

[54] **MULTI-COMPONENT PRODUCT DISPENSER**

[72] Inventor: Jean Marand, Norwalk, Conn.

[73] Assignee: Ciba-Geigy Corporation

[22] Filed: June 22, 1970

[21] Appl. No.: 48,336

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Primary Examiner—Samuel F. Coleman
Assistant Examiner—Thomas E. Kocovsky
Attorney—Wenderoth, Lind & Ponack

[52] U.S. Cl. 222/94, 222/145, 222/193,
239/308
[51] Int. Cl. B65d 83/14
[58] Field of Search.....222/193, 145, 135, 130, 402.16,
222/132, 402.18, 941, 94, 193, 145; 239/307, 308

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[57] **ABSTRACT**

A dispenser for spraying a multi-component product includes a product container housing the product components. The components are mutually isolated and are put in communication with product passages through a valve of the container. The stem of the valve is connected to a coupler-aspirator. An aerosol propellant cartridge is also connected to the coupler-aspirator. When the propellant cartridge is depressed, both the valve thereof and the container valve are opened. The product components are then combined and aspirated by the propellant through the coupler-aspirator.

26 Claims, 12 Drawing Figures

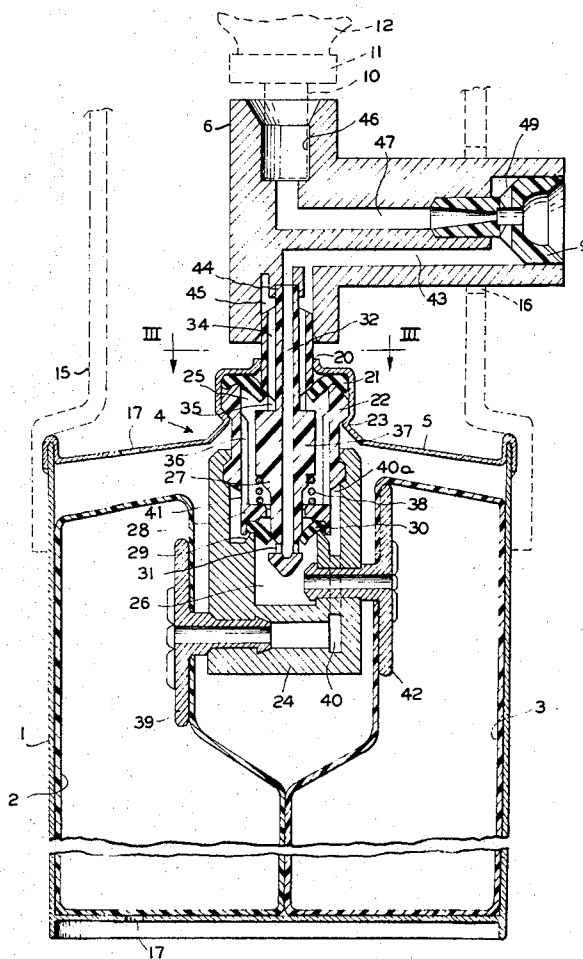
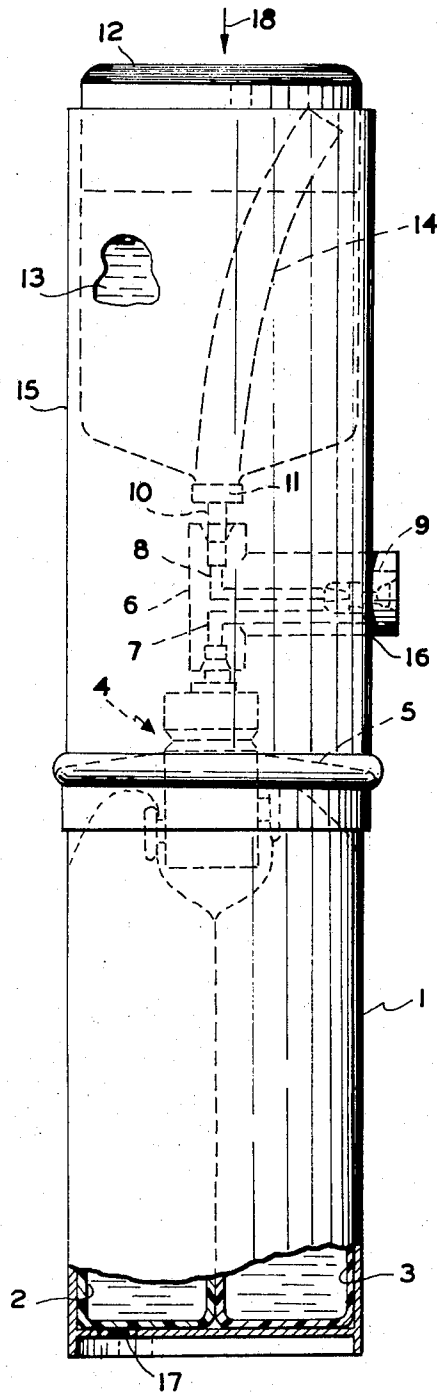


FIG. 1



INVENTOR
JEAN MARAND

BY *Wunderoth, Lind & Ponack*
ATTORNEYS

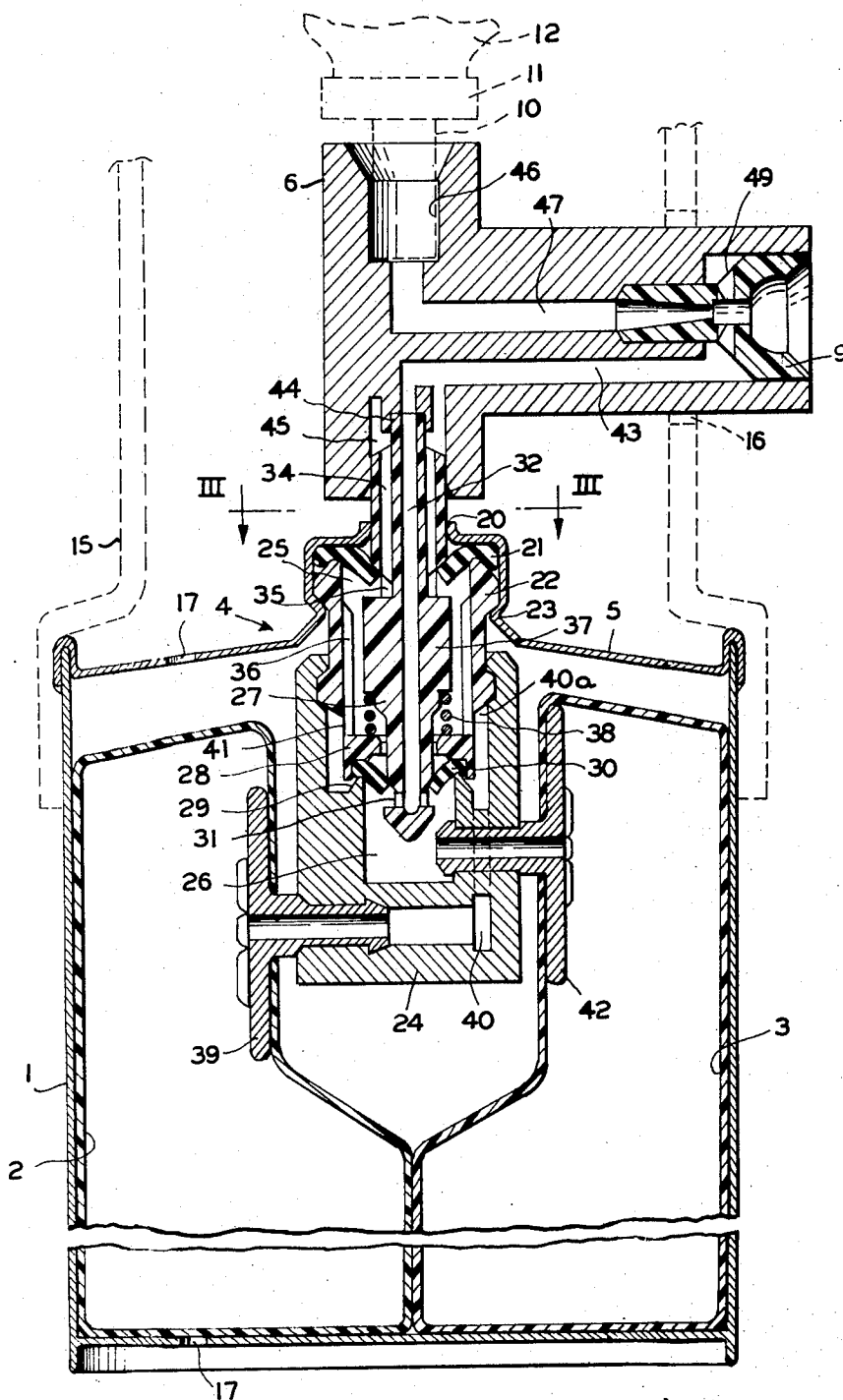


FIG. 2

INVENTOR
JEAN MARAND

BY *Wendroth, Lind & Feneck*
ATTORNEYS

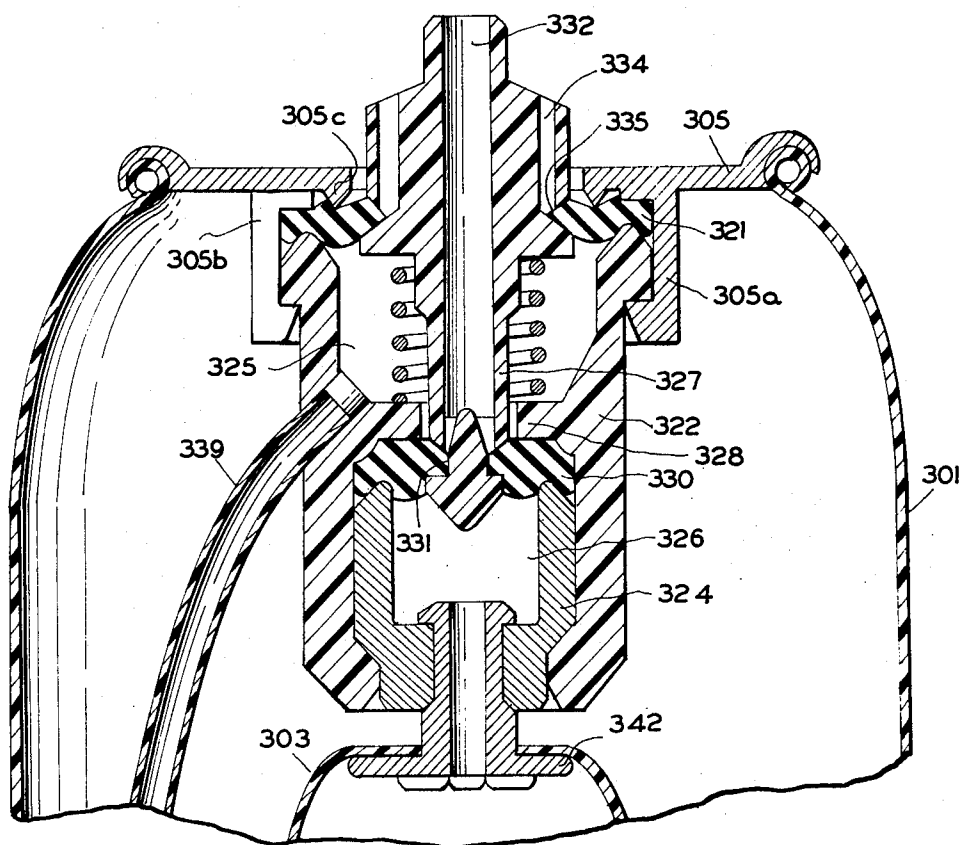


FIG. 6

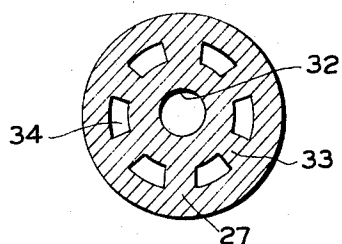


FIG. 3

INVENTOR
JEAN MARAND

BY *Wendroth, Lind & Ponack*
ATTORNEYS

FIG.4

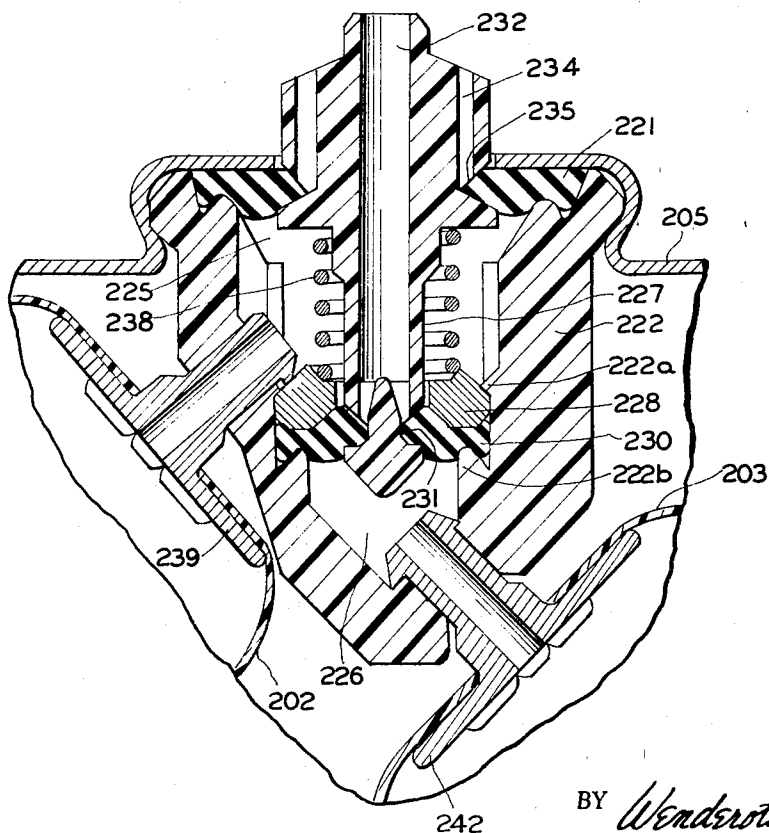
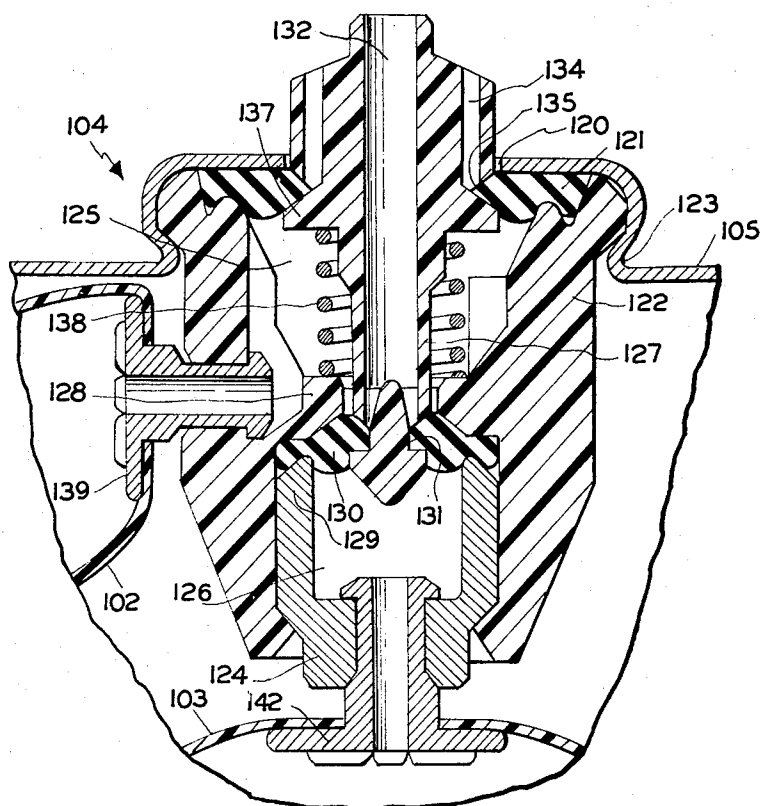


FIG.5

INVENTOR
JEAN MARAND

BY *Wendroth, Lind & Ponack*
ATTORNEYS

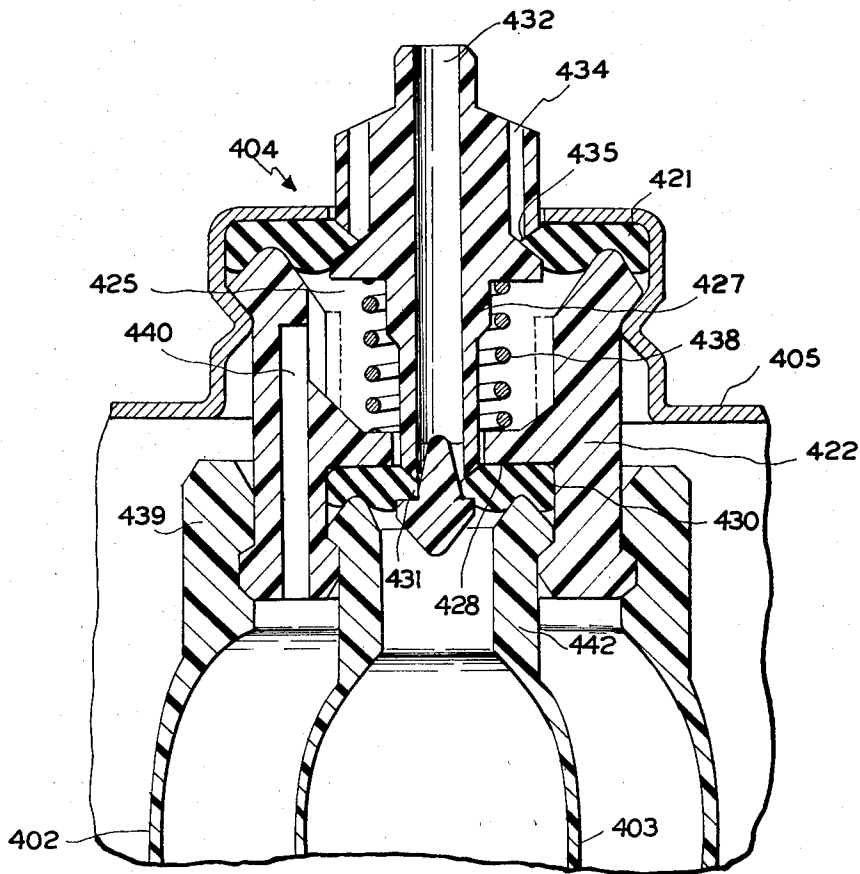


FIG. 7

INVENTOR
JEAN MARAND

BY *Wendroth, Lund & Bonack*
ATTORNEYS

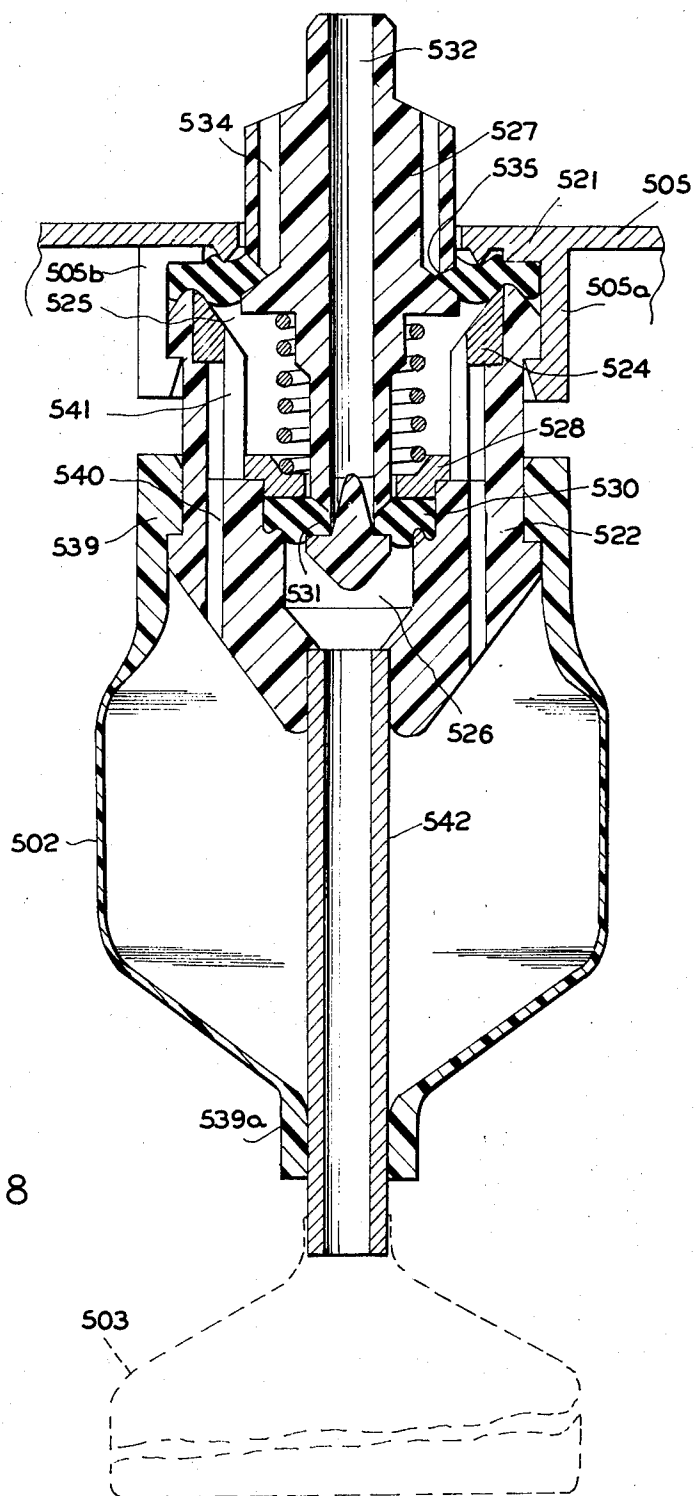
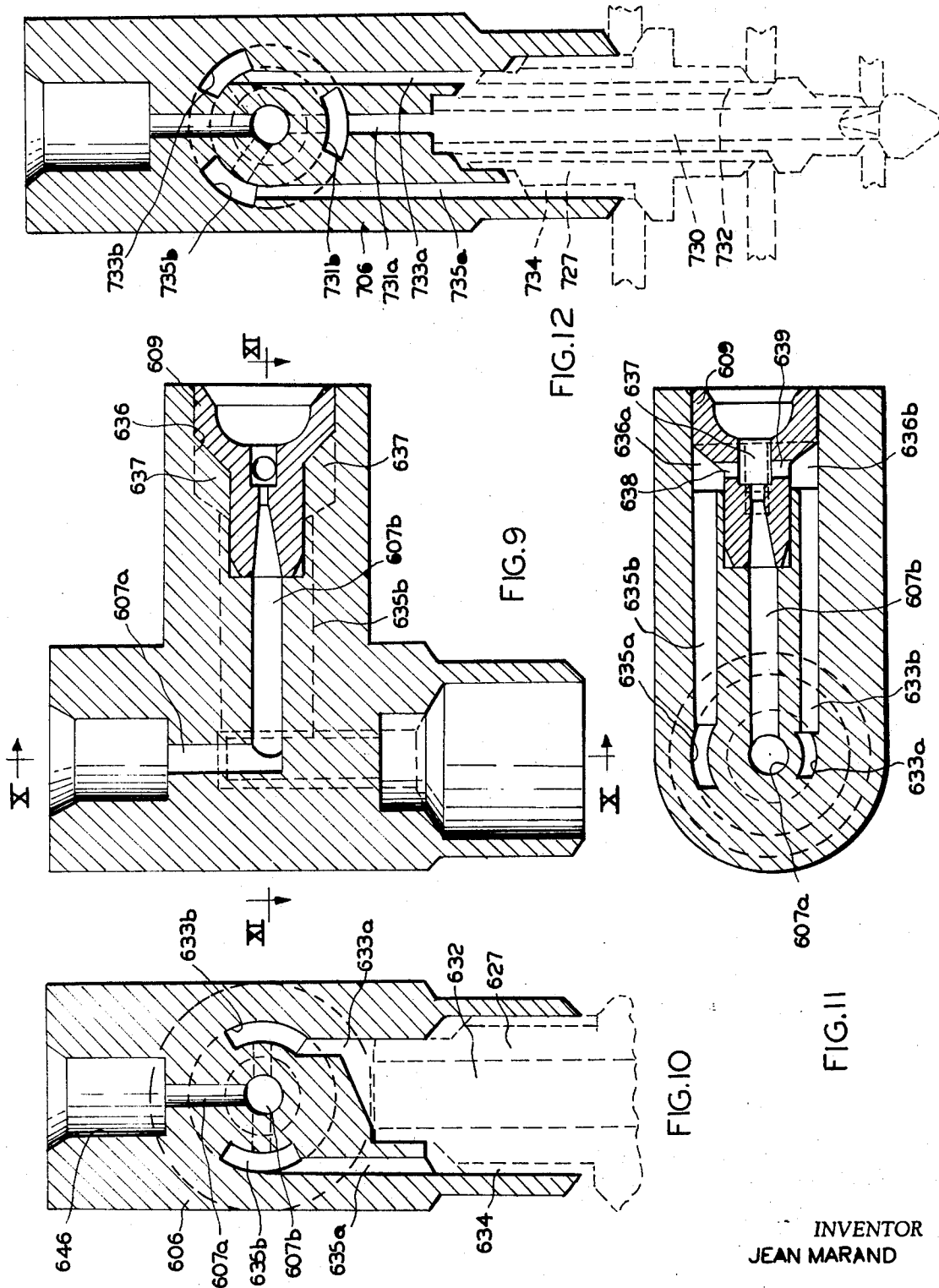


FIG. 8

INVENTOR
JEAN MARAND

BY

Wendroth, Lind & Brack
ATTORNEYS



INVENTOR
JEAN MARAND

BY *Wendroth, Lund & Tonack*
ATTORNEYS

MULTI-COMPONENT PRODUCT DISPENSER

BACKGROUND OF THE INVENTION

The present invention relates to a dispensing system of the pressurized type for spraying a multi-component fluid, generally liquid, by aspiration with a liquefied gas propellant.

More particularly, the present invention relates to such a system wherein the multiple components of the product are housed in a non-pressurized product container and coupled to a propellant cartridge separate from the product container through a coupler-aspirator.

Even more particularly, the present invention relates to such a system wherein a single actuation causes the propellant to aspirate and combine the product components through the coupler-aspirator.

Dispensers are known for dispensing multi-component products upon aspiration by a liquefied gas propellant. Such dispensers comprise a single product-propellant container. The container houses the propellant cartridge and the several product components. The propellant and the several products are all isolated from each other. Various flow paths lead from the products and the propellant through a common valve to a nozzle. When the valve is actuated, the products are combined and aspirated by the propellant.

However, certain commercial disadvantages are inherent in such dispensers. In the use of such dispensers it is necessary to create a seal between the common container and the valve collar. This becomes a complex practical problem with sophisticated dispensers. Also, the creation of a satisfactory pressure or liquid tight seal becomes difficult with the use of certain materials.

Furthermore, the general manufacture of aerosol dispensers is a specialized industry. Therefore, manufacturers who wish to market products in aerosol form must acquire specialized knowledge and must invest large capital in specialized equipment. An alternative is to "farm out" such aerosol production to specialized aerosol manufacturers. This, of course, reduces the amount of control which the product manufacturers can exercise over the quality of manufacture of their product.

Also, the handling and shipping of aerosol units is much more complex and expensive than that of non-aerosol products. Special product containers are required, and special shipping regulations must be observed.

Also, for economic reasons, the design of the aerosol unit must be such that the propellant is used up at approximately the same time as the product. This requires the propellant cartridge to be specifically designed for virtually each and every product which is manufactured. Manifestly, this individualization is expensive. And even though such design may be achieved, normal manufacturing tolerances are such that invariably some of the product or propellant is wasted.

With these disadvantages in mind, it is an object of the present invention to provide a multi-component product dispensing system of the type such that the product is aspirated by a propellant, wherein the products are housed in a product container separate from the propellant cartridge and are aspirated by the propellant separate from the product container through a coupler-aspirator.

It is a further object of the present invention to provide such a system wherein the product container and valve need only be leak sealed and not pressure sealed.

It is still further object of the present invention to provide such a system which need include only the product, the product container, and a coupler, and may be readily combined with a standard and conventional propellant cartridge and aerosol valve.

It is yet an additional object of the present invention to provide such a system that may be handled and shipped without the propellant and therefore in the same manner as other non-aerosol products.

It is still further an object of the present invention to provide such a system which eliminates waste of the product or the propellant.

These objects are achieved in accordance with the present invention by the provision of a product container containing at least one flexible product sac in communication with a product container valve, and either an additional flexible product sac in communication with the product container valve, or a dip tube opening into the product container and in communication with the product container valve. The product container valve and valve collar is leak sealed to the product container. The outlet of the product container valve communicates with at least one flow path in a coupler-aspirator. A second flow path in the coupler-aspirator is adapted to communicate with the outlet valve of a conventional propellant cartridge mounted in alignment with the product container. The two flow paths in the coupler-aspirator join at a Venturi nozzle therein for spraying the multi-component product. When the propellant cartridge is pressed downward, both the propellant cartridge valve and the product container valve are opened. This allows the multi-component product to be aspirated by a propellant through the coupler-aspirator.

Other objects and features of the invention will be made clear by the following description taken together with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS:

FIG. 1 is an elevational illustration of the basic features of the dispensing unit of the present invention shown in conjunction with a conventional aerosol propellant cartridge;

FIG. 2 is a cross-sectional view in detail of the lower or product portion of the dispensing unit shown in FIG. 1;

FIG. 3 is a cross-sectional view taken along line III—III of FIG. 2 illustrating the stem;

FIG. 4 is a cross-sectional view of a second embodiment of the valving structure of the present invention;

FIG. 5 is a cross-sectional view of the third embodiment of the dispensing unit of the present invention;

FIG. 6 is a cross-sectional view of a fourth embodiment of the dispensing unit of the present invention;

FIG. 7 is a cross-sectional view of a fifth embodiment of the dispensing unit of the present invention;

FIG. 8 is a cross-sectional view of a modification of the embodiment of the dispensing unit shown in FIG. 7;

FIG. 9 is a cross-sectional view of a modified coupler-aspirator in accordance with the present invention;

FIG. 10 is a cross-sectional view taken along line X—X in FIG. 9;

FIG. 11 is a cross-sectional view taken along line XI—XI in FIG. 9; and

FIG. 12 is a cross-sectional view of a further modification of a coupler-aspirator in accordance with the present invention.

With reference now to FIG. 1 of the drawings, the dispensing system of the present invention will be generally described.

A product container 1 is adapted to contain multiple component flexible product sacs 2 and 3. Sacs 2 and 3 contain different product components to be dispensed. Sacs 2 and 3 may be made of any suitable material which is compatible with the products to be dispensed. Product container 1 may also be made of any suitable or desirable material such as fiberboard, plastic or metal. Product container valve 4 is seated in valve collar 5. Valve collar 5 is attached to container 1 in any conventional manner. The attachment between collar 5 and container 1 need not be leakproof since both sacs are sealed and contain the product. The valve need only be leakproof but not a pressure seal since container 1 does not house a propellant. Sacs 2 and 3 are in communication with product flow paths in valve 4 in a manner to be described in detail below.

The outlet of product container valve 4 is in communication with a first flow path 7 in a coupler-aspirator 6. First flow path 7 and a second flow path 8 join in a Venturi nozzle 9 in a manner to be described in more detail below. Second flow path 8 is adapted to communicate with the stem 10 of a conventional aerosol valve 11 of a conventional propellant car-

tridge 12. Propellant cartridge 12 contains a suitable liquefied gas propellant 13. A dip tube 14 is provided in propellant cartridge 12, since the cartridge will be normally used in the inverted position and only vaporized propellant is desired. If the propellant is adsorbed on a silica type powder as disclosed in application Ser. No. 763,575, Felix Rousselot, filed Sept. 30, 1968 and assigned to the assignee of the present invention, the dip tube is not needed.

Product container 1 is provided with a guide 15 which is adapted to fit in any conventional manner, such as a snap fit over the top of the product container. Guide 15 acts to guide and laterally support propellant cartridge 12 as shown in FIG. 1. Coupler-aspirator 6 extends to and sprays through a hole 16 in guide 15. Container 1 is provided with holes 17 in any suitable location for the purpose of providing air vents within the container. Holes 17 allow equalization of atmospheric pressure within container 1 and around product sacs 2 and 3. Thus, as product is dispensed from sacs 2 and 3, pressure is equalized therearound to insure continued dispensing.

The general operation of the dispenser shown in FIG. 1 will now be described. The operator grasps the unit generally around guide 15. Force is applied by a finger or thumb in the general direction of arrow 18. Since container 1, coupler-aspirator 6 and cartridge 12 are aligned, this force actuates and opens both the aerosol valve and the product container valve. Only force sufficient to open the stronger of these two valves is required. When both valves are opened, the product components from both sacs 2 and 3 are combined and aspirated by the propellant. Thus, the multi-component product is sprayed from nozzle 9.

It is to be understood that any standard propellant cartridge may be used. The cartridge need not be specially designed in terms of quantity for the amount of product. When the propellant is exhausted, it need merely be replaced by another standard propellant cartridge. Additionally, when the products are exhausted and some of the propellant remains, the propellant cartridge may be transferred to a new product dispenser. Thus, it is apparent that the system in accordance with the present invention eliminates waste of both product and propellant.

With reference now to FIG. 2 of the drawings, the operation of the product container valve and the coupler-aspirator shown in FIG. 1 will be described in further detail. Valve collar 5 has a central opening 20 therein. Just below opening 20 a flexible annular gasket 21 is supported on a first body member 22. A crimp 23 in collar 5 acts to retain body member 22 in place and to hold gasket 21 in place. A second annular body member 24 depends from and is supported on the outer periphery of first annular body member 22. Slidably mounted within annular chamber 25 of first annular body member 22 and annular chamber 26 of second annular body member 24 is a hollow valve stem 27. Crimped between an inwardly extending ring section 28 of first annular body member 22 and an upward extending ridge 29 on second annular body member 24 is a flexible annular gasket 30.

Radial openings 31 extend from hollow passage 32 within valve stem 27 to annular chamber 26. The gasket 30 has the inner periphery thereof obturating the openings 31 and thus serves as a first low pressure obturator.

As shown in FIG. 3, stem 27 has a plurality of longitudinally extending webs 33 defining a plurality of flow passages 34. Radial openings 35 extend outwardly from flow passages 34 at the bottom thereof into annular chamber 25. The gasket 21 has the inner periphery thereof obturating openings 35 and thus serves as a second low pressure obturator. First annular body member 22 has on the inner surface thereof a plurality of longitudinal inwardly extending splines 36 which connect to ring section 28. Stem member 27 has an enlarged portion 37 which cooperates with splines 36 to generally provide lateral support for stem member 27. A spring 38 surrounds stem 27 and is positioned between the bottom of enlarged portion 37 and ring section 28, and urges the stem upwardly.

First flexible product sac 2 is secured to a sac adaptor 39. Sac adaptor 39 is secured into second annular body member 24 and opens into a flow passage 40. Flow passage 40 communicates with chamber 40a between second annular body member 24 and a reduced outer diameter section of first annular body member 22. Chamber 40a communicates through radial holes 41 in the first annular body member 22 into annular chamber 25. The second flexible product sac 3 is secured to a sac adaptor 42. Sac adaptor 42 is fixed into second annular body member 24 and opens into annular chamber 26.

To the top of stem 27 is attached coupler-aspirator 6. Hollow passage 32 of stem 27 opens into a first flow passage 43 of the coupler-aspirator. A reduced diameter section 44 of stem 27 provides a chamber 45 between the stem and the coupler-aspirator. Flow passages 34 of stem 27 communicate with chamber 45. Chamber 45 then communicates with the first flow passage 43 of the coupler-aspirator 6. Thus, the product components are mixed in flow passage 43. The mixed products are then introduced into nozzle 9 through a space 49.

Stem 10 of conventional aerosol valve 11 on propellant cartridge 12 is received within opening 46 of coupler-aspirator 6 in such a manner that the propellant cartridge is positioned above and aligned with product container valve 4. Opening 46 leads directly into flow passage 47 and into nozzle 9.

The operation of the dispenser shown in FIG. 2 will now be described in detail. As the operator presses down on the propellant cartridge as described above, both the propellant cartridge valve 11 and valve 4 are opened. Force from the propellant cartridge 12 pushes down coupler-aspirator 6. This force is then transferred to stem 27. As stem 27 is pushed down into the position shown in FIG. 2, both gasket 21 and gasket 30 are flexed. Therefore, both openings 35 and 31, respectively, are open. Communication is then open between flexible product sac 3, annular chamber 26, radial openings 31, passage 32, and first flow passage 43. Communication is simultaneously opened between flexible product sac 2, flow passage 40, chamber 40a, openings 41, annular chamber 25, radial openings 35, flow passages 34, chamber 45 and first flow passage 43. Propellant is discharged from cartridge 12 through stem 10 of the valve 11 into second flow passage 47 and into nozzle 9. This action aspirates the components of the product through the above mentioned channels, flow passage 43, chamber 49, and into nozzle 9. Coupler-aspirator 6 extends to and sprays the multiple component product through hole 16 in guide 15.

An alternative arrangement of the product container valve shown in FIGS. 1 and 2 will now be described with reference to FIG. 4. Valve collar 105 has a central opening 120 therein. Directly below opening 120 is a flexible annular gasket 121. A first annular body member 122 is supported from collar 105 by crimp 123 therein. Body member 122 supports gasket 121 and holds it in place. A second annular body member 124 is supported by first annular body member 122 and is held in place on the inner periphery thereof. A flexible annular gasket 130 is held in place between an upper ridge 129 of second annular body member 124 and an inwardly extending ridge section 128 of the first annular body member 122.

A hollow stem 127 is slidably mounted within annular chamber 125 in first annular body member 122 and annular chamber 126 within second annular body member 124. Radial openings 131 extend from central passage 132 of stem 127 into annular chamber 126. The gasket 130 has the inner periphery thereof obturating the openings 131, and thus serves as a first low pressure obturator. Stem 127, similarly to stem 27 shown in FIG. 2, has a plurality of webs which define a plurality of longitudinal channels 134 therein. Stem 127 has an outwardly projecting annular flange 137 on the outer periphery thereof. Channels 134 communicate through radial openings 135 into annular chamber 125. The gasket 121 has the inner periphery thereof obturating the openings 135, and thus serves as a second low pressure obturator. A spring 138 surrounds stem 127 and is supported between the bottom of enlarged portion 137 and the ring section 128 and urges stem 127 upwardly.

The flexible product sac 102 is secured to a sac adaptor 139. Sac adaptor 139 is fixed to first annular body member 122 and communicates with annular chamber 125. The flexible product sac 103 is secured to a sac adaptor 142. Sac adaptor 142 is fixed to second annular body member 124 and communicates with annular chamber 126. Stem 127 and channels 132 and 134 therein are connected to and communicate with the coupler-aspirator in precisely the same manner as did the embodiment described in FIG. 2.

Thus, it will be seen that when an operator presses downward on the propellant cartridge, thereby moving the coupler-aspirator downward, and thus causing stem 127 to move downward, gaskets 121 and 130 will be flexed downward. This will cause openings 135 and 131, respectively, to be opened. Thus, the product in product sac 102 will be in communication with the coupler-aspirator through annular chamber 125, openings 135, and channels 134. Likewise, the product in product sac 103 will be in communication with the coupler-aspirator through annular chamber 126, openings 131 and passage 132.

With reference now to FIG. 5, a further embodiment of the present invention will be described. The embodiment of FIG. 5 is similar to the embodiment of FIG. 4, with the exception of the angles of alignment of sac adaptors 239 and 242, and with the further exception that only a single annular body member 222 is provided. Flexible annular gasket 221 is held in place between collar 205 and body member 222 in a manner similar to that of the embodiment of FIG. 4. Flexible annular gasket 230 is held in place between a ridge 222b of body member 222 and a ring member 228. Ring member 228 is held in place and prevented from upward movement by ridge 222a on the inner surface of body 222. The flexible product sac 202 is secured to sac adaptor 239, which is held in place in body 222 to communicate with a chamber 225 therein. The flexible product sac 203 is secured to sac adaptor 242, which is secured within body 222 and communicates with a chamber 226 therein.

Hollow stem 227 is slidably mounted within chambers 225 and 226. Radial openings 231 extend from passage 232 within stem 227 into chamber 226. Radial openings 235 extend from longitudinal passages 234 within stem 227 into chamber 225. Gaskets 230 has the inner periphery thereof obturating the openings 231 and thus serves as first low pressure obturator. Gasket 221 has the inner periphery thereof obturating the openings 235 and thus serves as a second low pressure obturator. Spring 238 acts to bias stem 227 in an upward direction. It is noted in FIG. 5 that sac adaptors 239 and 242 are positioned within body 222 in an angular manner. This arrangement offers the significant advantage that the flow path of the product from product sac 202 is in a substantially straight vertical line from sac adaptor 239, through chamber 225 to passages 234. Thus, turbulence of the product within chamber 225 is reduced. This markedly reduces the time required for product flow. This arrangement offers the further advantage over the arrangement shown in FIG. 4 in that the sac adaptors need not be crowded around the collar 205. This provides much more freedom for the flexible sacs and helps to insure that the sacs are not prematurely closed. Product flow from sacs 202 and 203 through stem 227 is actuated in the same manner as product flow from the sacs in the embodiment of FIG. 4.

In the embodiments of the invention thus far described, all of the product components have been enclosed in flexible product sacs. In such arrangements as previously discussed with regard to FIG. 1, the product container is provided with various holes 17 therein to insure an equalization of pressure within the product container to further provide for continued dispensing of the products from the sacs. The valve collar need not be attached in a leakproof manner in such embodiments. However, as also previously mentioned, it is possible to enclose one of the product components within the product container itself, rather than in a flexible product sac. However, it is manifest that if such arrangement is made, the pressure equalization holes may not be provided in the product container itself. Further, the attachment of the valve collar must be leakproof.

Therefore, with reference now to FIG. 6, an embodiment of the present invention will be described wherein one of the products is located within the product container itself and means are provided for pressure equalization within the product container. The embodiment of FIG. 6 is similar to the embodiment shown and described with reference to FIG. 4. However, instead of a sac adaptor being fitted into body member 322, a dip tube 339 is fitted therein. Dip tube 339 communicates with chamber 325. Collar 305 is sealed to container 301 by any conventional means to provide a leakproof seal. A first annular body member 322 is supported from a downward extending projection 305a of collar 305. Gasket 321 is held in place between collar 305 and annular body member 322. A second annular body member 324 depends from and is supported by the inner periphery of first annular body member 322. Gasket 330 is supported between the upper edge of second annular ring member 324 and the lower edge of inwardly extending ring section 328 of the first annular body member 322. Flexible product sac 303 is secured to sac adaptor 342, which is then secured within the second annular body 324, and which communicates with chamber 326.

Slidably mounted within chambers 325 and 326 is hollow stem 327. Radial openings 331 extend from center passage 332 of stem 327 into chamber 326. Radial openings 335 extend from longitudinal passages 334 of stem 327 into chamber 325. Gasket 330 has the inner periphery thereof obturating the openings 331, and thus serves as a first low pressure obturator. Gasket 321 has the inner periphery thereof obturating the openings 335, and thus serves as a second low pressure obturator. Annular depending projection 305a has a longitudinal opening 305b therein. It will be apparent that as the unit is actuated and stem 327 is depressed, gasket 321 is moved downward. This, of course opens communication between the product in the container 301 through dip tube 339 into chamber 325 through openings 335 and into passages 334. Simultaneously, however, gasket 321 is moved away from projection 305c of collar 305 and there is then communication between the atmosphere above collar 305 and the interior of container 301 through opening 305b. Thus, as product is aspirated from the interior of container 301, atmospheric pressure is introduced into container 301 to equalize the pressure therein, and to thus insure continued dispensing of product therefrom. Conversely, upon release of the valve stem 327 a seal is again created when projection 305c engages gasket 321. It is to be understood that the dip tube 329 could be secured to second annular body member 324 in place of sac adaptor 342, and that a sac and sac adaptor could then be connected to the first annular body 322. It is to be further understood that a dip tube could be used in place of either of the sac adaptors 239 or 242 shown in FIG. 5, or either of the sac adaptors 39 or 42 shown in FIG. 2. All that would be required is that the air return device shown in FIG. 6 be provided in the valve structure of FIG. 5 or FIG. 2, and that the holes 17 be closed. It is to be further understood than any of the embodiments could employ the use of two or more dip tubes, rather than one dip tube and one or more sacs. This would merely require that the product container be partitioned to provide mutually isolated compartments.

With reference now to FIG. 7 of the drawings, a further embodiment of the present invention will be described, wherein a first flexible product sac 403 is connected to valve 404 and contained on the inside of a second flexible product sac 402. Flexible annular gasket 421 is held in place between collar 405 and the body member 422 in a manner similar to that of the previous embodiments. Flexible product sac 403 is blow or injection blow molded in a conventional manner to provide an integral rigid adaptor portion 442. The adaptor portion 442 is held around the inner periphery of body member 422. Flexible product sac 402 is also blow or injection blow molded in a conventional manner to provide an integral rigid adaptor portion 439. Adaptor portion 439 fits around and is held in place by the outer periphery of body member 422. Thus, it will be seen that bag 403 is positioned within bag 402. It will there-

fore be further apparent that bag 403 must be compatible with both the product component to be contained within bag 402 and the product component to be contained within bag 403.

Flexible annular gasket 430 is held in place between the upper surface of adapter portion 442 and an inwardly extending ring section 428 of body member 422.

Hollow stem 427 is slidably mounted within chamber 425 of body member 422. Radial openings 431 extend from passage 432 within stem 427 into and in communication with the interior of bag 403. Radial openings 435 extend from longitudinal passages 434 within stem 427 into chamber 425. Gasket 430 has the inner periphery thereof obturating the openings 431 and thus serves as a first low pressure obturator. Gasket 421 has the inner periphery thereof obturating the openings 435 and thus serves as a second low pressure obturator. Spring 438 acts to bias stem 427 in an upward direction.

Thus, it will be seen that when an operator presses downward on the propellant cartridge, thereby moving the coupler-aspirator downward, and thus causing stem 427 to move downward, gaskets 421 and 430 will be flexed downward. This will cause openings 435 and 431, respectively, to be opened. Passage 40 provided within body member 422 provides communication between the interior of product sac 402 and chamber 425. Thus, the product in product sac 402 will be in communication with the coupler-aspirator through passage 440, chamber 425, openings 435, and channels 434. Likewise, the product in product sac 403 will be in communication with the coupler-aspirator through openings 431 and passage 432.

With reference now to FIG. 8 of the drawings, a modification of the embodiment shown in FIG. 7 will be described. The dispenser of FIG. 8 is similar to that of FIG. 7, but instead of an inner flexible product sac, a dip tube 542 is friction fitted into the inner periphery of annular body member 522. Adapter portion 539 of blow or injection blow molded flexible product sac 502 is attached to the outer periphery of body member 522. The bottom of sac 502 is provided with a molded flange portion 539a, through which dip tube 542 extends. Flexible annular gasket 521 is held in place between collar 505 and annular body members 522 and 524 in a manner similar to that shown in FIG. 6. Annular depending projection 505a of collar 505 supports body member 522. Flexible annular gasket 530 is held in place between annular body member 522 and a ring portion 528 of second annular body member 524.

Stem 527 is slidably positioned within annular body members 522 and 524. Stem 527 operates in precisely the same manner as the stem in FIG. 7. Thus, when the unit is actuated and the stem 527 is depressed, the product component contained within the product container is in communication with passage 532 through dip tube 542, chamber 526, and openings 531. The product component contained within sac 502 is in communication with passages 534 through passages 540 and 541 in annular body members 522 and 524, respectively, chamber 525, and radial openings 535. Additionally, as stem 527 is depressed, the interior of the product container is placed in communication with the atmosphere through opening 505b in depending projection 505a, to equalize the pressure within the product container and to insure continued dispensing therefrom.

A further modification of this embodiment of the present invention is illustrated by the dashed lines of the second flexible product sac 503. Thus, the second product component may be enclosed in sac 503, rather than in the product container itself. Sac 503 would be fitted around the bottom outer periphery of dip tube 542. The product component within sac 503 would be dispensed therefrom in precisely the same manner as above described. Of course, it would not be necessary if sac 503 were to be employed to provide the air return passage 505b within the valve. It would manifestly be possible to merely provide openings at appropriate locations within the outer container itself.

In the various embodiments of the invention thus far described the product components have been mixed together in the first product flow passage within the coupler-aspirator immediately upon their being discharged from the product container valve stem. However, it is to be understood that it is contemplated to be within the scope of the present invention to delay the mixture of the various product components until actually aspirated through the nozzle of the coupler-aspirator. Such an arrangement would be particularly important in a situation where the product components should not be mixed until actually sprayed. With reference then to FIGS. 9-11, a coupler-aspirator will be described wherein the multiple product components are not mixed until they are actually sprayed from the nozzle.

As shown in FIG. 10, coupler-aspirator 606 is adapted to receive the stem of a conventional propellant cartridge with an opening 646. Opening 646 communicates with a vertical section 607a of a propellant flow passage. Section 607a terminates in a horizontal section 607b of the propellant flow passage which opens into the Venturi of nozzle insert 609. Coupler-aspirator 606 is also adapted to be coupled to a product container valve stem 627 having isolated product flow passages 632 and 634 therein. The valve product flow passage 632 communicates with a vertically extending first section 633a of a first product flow passage within the coupler-aspirator 606. Valve product flow passage 634 communicates with a vertical section 635a of a second product flow passage within the coupler-aspirator. Section 633a terminates in a horizontal section 633b of the first product flow passage within the coupler-aspirator. Section 635a terminates in a horizontal section 635b of the second product flow passage within the coupler-aspirator. Sections 635b and 633b extend horizontally through the coupler-aspirator 606 and terminate at chamber 636 housing the nozzle insert 609.

Dividing walls 637 are provided integrally of the coupler-aspirator 606 and extend in a generally vertical direction abutting against the nozzle insert 609. Dividing walls 637 thus divide chamber 636 into two separate product chambers 636a and 636b. Section 633b of the first product flow passage terminates in product chamber 636b, and section 635b of the second product flow passage terminates in product chamber 636a. Radial opening 638 extends from the interior of nozzle 609 into product chamber 636a, and radial opening 639 extends from the interior of nozzle 609 to product chamber 636b.

Thus, it will be apparent that the various product components are not mixed until they actually reach the interior of nozzle 609. The coupler-aspirator shown in FIGS. 9-11 of course otherwise operates in precisely the same manner as the coupler-aspirator discussed in the previous embodiments.

Although each of the embodiments of the present invention thus far discussed disclose the use of only two product components, it is to be understood that the present invention contemplates the use of three or more such components. This alteration could be made in any of the disclosed embodiments by providing additional product sacs, additional sac adaptors, additional product passages and additional obturating means. One such modification will be described now with reference to FIG. 12, wherein a product container valve modified to have three product passages is adapted to be coupled to a coupler-aspirator having three product flow passages similar to the coupler-aspirator shown in FIG. 10. Product container valve 727 is shown in dashed lines and has three product flow passages, 730, 732 and 734. Valve product flow passage 730 is adapted to communicate with vertical section 731a of a first product flow passage within the coupler-aspirator, valve product flow passage 732 is adapted to communicate with vertical section 733a of a second product flow passage within the coupler-aspirator, and valve product flow passage 734 is adapted to communicate with a vertical section 735a of a third product flow passage within the coupler-aspirator. Section 731a terminates in a horizontal section 731b of the first product flow passage, section 733a terminates in a horizontal

section 733b of the second product flow passage, and section 735a terminates in a horizontal section 735b of the third product flow passage. The product flow passages within the coupler-aspirator are adapted to mix the various product components within the nozzle of the coupler-aspirator in a manner similar to that described with reference to FIGS. 9-11. The embodiment shown in FIG. 12 in other respects operates in the same manner as the previously described embodiments, the only difference being that there are three, rather than two, product components.

In all of the embodiments of the invention thus far described, the coupler-aspirator has been illustrated as being coupled to male product and aerosol valve stems. However, it is to be understood that it is within the scope of the present invention to provide a coupler-aspirator having male coupling means adapted to be inserted into female product and/or aerosol valves.

All of the various parts of the various embodiments of the present invention above described may be molded of plastic material by conventional molding techniques, thus making possible the provision of such dispensers at a low cost.

The flexible sacs above described are preferably of the thin walled type and have a great flexibility. These sacs may be made of any suitable material which is compatible with the product used therein.

Thus, it will be seen that there has been provided a multi-component product dispenser which may be manufactured inexpensively by non-aerosol type manufacturers. The dispenser of this invention may manifestly provide greatly improved commercial exploitation of products which heretofore have not been distributed in aerosol form. The unit as described above may be manufactured and adapted to be latter combined with a conventional aerosol cartridge. The provision of this type dispenser eliminates a great many manufacturing problems. The product container need not be pressure sealed. The product unit need not be shipped or handled under aerosol regulations, since the unit contains no aerosol cartridge. The waste of either the propellant or the product, heretofore unavoidable, is eliminated.

Although several embodiments of the invention have been described in detail, such description is intended to be illustrative only, and not restrictive, since many details of the construction of the invention may be altered or modified without departing from the spirit or scope thereof.

What is claimed is:

1. A multi-component product dispenser comprising a product container housing at least two mutually isolated product components; a valve means mounted on said product container for selectively dispensing said product components, said valve means including a stem, isolated product passages communicating with said product components and obturating means for selectively closing and opening said product passages; and a coupler-aspirator mounted above said product container and having first and second coupling means, the first of said coupling means connected to said valve stem, the second of said coupling means extending upward and away from said product container for attachment to an aerosol propellant cartridge, said coupler-aspirator further having a Venturi nozzle having a throat portion and a plurality of flow paths joining at said nozzle, a first of said flow paths communicating with said second coupling means and the remainder of said flow paths communicating with said first coupling means, said Venturi throat portion located in said first flow path, said remainder of said flow paths being in fluid communication with said Venturi throat portion.

2. A dispenser as claimed in claim 1, wherein said valve means is leak-sealed but not pressure-sealed to said product container.

3. A dispenser as claimed in claim 2, wherein one of said product components is enclosed in a flexible product sac, said sac having a sac adaptor thereon which fits into said valve to provide communication between said sac and one of said product passages, and a second of said product components is

enclosed within said product container, said valve means having a dip tube fitted therein to provide communication between said second product component and a second of said product passages.

4. A dispenser as claimed in claim 2 further comprising a guide means fitting around and aligned with said container for providing lateral support for said aerosol propellant cartridge, said guide means having an opening therein through which said multi-component product is sprayed by said coupler-aspirator.

5. A dispenser as claimed in claim 2, wherein said product passages comprise substantially straight vertical paths from said product components to said coupler-aspirator.

6. A dispenser as claimed in claim 2, wherein said remainder of said flow paths comprise a single flow path and said product components are mixed in said single flow path.

7. A dispenser as claimed in claim 2, wherein said remainder of said flow paths comprise at least two mutually isolated flow paths and said product components are mixed in said nozzle.

8. A dispenser as claimed in claim 2, wherein said product components are enclosed in individual flexible product sacs, each of said sacs having a sac adaptor thereon which fits into said valve means to provide communication between said sac and one of said product passages.

9. A dispenser as claimed in claim 8, wherein said sac adaptors fit into said valve means generally horizontally.

10. A dispenser as claimed in claim 8, wherein one of said sac adaptors fits into said valve means generally horizontally and one of said sac adaptors fits into said valve means generally vertically.

11. A dispenser as claimed in claim 8, wherein said sac adaptors fit into said valve means at acute angles with respect to the vertical axis thereof, whereby the flow paths of said product components are substantially in a straight vertical line from said sacs to said coupler-aspirator.

12. A dispenser as claimed in claim 8, wherein said flexible product sacs are blow or injection blow molded, said sac adaptors are integral with said sacs, and a first of said sacs is disposed within a second of said sacs.

13. A dispenser as claimed in claim 12, wherein said valve means includes a body member having supporting means and a first of said obturating means comprises an annular gasket, said gasket being held in place within said body member by said supporting means and said sac adaptor integral with said first sac.

14. A multi-component product dispenser comprising a product container housing at least two mutually isolated product components; a valve means mounted on said product container for selectively dispensing said product components, said valve means including a stem, isolated product passages communicating with said product components and obturating means for selectively closing and opening said product passages; a coupler-aspirator mounted above said product container and having first and second coupling means, the first of said coupling means connected to said valve stem, the second of said coupling means extending upward and away from said product container, said coupler-aspirator further having a Venturi nozzle having a throat portion and a plurality of flow paths joining at said nozzle, a first of said flow paths communicating with said second coupling means and the remainder of said flow paths communicating with said first coupling means, said Venturi throat portion located in said first flow path, said remainder of said flow paths being in fluid communication with said Venturi throat portion; and an aerosol propellant cartridge positioned above said coupler-aspirator and vertically aligned with said container and having a valve connected to said second coupling means, such that depression of said cartridge and said coupler-aspirator opens said valve means and said valve and propellant from said cartridge aspirates said products through said Venturi nozzle.

15. A dispenser as claimed in claim 14, wherein said valve means is leak-sealed but not pressure-sealed to said product container.

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16. A dispenser as claimed in claim 15, wherein one of said product components is enclosed in a flexible product sac, said sac having a sac adaptor thereon which fits into said valve to provide communication between said sac and one of said product passages, and a second of said product components is enclosed within said product container, said valve means having a dip tube fitted therein to provide communication between said second product component and a second of said product passages.

17. A dispenser as claimed in claim 15, further comprising a guide means fitting around and aligned with said container for providing lateral support for said aerosol propellant cartridge, said guide means having an opening therein through which said multi-component product is sprayed by said coupler-aspirator.

18. A dispenser as claimed in claim 15, wherein said product passages comprise substantially straight vertical paths from said product components to said coupler-aspirator.

19. A dispenser as claimed in claim 15, wherein said remainder of said flow paths comprise a single flow path and said product components are mixed in said single flow path.

20. A dispenser as claimed in claim 15, wherein said remainder of said flow paths comprise at least two mutually isolated flow path and said product components are mixed in said nozzle.

21. A dispenser as claimed in claim 15, wherein said

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product components are enclosed in individual flexible product sacs, each of said sacs having a sac adaptor thereon which fits into said valve means to provide communication between said sac and one of said product passages.

22. A dispenser as claimed in claim 21, wherein said sac adaptors fit into said valve means generally horizontally.

23. A dispenser as claimed in claim 21, wherein one of said sac adaptors fits into said valve means generally horizontally and one of said sac adaptors fits into said valve means generally vertically.

24. A dispenser as claimed in claim 21, wherein said sac adaptors fit into said valve means at acute angles with respect to the vertical axis thereof, whereby the flow paths of said product components are substantially in a straight vertical line from said sacs to said coupler-aspirator.

25. A dispenser as claimed in claim 21, wherein said flexible product sacs are blow or injection blow molded, said sac adaptors are integral with said sacs, and a first of said sacs is disposed within a second of said sacs.

26. A dispenser as claimed in claim 25, wherein said valve means includes a body member having supporting means and a first of said obturating means comprises an annular gasket, said gasket being held in place within said body member by said supporting section and said sac adaptor integral with said first sac.

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