Aug. 29, 1967 W. MOONAN ETAL 3,338,022

METHOD AND APPARATUS FOR FILLING AEROSOL CANS

Filed Oct. 14, 1964

Fig. 2

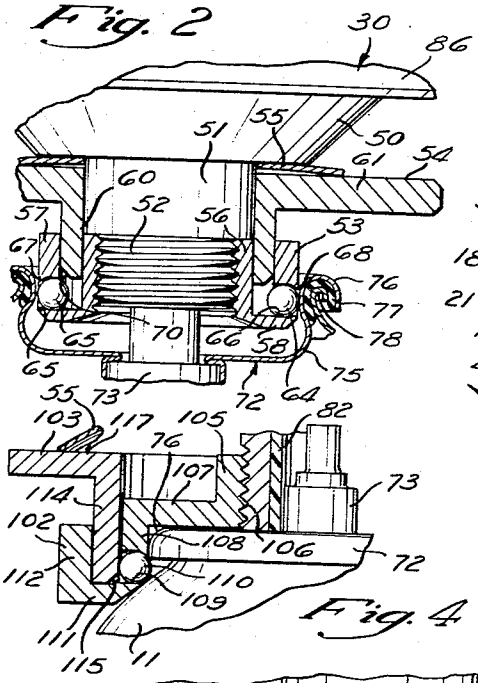


Fig. 4

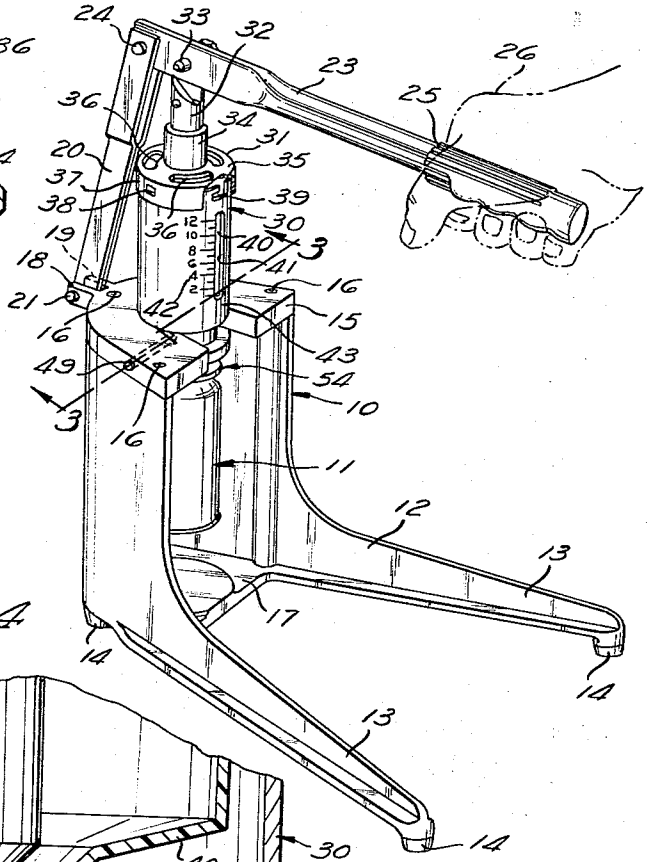


Fig. 1

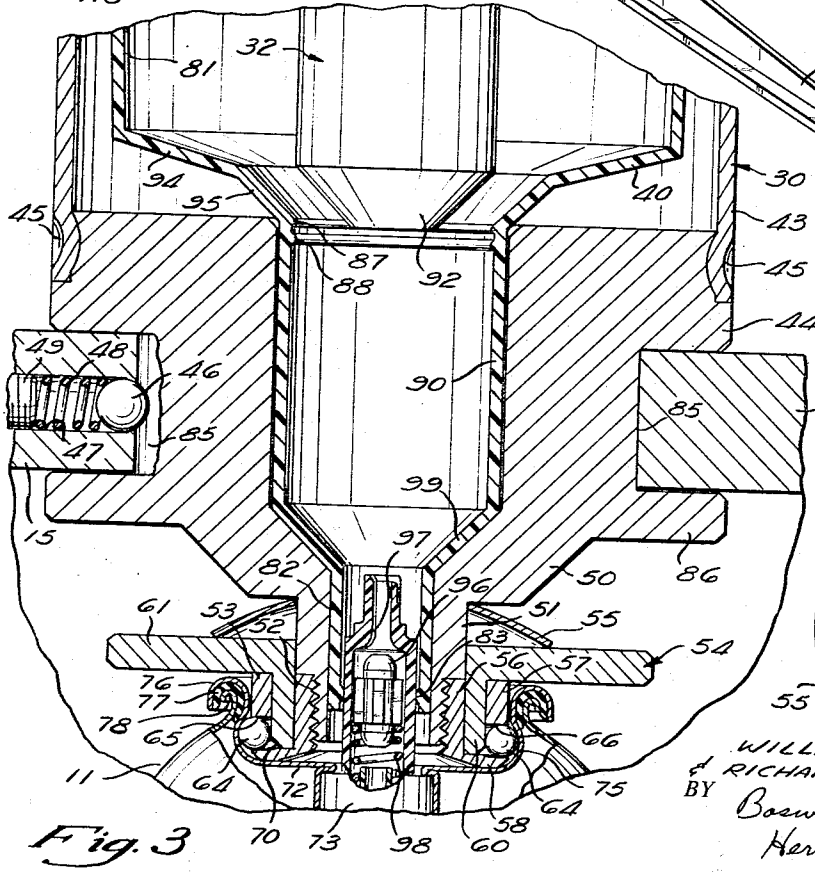


Fig. 3

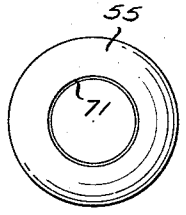


Fig. 5a



Fig. 5b

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METHOD AND APPARATUS FOR FILLING AEROSOL CANS

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11 Claims. (Cl. 53—36)

ABSTRACT OF THE DISCLOSURE

A method and apparatus for filling aerosol cans containing a liquid propellant with a liquid to be dispensed in which the can is supported in the apparatus that is employed to force the liquid to be dispensed into the can by locking engagement of the upper portion of the can with the apparatus.

This application is directed to a modification of methods, articles and apparatus for filling pressurized containers disclosed in application Ser. No. 340,261, filed Jan. 27, 1964, in the name of William Moonan and assigned to the same assignee as the instant application.

Frequently, paints and the like are sold in different sizes of aerosol containers or cans. In filling these cans it is necessary securely to support the can in alignment with the pressurized filling apparatus. Further, this supporting arrangement must include means for quickly and easily engaging and releasing the aerosol can while including means for positively locking the can during the filling operation.

Accordingly, general objects of the present invention are the provision of an improved method whereby it is possible economically and efficiently to fill small numbers of aerosol cans of different sizes by injection of a portion of the material to be dispensed after the liquid propellant has been supplied to the container. Another object of this invention is to provide a pressurized aerosol container filling apparatus with a securing device securely for engaging the aerosol can in a filling position and quickly and easily releasing the can after the can has been filled. Still another object of this invention is to provide methods and apparatus for engaging the tops of aerosol cans which method and apparatus do not require any modification of the existing aerosol can structure. Yet another object of this invention is to provide an apparatus for filling pressurized aerosol cans of different heights, which apparatus is simple in construction, easy to manipulate and has a positive locking engagement with the can.

Briefly, in accordance with aspects of this invention, we have discovered that a novel method and apparatus for filling pressurized aerosol containers of different sizes can be provided with a pump which is removably mounted on a base and including locking means for locking the upper portion of the aerosol can to and in axial alignment with the pump cylinder and with the dispensing nozzle of the can in engagement with a liner mounted within the pump cylinder. In accordance with other aspects of this invention we have discovered a novel arrangement for locking an aerosol can to a pump cylinder by employing means for exerting radially directed forces on a portion of the cap on the aerosol can. In accordance with the still other aspects of this invention, we employ, as a cap for an aerosol can, a metallic member having a recessed portion, which recessed portion includes an inwardly directed annular recess which is preferably C shaped in cross-section. We also provide suitable means on the discharge end of the pump cylinder or

pump nozzle for quickly and easily producing forces directed radially outwardly on these annular recessed portions of the cap of the aerosol can. In accordance with one illustrative embodiment of this invention, a sliding ring or sleeve, which is preferably spring biased, is slidably mounted on the pump nozzle and cooperates with a can locking bushing including at least a pair of locking members, such as balls, for engaging the C-shaped annular recess in the can cap. This combination quickly and easily locks the aerosol can in a position of axial alignment with the pump cylinder and provides an arrangement which can be quickly and easily unlocked from the pump cylinder after the can is filled but will not accidentally become unlocked because of the biasing spring.

In accordance with other aspects of this invention we provide a pump cylinder for filling aerosol cans with a locking bushing which is secured to the lower end of the pump cylinder, which locking bushing is preferably annular in shape and has at least two radially directed recesses which terminate in apertures in one surface of the bushing. Each of these recesses contains a ball or movable locking member. Preferably, the diameter of the apertures in the surface of the bushing is less than the diameter of the balls so that the balls will be retained in the passages. With this passage arrangement, when the bushing is in an upright position, the balls may be urged to a terminal locking position in the surface of the bushing by a sliding spring biased sleeve. If the balls are locked in this terminal position, the periphery of the balls will extend beyond the bushing to provide a locking engagement with a suitable recess in the can cap. Advantageously, we provide, in combination with this bushing, a sliding ring or sleeve having a right circular cylindrical and a flange portion extending radially from the cylindrical portion and position the cylindrical portion in sliding engagement in a cylindrical recess in the locking bushing. The end of the cylindrical portion of the sliding ring is moved beyond the centers of the balls by the biasing spring and the cylindrical surface of the sleeve securely locks the balls in their terminal position. Preferably, the sliding ring or sleeve is provided with a tapered surface joining one edge of the cylindrical surface for engaging the surfaces of the balls to urge the balls in their terminal can-engaging position. By positioning the sliding ring above the locking bushing, and employing a spring compressed between the ring and a portion of the pump cylinder cap the sliding ring will be spring urged into engagement with the balls and thus tend to lock the balls in their terminal position. When it is desired to release the locking engagement between the balls of the locking bushing and the annularly recessed cap surface, the sliding sleeve is manually moved away from the locking bushing with sufficient force to overcome the spring bias. This releases the balls in the locking bushing and permits these balls to move radially relative to the locking bushing in response to a radial force produced by the can when an axial pulling force is applied to the can. When the balls move radially they disengage the surface of the aerosol can cap.

According to the present method, cans intended for filling in accordance with the present invention are mounted upon the pump cylinder containing a removable plastic liner by first removing the cylinder from the base, inverting the cylinder and applying a sufficient force to the sleeve so that the sliding sleeve overcomes the spring bias and slides away from the locking bushing mounted on the bottom end of the cylinder. The balls in the locking bushing are thus unlocked so they may roll radially

relative to the axis of the cylinder in response to the radial force applied by the can. The sleeve is held in this position while the aerosol can is inverted and the dispensing nozzle of the can is inserted within the lower end of the cylinder and within the discharge end of the plastic liner in the cylinder. Preferably, the valve stem is inserted into the bottom, or discharge end of the plastic liner, with a relative twisting motion between the aerosol can and the pump cylinder. After the valve stem is fully inserted in the cylinder, the sliding sleeve is released, the pump cylinder and aerosol can are inverted and the pump cylinder is moved radially to engage a U-shaped or horseshoe-shaped top plate on the base. The portions of the horseshoe substantially engage the greater portion of the periphery of a collar or cylindrical surface on the pump cylinder and a spring biased detent ball in the plate engages the cylinder to frictionally lock the cylinder in position on the base. After the pump cylinder is positioned on the base, the paint or other liquid to be supplied to the aerosol container is poured into the plastic liner until the proper level is obtained. Subsequently, the pump piston assembly is positioned on and locked to the pump cylinder and the piston is connected to a handle pivotally linked to the base assembly. The pump piston assembly includes a sleeve slidably mounted on the pump piston and the sleeve lockingly engages the top of the pump cylinder to define a guide for the piston and to limit the stroke of the piston. Preferably, the sleeve has a plurality such as three indentations which frictionally engage suitable peripherally extending fingers in the pump cylinder upon rotation of the sleeve to lock the sleeve to the pump cylinder.

The pump handle is now manually operated to pump the fluid into the aerosol can. After the desired amount of liquid has been pumped into the aerosol can by developing within the pump a pressure greater than the pressure within the can plus the pressure of the spring biasing the aerosol can valve into its normally closed position, the piston is detached from the handle and the piston sleeve is rotated to unlock it from the top of the cylinder. The piston assembly is now removed from the cylinder and the cylinder and aerosol can are detached from the top plate. The cylinder and can are now inverted and sufficient force is applied to the sleeve to overcome the spring bias to unlock the balls from the annular recess in the can cap. The can is now rotated and pulled until the dispensing nozzle is removed from within the cylinder liner. Subsequently, the can may be shaken to thoroughly mix the contents and a plastic actuator may be inserted on top of the valve core and seated firmly by any convenient means such as by means of a notched metal tool. The plastic liner is now removed from the pump cylinder and the piston wiped to remove any adhering liquid. The pump is now ready to perform a subsequent filling operation on a can of any desired height by again employing the novel locking engagement between the pump cylinder and the top of the can. One of the many advantages of this novel method of filling aerosol containers is that when removing the inverted container from the end of the cylinder, any excess liquid will flow away from the aerosol dispensing nozzle and toward the pump cylinder rather than into the can cap and between the can cap and the base of the nozzle.

These and various other objects and features of the invention will be more clearly understood from a reading of the detailed description of the invention in conjunction with the drawing in which:

FIGURE 1 is a view in elevation and in perspective of an aerosol can and one embodiment of filling apparatus therefor;

FIGURE 2 is a view in section, to an enlarged scale, partly broken away, taken along the diameter of a preferred embodiment of can locking means of FIG. 1 and with the locking means partially engaged with an aerosol can;

FIGURE 3 is a view in section and in elevation, partly broken away, taken along the line 3—3 of FIG. 1 to the same scale as FIG. 2 and looking in the direction of the arrows showing the locking engagement between the locking means and the aerosol can cap;

FIGURE 4 is a view in elevation, partly in section and to the same scale as FIGS. 2 and 3, of an alternative embodiment of locking means for locking the filling apparatus to a peripheral portion of an aerosol package; and

FIGURES *5a* and *5b* are views in plan and section, respectively of a thrust spring employed in this invention, the views being to a reduced scale compared to the scale of FIGURES 2, 3 and 4.

FIGURE 1 shows in perspective, a pressurized can filling apparatus **10** in accordance with one illustrative embodiment of this invention for filling aerosol cans such as a can **11**. The filling apparatus **10** includes a generally U-shaped base portion **12** with a pair of legs **13** from which a group of rubber feet **14** depend, a generally horseshoe-shaped top plate **15** which is secured to the base portion by means of screws such as the screws **16** and a web **17** connecting the legs **13**.

A pump assembly is mounted on and linked to the top plate **15** by means of a pair of projecting arms **18**, **19** which receive a pump handle pivot arm **20** and connect to the pivot arm **20** by means of a pin **21**. The pivot arm **20** has a bifurcated end which receives and is linked to one end of a handle **23** by means of a pivot pin **24**. The handle **23** may be manually actuated by means of a handle grip **25** on the end of the handle **23** opposite from the pivot pin **24** as indicated by a hand **26**. The pump assembly also includes a pump cylinder **30** which receives a piston assembly including a cylinder top **31** and a piston **32** slidably engaging the top **31** and connected to handle **23** by means of a pin **33**. Downward movement of the handle **23** produces pressures within the pump cylinder **30** sufficient to overcome the pressure of the liquefied propellant and the spring in the discharge nozzle valve such that the liquid in the cylinder **30** is forced into the can **11**. The top **31** has a right circular cylindrical portion **34** which slidably engages and acts as a guide for the pump piston **32** as it is reciprocated by vertical movement of the handle **23**. The cylinder top **31** includes a flat, radially extending portion **35** having a plurality of oval-shaped apertures **36** therein to permit the entry of air into cylinder **30**. Top **31** also includes a cylindrical rim **37** which frictionally engages the upper periphery of cylinder **30** and has radially inwardly projecting portions **38** struck therefrom to define a locking engagement with individual ones of a plurality of circumferentially extending fingers **39** on the top edge of the cylinder **30**. Positioned within the pump cylinder **30** is a suitable liner **40** made of plastic or similar material, which liner receives the material to be supplied to the aerosol can **11**. The pump cylinder **30** is provided with an elongated oval-shaped slot **41** extending axially of the cylinder **30** through which the liquid level in the liner **40** may be observed.

Advantageously, the can **11** locks onto the end of the pump cylinder **30** by means of a suitable locking means which will be subsequently described. Because the can **11** locks to the end of the cylinder **30** it is possible to fill cans of different sizes. For example as indicated in FIG. 1, the can **11** clears the flat base portion or web **17** of the base portion **12**. Thus is would be possible to fill larger size cans by selectively locking these cans to the pump cylinder **30**. The locking means for locking the can **11** to the pump cylinder **30** are shown in detail in a partially engaged position in FIG. 2, which is a view in elevation, partly in section of the top portion of the can **11** and the lower portion of the cylinder **30** of FIG. 1 to an enlarged scale. As shown in FIG. 3, the pump

cylinder **30** includes a cylindrical portion **43** which is crimped to a suitable cylindrical cap portion **44** as indicated at **45**.

The cylinder **30** is positioned within the horseshoe-shaped portion of the top plate **15** and moved to seat in the slot defined by the horseshoe-shaped top plate the cylinder **30** is locked in position by a ball type detent locking arrangement which will be subsequently described in detail. The ball type detent includes a ball **46** sliding in a generally cylindrical passage **47** and urged into engagement with a portion of the cylinder **30** by means of a spring **48** and a detent screw **49** which acts to compress the spring **48** against the ball **46**. The pump cylinder cap **44** includes a frusto-conical portion **50** and a cylindrical portion **51** communicating with the frusto-conial portion **50**. The cylindrical portion **51** terminates in a threaded end **52** for supporting a can locking means including a can locking bushing **53**, a sliding annular ring or sleeve **54** and an annular thrust spring **55**.

The can locking bushing **53** is generally cylindrical in configuration and includes a pair of cylindrical segments **56, 57** spaced apart in parallel relationship by means of a radially extending flange portion **58**. The space between the cylindrical portions **56, 57** is also cylindrical in shape to receive a cylindrical projection **60** of the sliding sleeve **54**. The sliding sleeve **54** also includes a radially extending flange **61**. The locking bushion carries a plurality of locking balls **64** which are each positioned in an individual radially directed passage such as passages **65, 66**. These passages **65, 66** have diameters greater than the balls **64** to permit the balls **64** to slide and roll and terminate in openings **67, 68** respectively, each having a smaller diameter than the diameter of the balls **64** such that the balls **64** are retained within the passages. Advantageously, the cylindrical portion **60** of the sliding sleeve **54** includes a frusto-coical surface **70** on the lower outer edge thereof for engaging the balls **64** and forcing these balls **64** radially outwardly as the sliding sleeve **54** moves downwardly as viewed in FIG. 2. The locking means including bushing **53**, locking balls **64**, sleeve **54** and spring **55** produces and maintains a locking engagement with the top portion of the can in a manner which will be subsequently described. The details of spring **55** are shown in FIGS. *5a* and *5b*, which are views of spring **55** in plan and section, respectively to a reduced scale as compared to the scale of FIGS. 2, 3 and 4. The spring **55** is in the form of an annular ring having an aperture **71** in the center thereof to receive the cylindrical portion **51** of the can cap **44**. The spring **55** is dish-shaped in cross-section as shown in FIG. *5b* and is formed of a suitable resilient material such as metal.

As shown in FIG. 2, the can **11** includes a cap **72** which supports a discharge nozzle **73** containing a spring biased valve which will be subsequently described. Advantageously, the cap **72** is generally concave and includes a C-shaped side wall portion **75** which terminates in an inverted U-shaped outer lip **76**. The outer surface of the portion **75** and the inner surface of lip **76** secure a resilient sealing ring **77** in fluid sealing relationship against the top portion or lip **78** of the can **11**. The locking engagement between the balls **64** of the locking bushing **53** and C-shaped portion **75** of the cap **72** is obtained by positioning the balls in engagement with the C-shaped portion **75** of the cap **72** and locking the balls in this position by means of the cylindrical portion **60** of the sliding sleeve **54**. In FIG. 2, the sliding sleeve **54** is manually moved upwardly from its position of engagement with the balls **64** by compressing spring **55** such that the balls are free to move radially within their respective passages **65, 66**. Because the outer diameter of the cylindrical portion **57** of the locking bushing **53** is smaller than the inner diameter of U-shaped lip **76** of the cap **72**, the locking bushing **53** freely enters the bowl-shaped cap **72**. During this entry, the balls **64** are forced radially inwardly when they engage the U-shaped lip **76** of the cap **72**. Preferably, the engagement depicted in FIG. 2 is accompanied by relative rotary motion between cylinder **30** and can **11** about their common axis until the nozzle **73** reaches a position within the plastic liner **40** which is shown in detail in FIG. 3.

After the locking bushing **53** has reached a position in which the radial flange portion **58** engages the cap **72**, the sliding ring **54** is released and permitted to move downwardly in response to the force of spring **55** until the frusto-conical surface **70** passes the balls **64** and the balls are locked into position by means of the cylindrical portion **60**, as best seen in FIG. 3. Because the balls **64** are now secured in their terminal outward position, these balls securely engage the axially extending C shaped surface **75** on diametrically opposite portions of the cap **72**, in this particular example, and thus lock the can **11** to the cylinder **30**.

The plastic insert **40** includes a main reservoir **81**, a cylindrical discharge nozzle **82** and an inwardly directed circular flange, or integral O-ring **83**, extending from the cylindrical portion **82** into a tight fitting engagement with the nozzle **73**. FIG. 3 also shows the frictional engagement of the detent ball **46** with a cylindrical surface **85** of the cap portion **44** of the pump cylinder **30**. The cap portion **44** of the pump cylinder **30** includes a circular flange **86** which engages one surface of the horseshoe-shaped top plate **15** so that the cylinder **30** is securely held in axial alignment with the piston **32**. This engagement prevents the pump cylinder **30** from sliding from the U-shaped top plate **15** of the filling apparatus **10**. The plastic insert **40** also includes a pair of inwardly directed circular flanges or integral O-rings **87, 88** at the top edge of a cylindrical section **90** such that the rings **87, 88** produce a tight working engagement with the pump piston **32** when the pump piston is forced downwardly by the handle **23**. The discharge nozzle contains a ball-type valve **96** which is spring-biased into a filling and discharge orifice **97** by means of a spring **98**.

In filling the can **11** with liquid from the plastic liner **40** the handle **23** is raised until the piston **32** moves to a position in which the upper edge of a conical portion **92** of piston **32** clears the O-rings **87, 88** to permit the liquid in the main reservoir **81** to flow along a pair of conical sections **94, 95** until the liquid reaches the space within the cylindrical piston-engaging sections **90** and a conical section **99**. This build-up of pressure continues until the pressure overcomes the pressure within the can **11** plus the spring bias normally applied to the valve within the discharge nozzle **73**, and the liquid begins flowing into the can **11**. Additional downward movement of the piston **32** maintains the pressure in cylinder **90** and forces more of the liquid into the can **11**. The pump is operated by repeated strokes of the piston **32** into and out of the cylindrical section **90** until the liquid level, as measured on the graduated scale **42**, indicates that the desired amount of liquid has been supplied to the can **11**.

From the foregoing explanation it is apparent that the filling apparatus constitutes a simple and effective device for filling cans of different heights by overcoming the pressure of the propellant and the spring pressure on the discharge valve. Although the device was described with respect to a pair of locking balls engaging the curved surfaces of the cap **72**, it will be apparent that a larger number of locking balls or locking members could be employed. An important aspect of the invention is the production of radial movement of the locking members relative to the axis of the can to produce locking engagement with a recess in the surface of the can. By employing this form of locking engagement the filling apparatus can fill containers of different heights and configurations. For example, the apparatus might be employed to fill a spherical apparatus which contained a liquid propellant and had a surface which could be gripped by the locking means.

FIG. 4 is a view, in elevation and in section, of another illustrative embodiment of locking means according to this invention. As therein depicted, the locking means includes a locking bushing **102**, a cooperating sliding ring or sleeve **103** and a thrust spring **55**. The locking bushing **102** includes a cylindrical portion **105** which threadably engages the threaded section **52** by means of the threads **106**. Projecting radially from the cylindrical section **105** is a radially directed circular flange portion **107** which projects a distance sufficient to clear the outer flange of the cap **72** of the containers **11**. Connected to the flange **107** is a downwardly projecting cylindrical portion **108** having a plurality of radially directed passages **109** therein, each of which contains a suitable ball-type locking device such as the ball **110**. The locking bushing **102** also includes a second radially directed flange portion **111** which connects and is formed integrally with a vertically directed cylindrical section **112**. The sliding ring or sleeve **103** includes a cylindrical portion **114** which slides between the cylindrical sections **108**, **112** and has a tapered edge **115** which is positioned to engage the locking balls **110** and to move the locking balls radially inwardly toward the lip **76** of the cap **72**. The sliding ring **103** also includes an outwardly directed circular flange **117** which extends a sufficient distance beyond the cylindrical section **112** to permit the flange **117** to be manually gripped for movement along a vertical axis. Advantageously, this embodiment of locking means can be employed with aerosol cans which do not have the C-shaped bowl profile **75** described in conjunction with FIGS. 2 and 3. Stated in another manner, this embodiment of locking means can be employed to engage an annular recess or a radially directed recess in the periphery of the aerosol can. Preferably, the engagement is such that the locking means engages a suitable recess in the upper portion of the can **11**. In the embodiment of FIG. 4, the engagement between locking members such as the balls **110** and the cap **72** facilitates the locking and unlocking means by requiring a minimum of relative axial movement between the can **11** and cylinder **30**.

One method which may be employed in filling cans of various heights and shapes with this novel apparatus will be described in detail. In performing this method, the plastic liner **40** is slidably inserted in cylinder **30** by movement in a direction axially of the cylinder **30** until the cylindrical projection **82** has reached its terminal position. The usual protective cap and plastic actuator are then removed from the dispensing nozzle of the can to be filled. With the cylinder **30** in an inverted position relative to its final position on the filling apparatus, the sleeve **54** is pushed downwardly and held in this position, the can **11** is inverted and placed in axial alignment with the cylinder **30** and the discharge nozzle **73** is slowly inserted into the plastic liner **40** until the circular flange **58** of the locking bushing **53** engages the can cap **72**. Preferably this insertion is accompanied by producing relative rotation between the can **11** and the pump cylinder **30**. The sleeve **54** is released, the can **11** and pump cylinder **30** are inverted to a position corresponding to that shown in FIG. 1 and the cylinder **30** is moved between the horseshoe-shaped projections of the top plate **15** until the detent ball **46** securely engages the cylindrical surface **85** of the cylinder cap **44**. The locking engagement defined by the locking bushing **53** including the balls **64** and the cap **72** is now tested by applying a downward force on the can **11**. If the can is not securely locked, the can leaves the locking bushing **53**. The locking engagement can now be obtained by pushing up the sliding ring **54**, pushing the can upwardly over bushing **53** and releasing sliding ring **54** so that the balls **64** securely engage the cap **72**. The next step in the filling operation involves the pouring of the liquid into the plastic liner **40**, which liquid is to be supplied to the can **11**. The liquid, such as paint, is poured into the plastic liner until the liquid reaches the desired graduation **42** on the pump cylinder **30**. The handle **23** is now moved to an upward position and pin **33** is inserted through the end of the piston **32** and through the handle **23**. After the paint or lacquer or other liquid to be charged into the aerosol can **11** is poured into the plastic liner **40** the pump piston asembly, including cylinder top **31** and piston **32** is positioned on the top of the pump cylinder **30** and rotated into a locked position. Subsequently, the paint is pumped into the aerosol can **11**. After a sufficient amount has been pumped from the liner **40** into the can **11**, the pump handle is disconnected from the piston and the piston assembly is detached from the cylinder. The piston may now be cleaned as by wiping with a cloth. The next step involves a removal of the cylinder **30** and the can **11** from the apparatus **10** by overcoming the force exerted on detent ball **46** by detent spring **48** and inverting the cylinder and can until the can **11** is in an upside down position. In this position, the sliding sleeve **54** is manually moved from the locking bushing **53** by overcoming the force of spring **55**. Thus, the balls **64** are free to roll radially inwardly away from engagement with the C-shaped surface **75** of the cap **72**. The only force opposing the withdrawal of the can **11** from the cylinder **30** will be the frictional engagement between the inwardly projecting O-ring **83** of the plastic liner **40** and the discharge nozzle **73**. Advantageously, by removing the can in this direction any small amount of paint within the cylindrical portion **82** of the liner **40** and around the end of the discharge nozzle **73** will tend to flow downwardly back into the liner **40** rather than around the discharge nozzle **73**. Any of this paint which adheres to the discharge nozzle **73** may be quickly and easily wiped from the ends of the discharge nozzle. The apparatus is now in condition to be employed to fill another aerosol package, which package may be of different height or shape than the package previously filled.

While we have shown and described in detail two illustrative embodiments of this invention, it is understood that other embodiments could be provided to encompass these features without departing from the spirit and scope of this invention.

What is claimed is:

1. The method of filling a plurality of aerosol containers with paints and the like of several different colors, each container having the required amount of liquified propellant gas and at least a substantial quantity of a solvent for the paints or the like to be dispensed and a cap having a normally closed discharge valve, said valve being openable by external fluid pressure substantially in excess of the fluid pressure within the container, including the steps of mounting said container by means of said cap beneath a discharge container containing the paint desired to be injected in the said container and thereafter injecting said paint or the like into each individual container from said discharge container through the discharge valve of said aerosol container under a pressure sufficiently greater than the pressure within the container to open said valve.

2. The method of filling aerosol containers with liquids to be discharged, each having the required amount of liquified propellant gas and at least a substantial portion of the liquid to be dispensed in the container and a cap thereon, said cap having a normally closed discharge valve mounted therein, said valve being openable by external fluid pressure substantially in excess of the fluid pressure within the container, including the steps of mounting said container beneath a filling apparatus by means of an axially extending surface of said cap and thereafter injecting the balance of the materials into the container through said valve under pressure sufficiently greater than the pressure within the container to open said valve.

3. The method of filling a plurality of aerosol containers with paints and the like of several different colors, each container containing the required amount of liquified propellant gas and at least a substantial quantity of a solvent for the paints or the like to be dispensed and hav-

ing a cap containing a normally closed discharge valve, said valve being openable by external fluid pressure substantially in excess of the fluid pressure within the container comprising the steps of mounting said aerosol container on the end of a discharge container by frictionally engaging an axially extending surface of said aerosol container and thereafter injecting said paint or the like into said aerosol container through the discharge valve of that container under pressure sufficiently greater than the pressure within the container to open said valve.

4. The method of filling aerosol containers with liquids to be discharged, each containing the required amount of liquified propellant gas and at least a substantial portion of the liquid to be dispensed and having a cap on the open end thereof, said cap having a normally closed discharge valve mounted therein, said valve being openable by external fluid pressure substantially in excess of the fluid pressure within the container, comprising the steps of locking said container to the discharge end of a filling apparatus by means of a radially directed recess in said container and thereafter injecting the balance of the materials into the container through said valve under pressure sufficiently greater than the pressure within the container to open said valve.

5. Apparatus for charging material to be sprayed into an aerosol can containing a liquified propellant gas under pressure, said can having a discharge valve at the top thereof, said apparatus comprising a base, a cylinder member supported on said base, said cylinder member having a main working bore communicating at its lower end with a bore of reduced diameter for surrounding the discharge valve of a can disposed in the apparatus, means for forming a seal between said bore of reduced diameter and said valve, a piston making a working fit with said main working bore, manually operable means for reciprocating said piston within said working bore, a reservoir disposed above said working bore for supplying material to be injected into said aerosol can to said working bore and means for lockingly engaging the upper portion of said can.

6. Apparatus for charging material to be sprayed into an aerosol can containing a liquified propellant gas under pressure, said can having a cap on the top thereof with a discharge valve therein, said apparatus comprising a base, cylinder means supported on said base, said cylinder means having a main working bore communicating at its lower end with a bore of reduced diameter that surrounds the discharge valve of a can disposed in the apparatus, a piston making a working fit with the interior of said cylinder means, manually operable means for reciprocating said piston within said cylinder means, means for supplying material to be injected into said aerosol can to said cylinder means and can locking means mounted on the lower end of said cylinder means including a sliding annular ring slidably mounted on said cylinder, a can locking bushing mounted beneath said sliding ring and a plurality of radially movable means for lockingly engaging a vertically extending surface of said can, said sliding ring including means for locking said radially movable means in engagement with said can surface.

7. Apparatus for charging material to be sprayed into an aerosol can containing a liquified propellant gas under pressure, said can having a discharge valve at the top thereof, said apparatus comprising cylinder means having a main working bore communicating with a bore of reduced diameter for surrounding the discharge valve of a can, a piston making a working fit with said main working bore, manually operable means for reciprocating said piston within said working bore, a reservoir communicating with said working bore for supplying material to be injected into said aerosol can to said working bore and locking means for frictionally engaging an axially extending surface of said can including at least two members for frictionally engaging said axially extending surface of said can, supporting means supporting said members for radial movement relative to said can and member locking means for locking said members in a position of engagement with said can surface.

8. Apparatus for charging material to be sprayed into aerosol cans of different heights containing a liquified propellant gas under pressure, each of said cans having a cap on the top thereof with a discharge valve therein, said apparatus comprising cylinder means, said cylinder means having a main working bore communicating at its lower end with a bore of reduced diameter that surrounds the discharge valve of a can disposed in the apparatus, a piston making a working fit with the interior of said cylinder means, manually operable means for reciprocating said piston within said cylinder means, each of said cans having a cap with an axially extending, annular recess therein, and means for selectively frictionally securing cans of different heights in a position of axial alignment with said cylidner means including at least two friction bearings, means supporting said bearings for radial movement relative to said can and sliding means for locking said bearings in their terminal outward position in engagement with said annular recess of said cap.

9. Apparatus for charging material to be sprayed into aerosol cans of different heights containing a liquified propellant gas under pressure, each of said cans having a cap on the top thereof with a discharge valve therein, said apparatus comprising a cylinder member, said cylinder member having a main working bore communicating at one end with a bore of reduced diameter for surrounding the discharge valve of a can disposed in the apparatus, a piston making a working fit with the interior of said cylinder member, manually operable means for reciprocating said piston with said cylinder member, means for supplying material to be injected into said aerosol can to said cylinder member, each of said cans having a cap with a vertically extending annular recess facing said discharge valve, and locking means for locking said cans to said apparatus including at least two friction bearings, bushing means mounted on said apparatus and having an individual radially outwardly directed passage encircling each of said bearings, a sliding sleeve for locking said bearings in their terminal position and spring means for biasing said sliding sleeve into engagement with said bearings.

10. Apparatus for charging material to be sprayed into an aerosol can containing a liquified propellant gas under pressure, said can having a discharge valve at the top thereof, said apparatus comprising a cylinder member, said cylinder member having a main working bore communicating at one end with a bore of reduced diameter for surrounding the discharge valve of a can disposed in the apparatus, means for forming a seal between said bore of reduced diameter and said valve, a piston making a working fit with said main working bore, manually operable means for reciprocating said piston within said working bore, a reservoir communicating with said working bore for supplying a material to be injected into said aerosol can to said working bore, said can having a peripheral annular recess thereon, and means for locking said can to said apparatus by frictionally engaging said recess including at least two friction bearings, bushing means mounted on said apparatus and having a pair of inwardly directed passages relative to said can, each encircling one of said bearings, sliding means for locking said bearings in their terminal inward position in engagement with said recess and spring means for biasing said sliding means in engagement with said bearings.

11. Apparatus for charging material to be sprayed into aerosol cans of different heights containing a liquified propellant gas under pressure, each of said cans having a cap on the top thereof with a discharge valve therein, said apparatus comprising a cylinder member, said cylinder member having a main working bore communicating with a bore of reduced diameter that surrounds the discharge

valve of a can disposed in the apparatus, a piston making a working fit with the interior of said cylinder member, manually operable means for reciprocating said piston and can locking means mounted on said cylinder including a bushing having a pair of friction bearings slidably mounted in diametrically opposed passages therein for movement inwardly toward said can, a sliding sleeve slidably engaging said bushing for movement in the paths of said bearings for retaining said bearings in their terminal inward position in engagement with said can and thrust spring means between said cylinder member and

said sliding sleeve for urging said sleeve into engagement with said bearings.

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