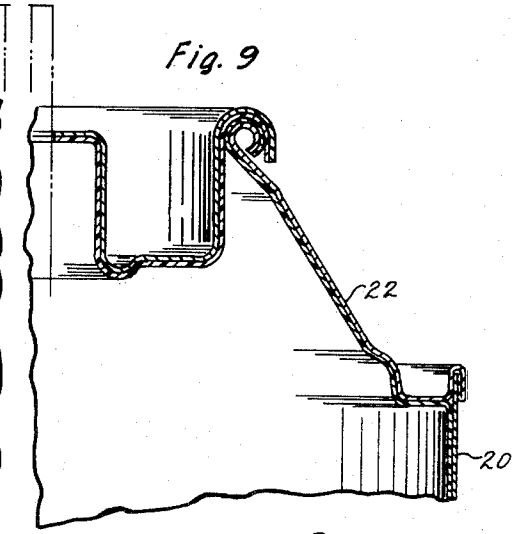

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Fig 10

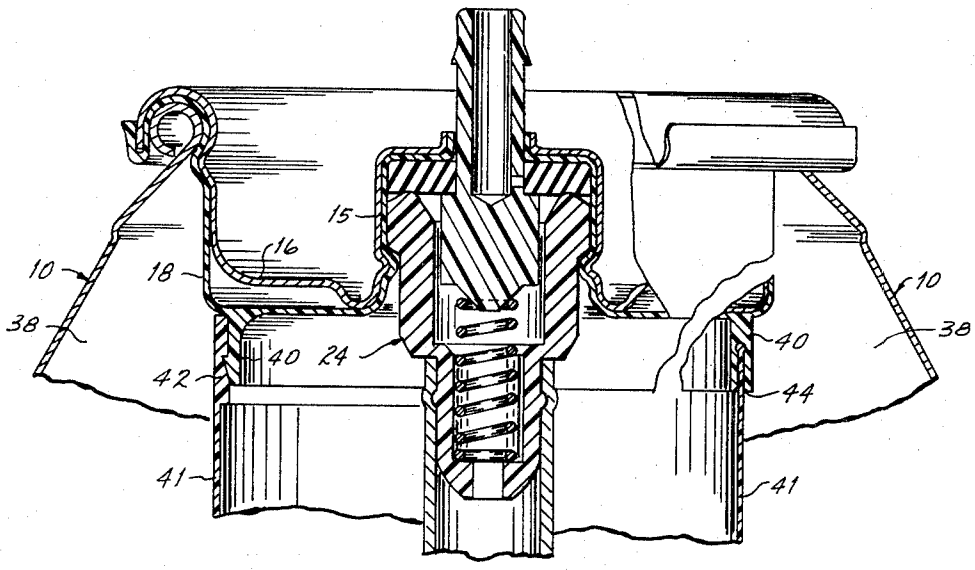

Fig. 11

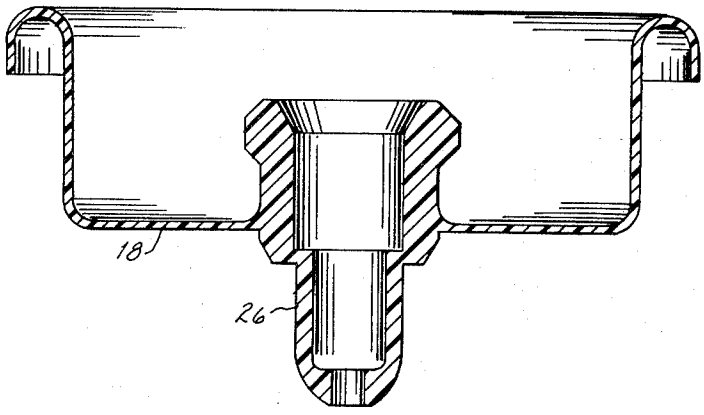

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Fig. 12

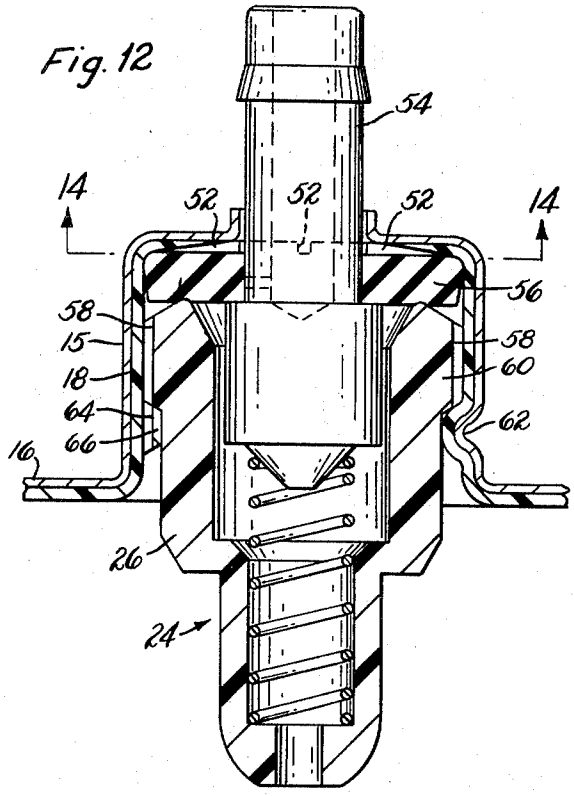
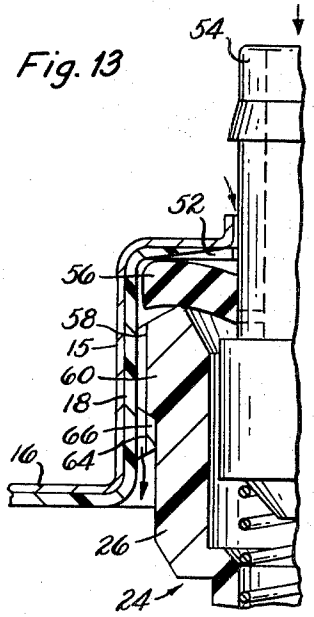
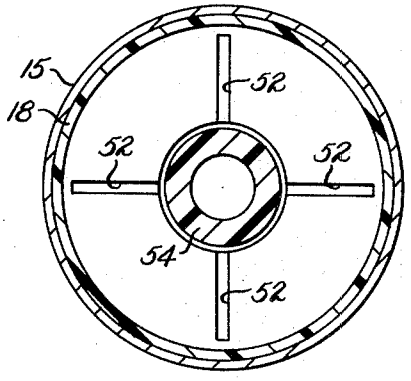


Fig. 13





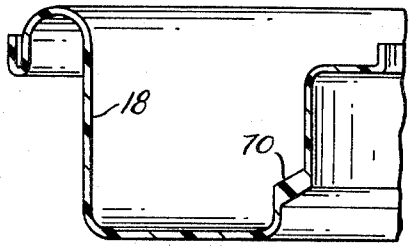


Fig. 15

Fig. 14

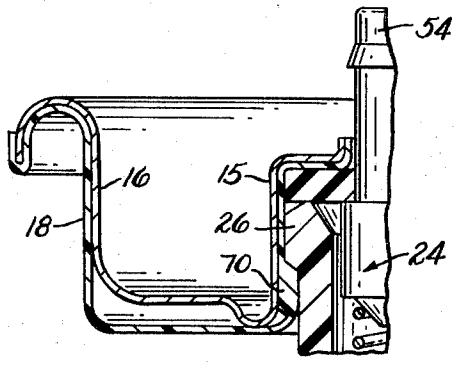


Fig. 16

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Fig. 17

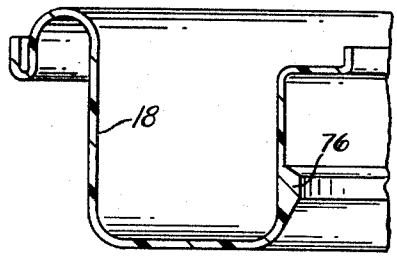
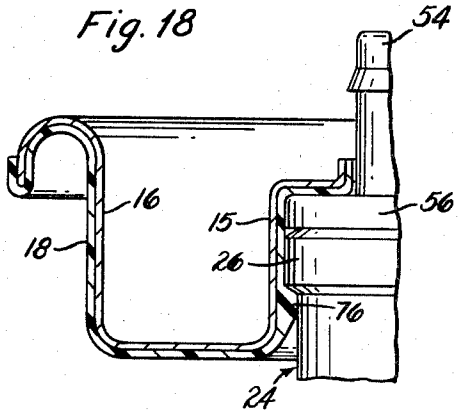


Fig. 18



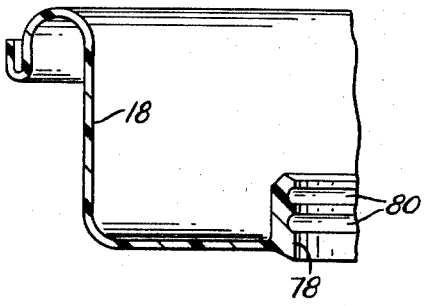


Fig. 19

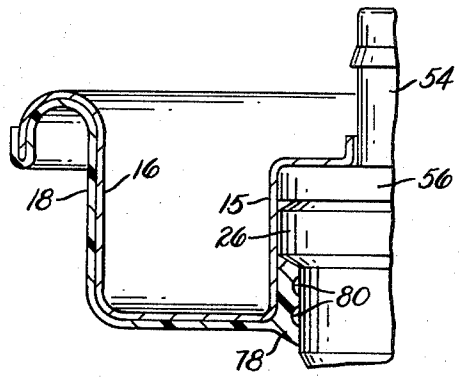


Fig. 20

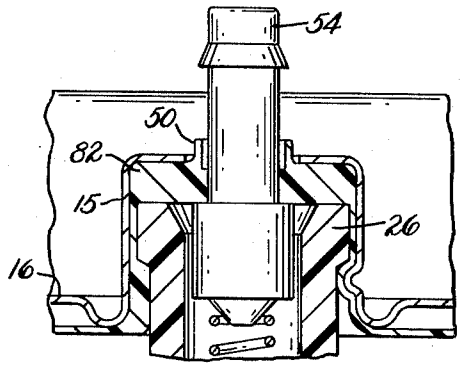


Fig. 21

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United States Patent Office 3,702,669 Patented Nov. 14, 1972

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AEROSOL CONTAINER

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Continuation-in-part of application Ser. No. 724,010, Apr. 28, 1968. This application Feb. 5, 1970, Ser. No. 8,847

Int. Cl. B65d 83/14

U.S. Cl. 222—402.16 2 Claims

ABSTRACT OF THE DISCLOSURE

An aerosol container with an inner auxiliary plastic container internal to the customary metal can. A preformed plastic disc contoured to fit against the inside of the usual mounting cup of the valve is crimped into the valve opening of the can to isolate all metal surfaces from the product within the container. The disc may be used decoratively or may have an annular inner groove to provide a safety release for excess pressure or be provided with an inner annular protrusion to hold a container of product separate from the propellant within the can.

This is a continuation-in-part of my co-pending application Ser. No. 724,010 filed Apr. 28, 1968 for an Aerosol Container now Pat. No. 3,512,685.

This invention relates to an aerosol container and more particularly to a unique structure for an aerosol container and valve wherein the product is isolated from all metal surfaces.

The modern trend to convenience items, especially, foods, has stimulated a great demand for aerosol dispensers. Today there is a great variety of products, available in aerosol form. It is likely that such a trend will continue at an even greater pace.

Each product has individual requirements. This has caused the development of many types and styles of aerosol containers. Certain requirements seem to be universal to the field.

One is that an aerosol container must be safe. The propellants, being pressurized, always presents the possibility of explosion, should the container be accidentally or intentionally exposed to heat. While manufacturers have tried to minimize the risk, nevertheless, an occasional potentially dangerous explosion does occur. This usually happens when trash is burned, either by an individual or by city sanitation workers. Until now, the only practical solution has been to strengthen the container. But this, unfortunately, increases costs as well as the violence of potential explosions.

An aerosol packaged product should also have a good shelf life. This requires not only good seals but also chemical inertness or isolation of the product, propellant, solvent, if any, and container. Many products unfortunately react chemically with the propellant, the container, or the components of the valve. This is particularly troublesome where the product is food. Indeed, only limited usage of aerosols has occurred in the food industry due to the tendency of many foods to take on an unpleasant taste because of admixture with the propellant or reaction with the metal usually used in aerosol containers. Attempts have been made to prevent reaction with the metal of the container by spraying a plastic film on the inside of the container. Unfortunately, such film usually has numerous pin holes which allows eventual interaction between the food and the metal. Isolation of the food from the propellant has also been tried by use of separate concentric compartments, but such a structure is usually too expensive.

An aerosol container must also be economical due to its throw-away nature. Fortunately, the manufacturing and

filling procedure has been so developed that aerosols are feasible for all but the most inexpensive products.

An aerosol container should also be attractive. Many of the products dispensed from aerosol containers compete in very competitive markets. In many cases, success or failure depends upon consumer appeal for the ease of dispensing or the package.

It is therefore an object of this invention to provide an aerosol container of unique structure.

Another object is to provide an aerosol container of the above character wherein there is no contact between the product and the metal surfaces of the container.

Still another object is to provide an aerosol container with safety features incorporated therein.

A further object is to provide an aerosol container wherein the propellant may be isolated from the product.

A still further object is to provide an aerosol container which is uniquely decorative.

Another object is to provide an aerosol container wherein the valve body uniquely comprises a portion of the mounting cup liner.

Another object is to provide an economical aerosol container.

Another object is to provide an aerosol container with increased consumer appeal.

Other objects of the invention will in part be obvious and will in part appear hereinafter.

The invention, in its most basic form, comprises an internal and auxiliary plastic container and a preformed plastic disc, both of which, when sealed together, provide a plastic barrier between the product and the aerosol can and the customary mounting cup usually used with such can. The plastic container is just slightly smaller in dimension and therefore can be inserted into the aerosol can during formation of the can. The plastic disc is formed to fit the contour of the mounting cup of the valve. Then when the valve is crimped into the can, a plastic to plastic seal is provided and the product and propellant are isolated from all the metal of the can and the valve.

The structure, broadly described above, permits certain unique additional structures. For example, by utilizing excess rim material in the plastic disc, such rim may be used decoratively around the mounting cup. The disc may also be weakened by an annular score line used in conjunction with a large axial opening in the mounting cup; a pressure safety is incorporated into the aerosol. One can also mold a valve body directly into the axial portion of the disc. Also, the mounting cup can be designed to retain an inner concentric chamber, whereby product and propellant may be stored separately. The product may be dispensed by the propellant collapsing the inner chamber, or by the use of a bleed valve which bleeds off the propellant with the product.

The invention accordingly comprises the features of construction, combination of elements, and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the invention will be indicated in the claims.

For a fuller understanding of the nature and objects of the invention, reference should be had to the following detailed description taken in connection with the accompanying drawings in which:

FIG. 1 is a partial prospective view of an aerosol container embodying this invention with the decorative rim feature thereof utilized around the rim of the mounting cup of the valve.

FIGS. 2 and 3 are section views of two embodiments of the disc for lining the mounting cup.

FIGS. 4 and 5 are top views of the safety valve feature.

FIGS. 6 and 7 are partial cross sectional views showing

the metal mounting cup and plastic disc-safety valve structure affixed thereto.

FIGS. 8 and 9 are cross sectional views showing the mounting cup with and without a decorative flaring of the plastic disc, crimped into the aerosol container.

FIG. 10 is a cross sectional view showing the auxiliary concentric chamber to separate the product from the propellant.

FIG. 11 is a cross sectional view showing the combined disc-valve body embodiment of this invention.

FIGS. 12 and 13 are cross sectional sequential views showing another embodiment which has a pressure fill assist structure.

FIG. 14 is a top view of the valve embodiment of FIG. 13, taken along lines **14—14**.

FIG. 15 is a partial cross sectional view of another embodiment of disc which has an automatic valve body retention means.

FIG. 16 shows the disc of FIG. 15 in use on a mounting cup.

FIGS. 17 and 18, and 19 and 20, show other embodiments of discs with automatic valve body retention means.

FIG. 21 is a cross sectional view of a valve embodying this invention and further having a stem guide structure therein.

Similar reference characters refer to similar parts throughout the several views of the drawings.

With particular reference to FIGS. 1, 8 and 10, it can be seen that the invention comprises an aerosol can **10** with an auxilary plastic container **12** internal to said can. The open center top of both said can **10** and container **12** are closed by crimping a plastic lined mounting cup **16** into said open center. A plastic disc **18**, contoured so as to fit mounting cup **16**, lines the inside of the cup and is interspaced between cup **16** and container **12**. In this manner a plastic to plastic seal is accomplished. Also, a closed all-plastic container is created for the product and propellant with no exposure to the metal surface of the can **10** or the mounting cup **16**.

Normally can **10** is formed by first side seaming metal sheet **20** into a tube and then attaching a crown cap **22** with an open center about one end and a flat base about the other end of said tube. Auxiliary plastic container **12** may be inserted through the bottom or the top, prior to affixing the crown cap or the base respectively. The plastic container **12** is preferably a blown plastic container with an integral crown top and bottom. The crown top has an open center which coincides with the open center of the crown top **22** of the can **10**.

Contoured disc **18** is placed in contact with cup **16** prior to crimping the cup into can **10**. The can may be filled with product prior to such or by pressure filling through the valve, both in accord with customary practice.

A valve assembly **24** of customary design, is crimped into turret **15** of the mounting cup **16** prior to insertion of the cup **16** into the open center of the metal can **10** (see FIG. 10). The edge of the cup is then crimped inwardly about the head of the open center of the crown top of can **10**. In one alternative embodiment (see FIG. 11), the valve housing **26** of the valve assembly **24** may be integral with disc **18**.

On still other alternate embodiments (see FIGS. 15 and 16; 17 and 18; 19 and 20), the valve housing **26** may be wedged into turret **15** by disc **18**.

For a decorative effect, the peripheral edge of disc **18** may be extended (see FIGS. 1 and 8), and turned up external to edge of mounting cup **16** to form a decorative flare **28**. It may even be printed or embossed or scalloped etc. Such is most easily accomplished when the disc is still flat and prior to vacuum forming into the desired contour. Printing etc. of the upturned edge may also be performed where the disc is injection or impact molded, after the molding thereof and prior to being joined to the underside of the mounting cup.

As seen in FIGS. 2 and 3, the disc may be extra thick at the rim area **30** of the mounting cup to avoid the need for gasket material usually used at such area. Also a valve guide **32** in the open center of the disc may be provided to aid in assembly of the valve or mounting upon the can **10**, or a stem guider **50** (see FIG. 21) may also be provided to aid in use.

In another embodiment, disc **18** may be provided with raised central portion **33** within an enlarged center opening in cup **16** to act as a pressure relief means in the event excess pressure develops within the can. Portion **33** is provided with an annular scoring **34**. Such scoring may be V shaped or any other configuration, as desired. Preferably at one or more locations, groove **34** has a safety tab **36** (FIGS. 4 and 5), so that disc **18** may fracture at groove **34** but not be completely severed, thereby avoiding a missile-like pressure release.

FIG. 10 shows still another embodiment wherein the propellant and the product are isolated both from each other and, if desired, one or both from contact with the metal can. Where both the propellant and the product are isolated from contact, the plastic container within the can structure of FIG. 8 is utilized. In the more likely situation, where only the product is to be isolated from the propellant from the can need be considered, the structure of FIG. 10 is preferred. In this embodiment an auxiliary concentric chamber **41** with a propellant reservoir **38** between chamber **41** and can **10** is provided. Chamber **41** is preferably of a pliant nature, such as polyethylene, polypropylene, nylon, etc., so as to transmit the pressure of the propellant charge to the product and thereby expel it out valve **24**. In such structure, chamber **41** may be either stretched about an annular protrusion **40** on disc **18** with anchor ring **42** or said chamber may be pressed into an annular slot **44** in protrusion **40**.

Referring now to FIG. 12, which shows the pressure fill assist embodiment, disc **18** has pressure fill grooves **52** on its undersurface within the turret section.

Referring now to FIGS. 15–20, three configurations of a valve body wedge containing disc **18** are shown.

In FIGS. 15 and 16, disc **18** has a thickened bend **70** which snaps into an annular wedge (compare FIGS. 15 and 16) when disc **18**, along with valve **24**, are forced into turret **15** of the mounting cup **16**. In FIG. 17, disc **18** has an annular valve body wedge ring **76** formed in its turret portion. Valve **24** is forced over ring **16** prior to insertion of disc **18** into turret **15**. The resilience of disc **18** enables such action. Thereafter annular ring **76** will hold valve **24** tightly without a crimp.

In FIGS. 19 and 20, another configuration is shown for the annular wedge ring. Here annular wedge ring **78** has several seal grooves **80** to improve the seal against the valve **24** when the assembly is wedged within the mounting cup **16**.

In FIG. 12, the wedge **66** could be a serrated ring, the serrations avoiding the need for pressure fill passages **64**.

FIG. 21 depicts the situation where the disc **18**, has an enlarged seal ring section **82** integral therewith. Section **82**, has a valve stem guide **50** protruding above the mounting cup **16**. Thus, as best seen in FIG. 13, when the aerosol container is pressure filled, the valve stem **54** is depressed by the pressure fill nozzle (not shown) which embraces turret **15**. This results in an inner flexing of seal **56**. Product, under pressure, is then forced into the aerosol valve via the clearance between the mounting cup **16** and the valve stem **54**. It then passes through pressure fill grooves **52**, toward and around the outer edge of seal **56** to valve bypass slots **58** on the outer surface of valve body **60** of valve **24**, then either through the clearance between crimp **62** and the valve body **60**, if the valve is crimped within the mounting cup **16**, or through pressure fill passages **64** in annular valve body wedge **66**, if the valve is wedged within the mounting cup **16**, as will be described hereinafter. The product then enters its usual storage cavity **68** within the aerosol container.

As should now be evident, a unique aerosol container has now been provided wherein contact between product and metal of the can is definitely prevented. This is in contrast to the haphazard protection accomplished by spraying a liner coating within the aerosol can. The structure described also enables isolation of the propellant charge from either or both of the product and metal can. Disc **18** can be easily and economically fabricated from sheet plastic by vacuum forming. Or both the disc and the plastic container may be fabricated by injection or impact molding with blow molding preferably used to fabricate the container. An increase in consumer appeal is obtained through use of the decorative flaring **28**. And the possibility of potentially dangerous explosive device has been completely eliminated.

It will thus be seen that the objects set forth above, among those made apparent from the preceding description, are efficiently attained and, since certain changes may be made in the above construction without departing from the scope of the invention, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense.

Now that the invention has been described.

What is claimed is:

1. A combination aerosol container and valve assembly, said aerosol container comprising an outer can and a mounting cup for supporting the valve body of said valve assembly, a plastic disc contoured to cover the entire interior surface of said mounting cup, said mounting cup and said plastic disc crimped to the opening of said aerosol can, a horizontally disposed annular flexible valve seal surrounding the valve stem of said valve and arranged in sealing engagement with the undersurface of said plastic disc to seal the aerosol contents within said container, said valve body including an enlarged lip and said disc including inwardly directed spaced projections to engage said enlarged lip to wedge said valve within said mounting cup, said spaced projections being arranged relative to each other such that the interior of said container is in communication with the undersurface of said valve seal to form pressure fill passages.

2. The combination aerosol container and valve assembly of claim **1**, wherein said plastic disc includes at least one pressure fill groove formed on its undersurface, said pressure fill groove arranged in open communication with the exterior of said mounting cup, the inside diameter of said disc being sufficiently greater than the outside diameter of said valve body to form a fill slot therebetween, said pressure fill groove being arranged relative to said flexible valve seal such that said container may be pressure filled through said pressure fill groove around the outer edge of said valve seal as it flexes under pressure, said fill slot and pressure fill passage into said container.

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