Sept. 17, 1963 J. R. FOCHT 3,103,956

METHOD OF AND APPARATUS FOR PRESSURE CHARGING AEROSOL DISPENSERS WITH PUSH BUTTONS ATTACHED

Filed Aug. 4, 1960

FIG 1

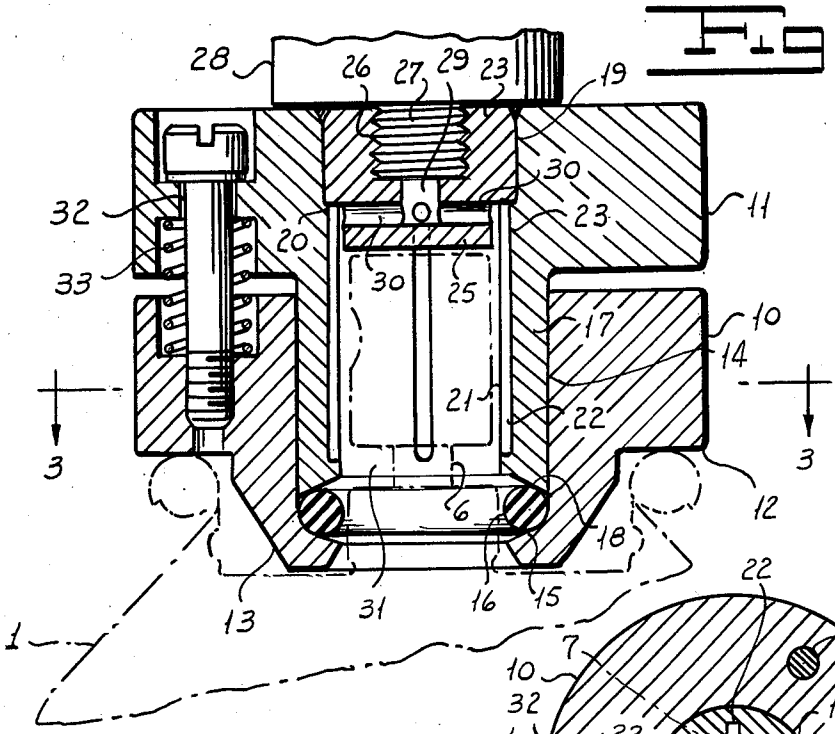


FIG 3

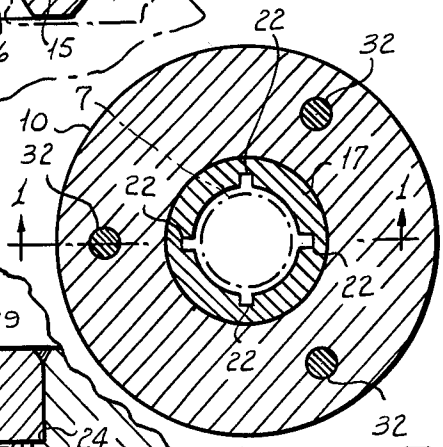
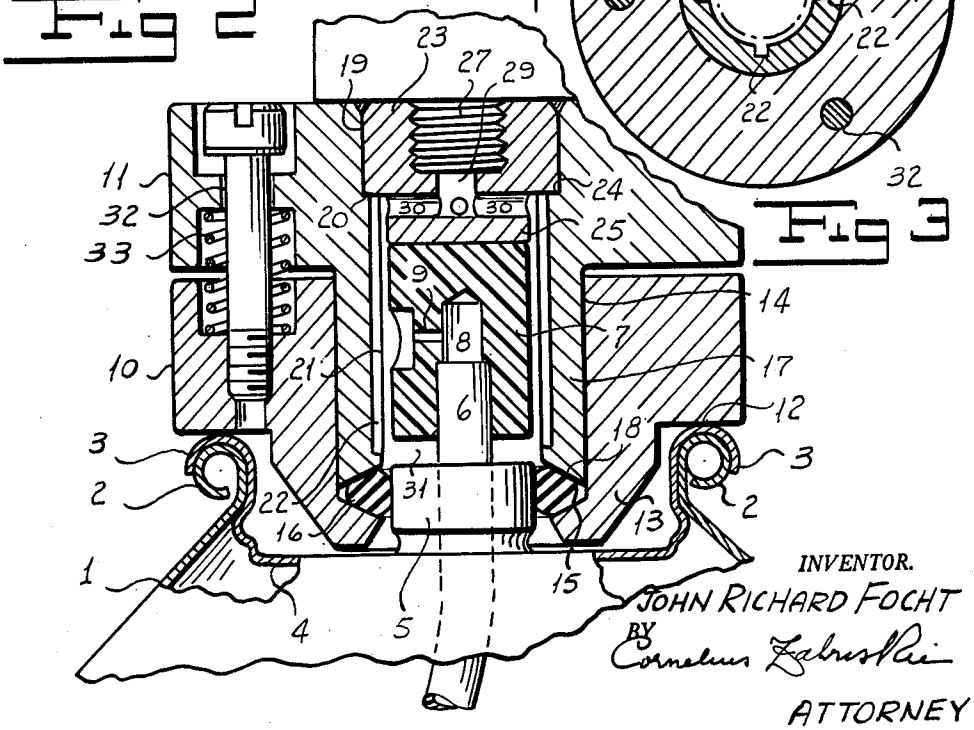


FIG 2



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METHOD OF AND APPARATUS FOR PRESSURE CHARGING AEROSOL DISPENSERS WITH PUSH BUTTONS ATTACHED

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This invention is a method of and apparatus for pressure charging aerosol dispensers with push buttons attached.

Aerosol dispensing packages commonly comprise a metal can having a top opening sealed by a mounting cup on which is supported a manually operable valve having a tubular valve stem surmounted by a push button by means of which the valve stem may be depressed to open the valve and permit the discharge of the contents of the can through the push button. The cans contain a so-called active ingredient which it is the primary purpose to dispense, together with a propellant.

One common method of filling and charging these aerosol dispensing packages is to fill the can with the desired quantity of active ingredient, then apply the mounting cup with valve thereon, and then introduce the propellant into and around the valve stem before the push button is applied to the valve stem.

To accomplish this result, the charging apparatus is provided with a charging head which is brought into sealing engagement with the rim of the mounting cup, the valve stem is depressed and the propellant is then fed through the filler head and through the valve stem into the can. There has never been heretofore any satisfactory method or apparatus devised for charging the can with propellant with the push button in position on the valve stem. Consequently the push buttons are supplied separately from the mounting cups with valves thereon, and after the can is charged with propellant, the "filler" is required to individually attach a push button to each valve stem. This operation involves time and cost factors which it is highly desirable to eliminate.

The object of the present invention is to provide a method of and apparatus for charging a can of the character described with propellant while the mounting cup is in place and the push button on the valve stem so that the assembled mounting cup, valve and push button can be supplied by the manufacturer of the valves and handled as a unit by the filler who is thus spared the necessity of subsequently applying the push buttons as stated.

The present invention, from the apparatus standpoint, comprises an adaptor to be used in lieu of the conventional charging head. When this adaptor is secured to the nozzle of the charging machine, it may be lowered to enclose the cup on the can and form a leak-tight seal with the can and thereupon open the valve so that propellant under pressure can be fed from the nozzle into the interior of the adaptor and thence through the usual discharge orifice of the button, as well as around the valve stem into the interior of the can. Retraction of the nozzle with the adaptor is accompanied by closing of the self-sealing valve on the can.

Features of the invention, other than those adverted to, will be apparent from the hereinafter detailed description and appended claims, when read in conjunction with the accompanying drawings.

The accompanying drawing illustrates one practical embodiment of the invention, but the construction therein shown is to be understood as illustrative only, and not as defining the limits of the invention.

FIG. 1 is a central section on the line 1—1 of FIG. 3 showing the parts of the adapter in inactive condition.

FIG. 2 shows the relation of the parts to one another with the can while filling the can.

FIG. 3 is a section on the line 3—3 of FIG. 1.

In the drawing, 1 indicates a conventional can having a top opening the margin of which is curled as at 2 to receive in sealing relation a marginal inverted channel 3 of a mounting cup 4. This cup has a central boss 5 in which is supported a valve having a valve stem 6 projecting upwardly therefrom. A push button 7 having therein an expansion chamber 8 and an outlet orifice 9, forming fluid discharge passages, is mounted on the valve stem. The parts thus far described are conventional and per se form no part of the present invention. They simply illustrate one type of aerosol dispenser package with which the present invention is adapted to function.

The adapter of this invention comprises a body made in two sections 10 and 11. The lower section 10 is provided with a horizontal abutment 12 adapted to seat on the top of the can and below this abutment is an extension 13 which projects downwardly into the intetrior of the mounting cup. It may engage with the base of that cup if desired, but this is not necessary if the abutment 12 rests on the can during the charging operation.

The lower section 10 has an axial bore 14, the lower end of which is flared inwardly to form a gasket seat 15, complementary to the gasket seat 18, for a gasket 16 which may be of any desired form. An O-ring is shown merely by way of example.

The upper section 11 has a reduced depending cylindrical portion 17 which telescopes downwardly into the bore 14 of the lower section 10 and is chamfered at its lower edge, as shown at 18, to form another gasket seat for the gasket 16. Said upper section 11 is provided in its upper portion 19 with a stepped bore. The upper portion 19 of the bore extends downwardly to a shoulder 20 below which the bore 21 is of reduced diameter and this reduced portion of the bore is provided with upright channels 22, as clearly shown in FIG. 3.

The upper portion 19 of the bore is closed by a plug 23 welded or soldered in place. This plug has, intermediate its top and bottom, a shoulder 24 which seats on the shoulder 20 and beneath this shoulder the plug has a portion 25 of reduced diameter projecting downwardly into the portion 21 of the bore, but free from contact with the wall thereof. The plug 23 has a centrally located threaded socket 26 by means of which it may be attached to the nozzle 27 of a charging machine indicated generally by the reference character 28.

The base of the socket 26 is provided with a central opening 29 communicating with a plurality of radial passages 30, leading from said opening 29 to the periphery of the reduced portion 25 of the plug, so that propellant may be fed from the nozzle 27 through the opening 29 and radial passages 30, which collectively form propellant conveying ducts, into the chamber 31 which constitutes the bore portion 21 of the adapter.

The upper and lower sections 11 and 10 are secured to one another by limiting studs 32, shown three in number. These studs extend loosely through holes in the upper section and are threaded at their lower ends into the lower section 10. Adjacent portions of the two sections, at the studs, are chambered to receive compression springs 33 and these springs normally separate these sections sufficiently to relieve pressure on the gasket 16, so that the latter is normally in unstressed condition.

Operation

In practice the adapter, constructed as described, is secured to the threaded nozzle 27 of the charging apparatus as shown, the parts being at that time as illustrated in FIG. 1. While in this condition, the adapter is brought into engagement with the completely equipped

dispensing container, as shown in dotted lines in said figure. When so positioned the abutment **12** is seated on the mounting cup **4** with the boss of such cup extending loosely through the gasket **16** and with the push button **7** of the valve stem occupying a position within the chamber **31**, with clearance between the upper end of the push button and the plug **23**.

The part **28** of the charging machine is then lowered. By this movement the chamfered surface **18** of the part **17** is brought into engagement with the gasket and, operating conjointly with the seat **15**, vertically compresses said gasket to contract its internal diameter sufficiently to tightly grip the boss **5** of the mounting cup and form therewith a hermetic seal for the chamber **31**. Continued downward movement of the section **11**, under the impulse of the part **28**, causes the lower end of the plug **23**, which forms an abutment, to engage with and depress the push button sufficiently to open the valve of the can. Conventional mechanism of the charging machine then admits either gaseous or liquid propellant into the opening **29** and this propellant flows through the radial passages **30** and upright passages **22** into and fills the chamber **31**. This propellant, under pressure, flows from the chamber **31** through the discharge orifice **9** of the button, the expansion chamber **8** thereof, and hence through the tubular valve stem and open valve into the can. Some of the propellant may also enter the can along the exterior surface of the valve stem.

As soon as a sufficient amount of propellant has been fed in the manner described, the part **28** of the charging machine is elevated, carrying with it the upper section **11**, and relieving pressure on the gasket **16** to release the hub of the mounting cup. Through this retracting movement, the push button is released and the self-sealing valve of the can closes. The adapter is then lifted bodily with the part **28**, free from the can for the charging operation is completed.

Cans may be operated in succession in the manner described and, as each can leaves the adapter, it is ready for the market, without requiring further attention on the part of the filler.

The foregoing detailed description sets forth the invention in its preferred practical forms, but the invention is to be understood as fully commensurate with the appended claims.

Having thus fully described the invention, what I claim as new and desire to secure by Letters Patent is:

1. An adapter for an aerosol charging machine comprising: an upper section adapted to be secured to the charging nozzle of a charging machine, said upper section embodying a depending cylindrical portion provided at its lower end with a gasket seat and having a chamber to receive a push button attached to the valve stem of an aerosol container, a relatively movable lower section having an axial bore embracing said depending portion of the upper section and provided with a complementary gasket seat, a gasket interposed between said seats and adapted to be compressed therebetween to force the gasket into hermetic sealing relation with a portion of the container when the lower section is forced against the container by pressure applied through the gasket to the lower section, the upper section being provided with propellant conveying ducts leading from the charging nozzle into the chamber of the upper section and also having an abutment to engage with and depress the push button of the container to unseal the valve of the container after such hermetic seal has been established, and means for retracting the depending section from the gasket to relieve pressure of the gasket on the container part when said sections are withdrawn from cooperative relation with the container.

2. An adapter for an aerosol charging machine comprising: an upper section adapted to be secured to the

charging nozzle of a charging machine, said upper section embodying a depending cylindrical portion provided at its lower end with a gasket seat and having a chamber to receive a push button attached to the valve stem of an aerosol container, a relatively movable lower section having an axial bore embracing said depending portion of the upper section and provided with a complementary gasket seat, a gasket interposed between said seats and adapted to be compressed therebetween to force the gasket into hermetic sealing relation with a portion of the container when the lower section is forced against the container by pressure applied through the gasket to the lower section, the upper section being provided with propellant conveying ducts leading from the charging nozzle into the chamber of the upper section and also having an abutment to engage with and depress the push button of the container to unseal the valve of the container after such hermetic seal has been established, said sections being connected to one another by limiting studs which limit relative movement between said sections and with springs for moving the upper section in a direction away from the lower section when pressure of the upper section on the lower section is relieved.

3. An adapter according to claim 2, wherein the springs are interposed between said sections and embrace the limiting studs.

4. The method of charging with a propellant an aerosol can having a self contained outlet valve provided with a tubular valve stem having thereon a valve operating push button with fluid discharge passages therethrough, which method comprises the following steps, viz.: enclosing the assembled push button, valve stem and a portion of the can surrounding the valve stem within a hermetically sealed chamber, applying mechanical pressure to the push button to unseal the valve of the can, admitting propellant under pressure into the sealed chamber to flow from said chamber through the fluid discharge passages of the push button and through the tubular valve stem into the interior of the can to charge the latter, thereafter relieving the pressure on the push button to permit the valve of the can to seal the charged can, shutting off the feed of propellant to the sealed chamber, thereafter unsealing such chamber, and removing the resulting charged can from cooperative relation with said chamber, whereby the can is charged with propellant while the valve operating button thereof remains in intact condition thereon throughout the charging operation.

5. The method of charging with a propellant an aerosol can having a self contained outlet valve provided with a tubular valve stem having thereon a valve operating push button with fluid discharge passages therethrough, which method comprises the following steps, viz.: enclosing the assembled push button, valve stem and a portion of the can surrounding the valve stem within a hermetically sealed chamber, applying mechanical pressure to the push button to unseal the valve of the can, admitting propellant under pressure into the sealed chamber to flow from said chamber into the can through the fluid discharge passages of the push button and tubular valve stem and also along the exterior surface of the valve stem to charge the interior of the can with the propellant, thereafter unsealing such chamber, and removing the resulting charged can from cooperative relation with said chamber, whereby the can is charged with propellant while the valve operating button thereof remains in intact condition thereon throughout the charging operation.

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