

[54] **EJECTION DEVICE FOR MULTIPLE-PRODUCT DISPENSERS**

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[58] Field of Search.....239/307, 308, 306, 239/337, 579, 543, 544; 222/94, 139, 193

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[57] **ABSTRACT**

An ejection device for producing a mixed spray of a product consisting of at least two fluid product com-

ponents through aspiration and ejection by a gaseous propellant. An ejector housing has a manifold chamber therein and nozzle means therein. The nozzle means has at least two aspirating Venturi-type nozzle elements, one for aspirating each of the fluid products. Each nozzle has a convergent chamber having a narrower and opposite this a wider open end, which latter is in free communication with the manifold chamber, a divergent chamber having a narrower and opposite this a wider open end, and a neck portion connecting the narrower end of the convergent chamber and the narrower end of the divergent chamber with each other. The nozzle elements each have a product inlet between the two chambers. A mixing recess, open to the outside, is provided in a wall of the housing, into which recess the under open ends of the divergent chambers of all of the nozzle elements open. At least one duct means is provided in the housing, opening at one end in a wall of the housing spaced from the mixing recess and communicating at its other end with the manifold chamber, for the free flow of propellant gas therethrough into the convergent chambers of all of the nozzle elements. Separate conduit means is provided in the housing, one for each of the nozzle elements, each of which conduit means opens at one end in a wall of said housing spaced from the opening of the mixing recess and from the opening or openings of the duct means, and each of which conduit means is, at its other end, in communication with the product inlet of the neck portion of a different one of the nozzle elements.

**8 Claims, 6 Drawing Figures**

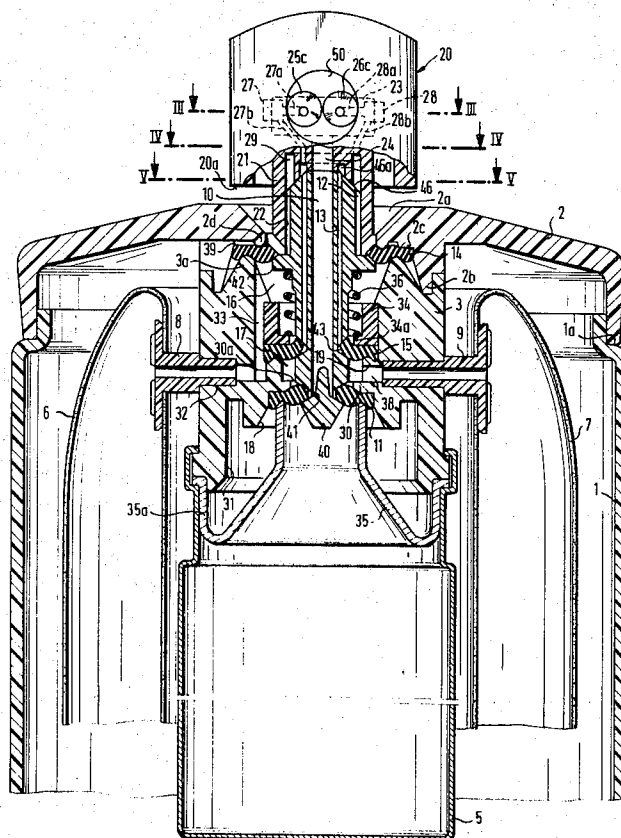
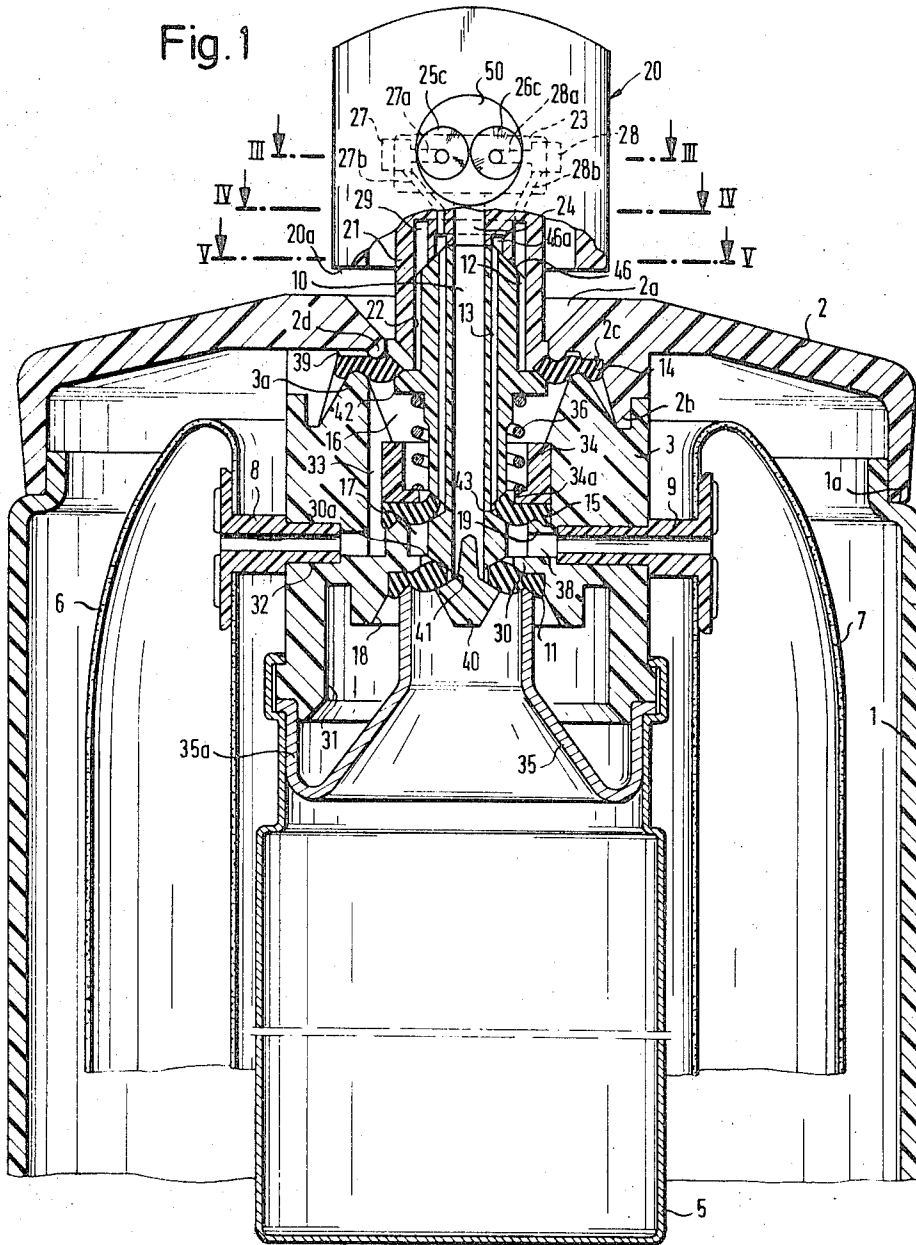


Fig. 1

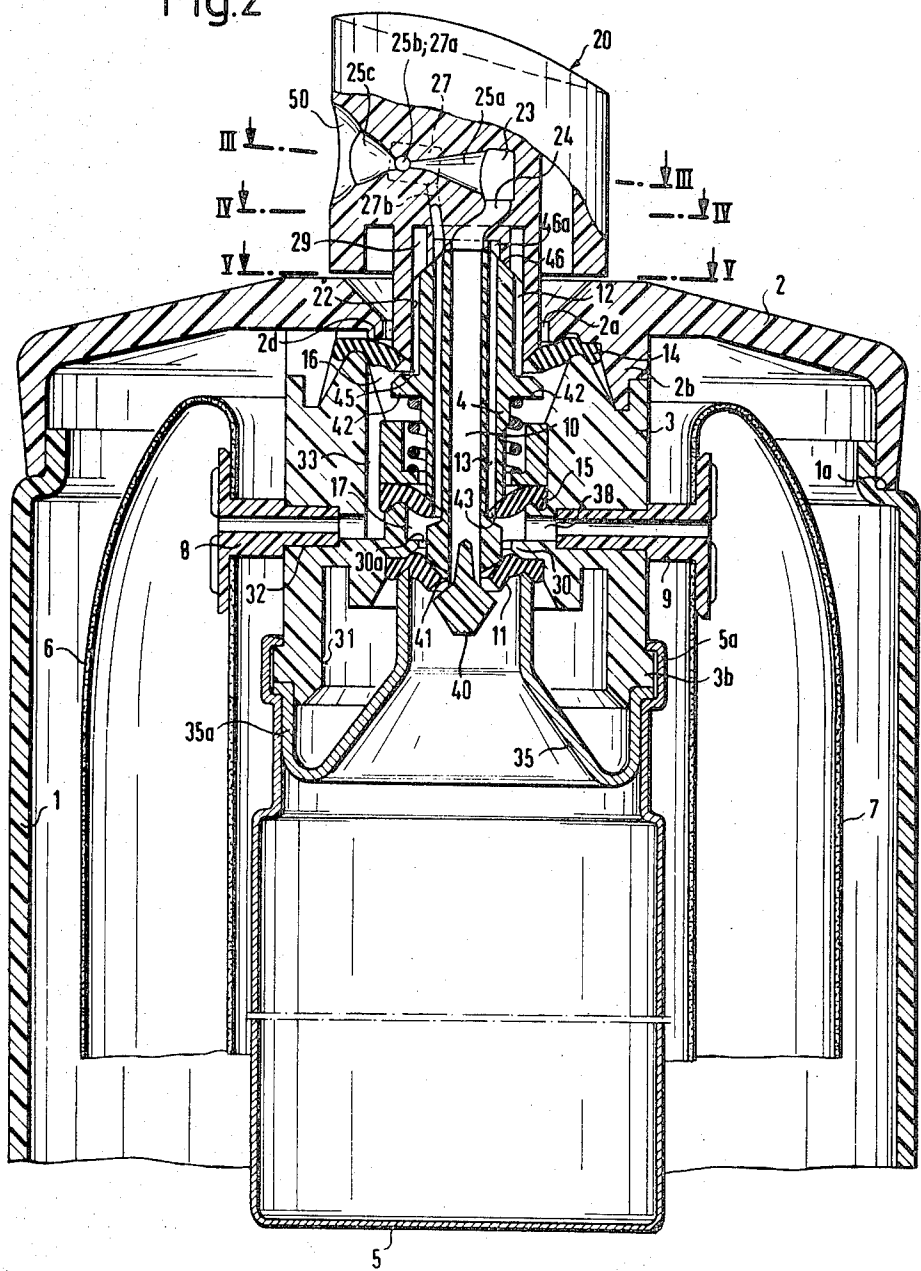


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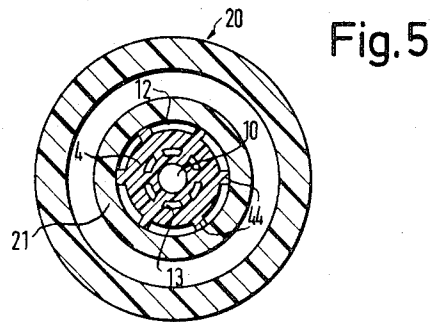
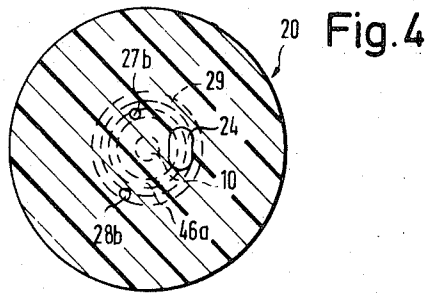
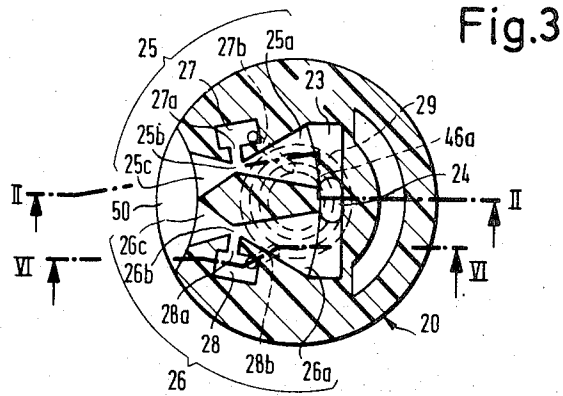
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Fig.2



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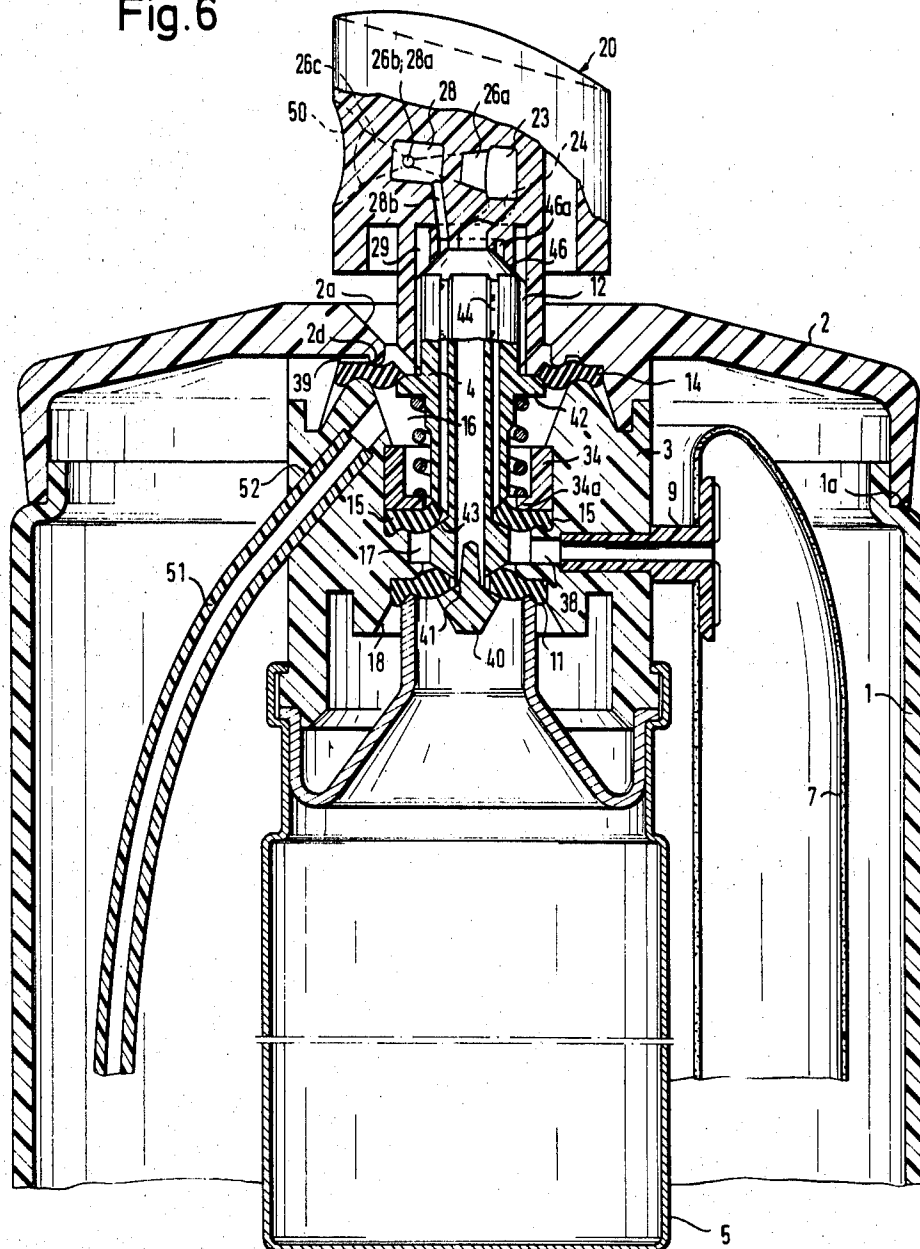
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Fig. 6



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## EJECTION DEVICE FOR MULTIPLE-PRODUCT DISPENSERS

This invention relates to an ejection device for producing a mixed spray of at least two fluid products, and more particularly an ejection device of this type which is suitable for use as pushbutton spray head for multi-component aerosol dispensers.

More specifically, the ejection device according to this invention is usable in aerosol dispensers of the type in which the components of the product to be sprayed are held in different compartments of a product container, and a separate cartridge for holding the propellant is provided within the interior of the dispenser and surrounded by a product container or containers, so that the components of the product are kept separate from each other and from the propellant in the dispenser.

Such multi-component aerosol dispensers which comprise a propellant cartridge filled with liquefied gas propellant and separate containers for two or more different fluid products, are generally equipped with suitable valve means and with a pushbutton spray head provided with a Venturi-type nozzle and wherein pressure upon the pushbutton spray head actuates the valve means to release propellant in the gas phase and the latter, passing through the spray nozzle, will aspirate the two or more products, to be dispensed in mixture with each other, via conduits means controlled by the same valve means.

Multi-component dispensers are especially desirable for application of pesticidal agents having two or more different biological activities for instance, when a fungicide and an insecticide which are insufficiently compatible for storage in mixtures are to be applied at the same time. Thus, insecticidal phosphoric acid esters are conventionally applied dissolved in nonpolar solvents, while fungicides often require a polar solvent; mixture of the two components in a common aerosol product container would cause precipitation or decomposition, for instance in the case of Diazinone and Dodine. Other important applications are found in the field of plant growth stimulation and fertilizer compositions. Iron chelates in solution are not stable when admixed with ammonium salts, in particular the nitrate or sulfates. Previously, it was necessary to keep these components strictly separated before actual usage. A most important application of multi-component compositions in which absence of decomposition products and exact ratio of components in the mixture must be assured, is for the dyeing of hair. To this end, usually an oxidation dye and oxidizing agent such as hydrogen peroxide are brought together; ready-to-use aerosol mixtures must, therefore, be prepared only at the moment of actual use. It must be possible to maintain a given ratio of oxidation dye to oxidizing agent very precisely in order to obtain a tint of the hair exactly as desired by the hairdresser. This is also true for hair-bleaching mixtures in which, at the moment of use, a persulfate component is to be admixed in a constant ratio with hydrogen peroxide or the like acting as reducing agent on the persulfate component. Products being constituted by two or more components which are sufficiently inert with regard to each other to permit their intermingling before they enter a Venturi nozzle of conventional construction or as they meet in the narrow neck portion of such conventional Venturi nozzle, can be sprayed from

a dispenser equipped with a conventional type of Venturi spray nozzle, even if there is some interaction between the components of the product, as long as any reaction products formed do not tend to clog the narrow neck portion of the Venturi nozzle between a convergent portion of the nozzle, through which the propellant is usually caused to flow in order to enhance its aspirating force, on the one hand, and the divergent ejection chamber which is usually to be found in the more recent types of such nozzles.

However, when reaction products of a clogging nature are formed immediately upon contact between two different products being dispensed through a common Venturi nozzle, then these dispensers will not operate fully satisfactorily.

Dispensers in which the product components are brought into contact before entering the Venturi nozzle suffer from the further drawback that the weight ratio of the components in the mixed spray is not constant, but fluctuates within certain limits. A similar fluctuating effect is observed, for example, when running hot and cold water simultaneously from a common faucet, e.g., of a shower or bathtub, the water jet being at times colder and at times hotter than the desired average temperature.

It is therefore an object of the present invention to provide an ejection device usable as spray nozzle in the aforesaid type of multi-component dispensers, which produces a spray of constant weight ratio, practically free from fluctuations of that ratio, between the several fluid products being dispensed.

It is another object of the invention to provide an ejection device usable as spray nozzle for two or more product components to obtain a mixed spray, in which at least two or more of the components react instantly with each other with formation of products tending to clog the Venturi spray nozzle, which ejection device is free from any danger of clogging by such reaction products.

It is furthermore a principal object of the invention to provide an ejection device of the type described hereinbefore which permits of intimate intermingling of two product components in a common spray cloud without the formation of extensive zones in the common spray cone in which there is preponderance of one component over the other or others.

It is yet another principal object of the invention to provide an ejection device which produces a mixed spray in which the formation of larger droplets due to impinging of finer ones upon each other is kept to a minimum or completely avoided, the last mentioned two objects to be achieved while maintaining the first-mentioned two objects of the invention.

U.S. Pat. No. 3,180,578 to Elmore W. Hagadorn describes a spraying apparatus that would permit achieving the two first-mentioned object, however without permitting attainment of the above-stated principal objects, for the ejected sprays are directed at an angle away from each other and mixing will only occur at a marginal zone between them.

On the other hand, U.S. Pat. No. 3,236,457 to J.R. Kennedy et al provides for directing two jets of product produced by a propellant exerting pressure and pushing rather than aspirating the product components out of their respective reservoirs. The two jets impinging upon

each other only intermingle unsatisfactorily at their contact zone and will be largely deflected away from each other.

These drawbacks are avoided and the above stated object are attained by the ejection device according to the invention for producing a mixed spray of a product consisting of at least two fluid product components, through aspiration and ejection by a gaseous propellant, and comprising an ejector housing and nozzle means therein, characterized by

- a. a manifold chamber provided in said housing, and by
- b. at least two Venturi-type nozzle elements in said nozzle, each of which elements is adapted for aspiration, by a gaseous propellant passing therethrough, of one of said fluid product components, and each of which nozzle elements comprises
  - i. a convergent chamber having a narrower and opposite this a wider open end which latter is in free communication with said manifold chamber,
  - ii. a divergent chamber having a narrower and opposite this a wider open end, and
  - iii. a neck portion connecting the narrower end of said convergent chamber and the narrower end of said divergent chamber with each other, and having a product inlet opening the neck passage,
- c. a mixing recess, open to the outside, in a wall of said housing, into which recess the divergent chambers of all of said nozzle elements open with their wider open ends,
- d. at least one duct means in said housing, opening at one end in a wall of the latter spaced from said mixing recess therein, and being at its other end in communication with said manifold chamber, for the free flow of propellant gas therethrough into said convergent chambers of all of said nozzle elements, and
- e. separate conduit means in said housing corresponding in number to that of said nozzle elements, each of which conduit means opens at one end in a wall of said housing spaced from the openings of said mixing recess and from the opening or openings of said duct means, and each of which conduit means is, at its other end, in communication with the said product inlet of the neck portion of a different one of said nozzle means.

Thereby, propellant passing through the manifold into the convergent portions of the several Venturi spray nozzle elements connected thereto, in the proportions corresponding to the dimensions of the convergent portions of the nozzles, aspirates in the connecting neck passages of the nozzle elements, fluid product in proportion to the dimensioning of each of the nozzle elements. Thus, all dimensions of the nozzle elements being equal, there will be aspiration of equal amounts of fluid products and feeding of the same in spray form into the mixing recess of the ejector housing. The ratio of each component in the mixed spray will thus be maintained practically constant. On the other hand, if the dimensions of one of two nozzle elements present in the ejection device are twice as large as those of the other nozzle element, the weight ratio of the first to the second product component in the mixed

spray ejected from the device will be practically constant at 2:1.

Ejection devices according to the invention which are particularly simple to manufacture are those having two Venturi-type nozzle elements opening into the common mixing recess. Such ejection devices can be readily made from synthetic plastics by molding of two halves joined together in the common central plane through the two nozzle elements, by conventional means such as thermic welding, gluing or the like.

The two Venturi-type nozzle elements are preferably located in a plane horizontal to the bottom wall of the ejector housing.

In this bottom wall there is preferably arranged the inlet recess from which the duct means for the propellant lead to the manifold, and the several product conduits lead to the respective neck passages of the different nozzles. When three nozzle elements are used they are preferably arranged so that their longitudinal axes represent the edges of a triangular pyramid or tetraeder, with the manifold chamber as its base.

The preferred use of the ejection device according to the invention is as a pushbutton spray head for aerosol dispensers. Well-known types of pushbutton aerosol dispenser can be readily fitted with an ejector device according to the invention, as long as they possess more than one compartment for product to be dispensed, and are equipped with valve means for commonly controlling outflow of product components from the several compartments, as well as outflow of propellant from a separate propellant cartridge or the like reservoir. The valve shaft or stem of such valve means must, of course be designed to possess a separate duct for the propellant and separate conduits for each of the product components. These ducts and conduits should open at the outward end of the valve shaft.

The inlet recess of the ejector device according to the invention must be so devised, and the openings of the propellant duct to the manifold and of the several product conduits to the product inlets of the several neck passages of the Venturi-type nozzle elements must be so located in that recess, that upon placing of the ejection device upon the valve shaft, each of the duct and conduits in the device registers with a corresponding duct or conduit in the valve shaft, so that there is no intermingling of the several product components prior to their ejection into the mixing recess, contrary to what occurs in the earlier constructions using a single Venturi-type nozzle; there must, of course, be no mixing of the propellant with one or the other of the product components either, prior to the propellant passing through the manifold into the convergent chambers of the several nozzles.

We have found that, in the case of multi-venturi ejection device according to the invention which comprises two Venturi elements, a very satisfactory intermingling of the fine droplets of the two product components is achieved when the central axes of the spray cones ejected from the two divergent chambers of the Venturi elements intersect each other at an acute angle of from about 3° to 60°, and preferably at an angle of about 5° to 30°. The optimal angle of intersection of the two axes depends not only on the shape of the two divergent chambers but above all on the nature of the propellant employed and on the physico-chemical properties of the two products to be sprayed.

The products to be dispensed are preferably in the liquid phase, i.e., they are solutions, emulsions or suspensions of active substances having some desired activity or consist of the liquid substances themselves; they may be foaming or non-foaming, either per se, or when they come into contact with each other in the mixing recess of the ejection device according to the invention.

Other features of the invention will be made clear by the following description, taken together with the accompanying drawings, in which:

FIG. 1 is an axial section of the upper part of a first embodiment of a dispenser which is equipped with, and shows a front view partially in section of, the ejection device according to the invention; all movable parts are in unactuated or "storage" position.

FIG. 2 shows the same arrangement as in FIG. 1, but with the ejection device in a partially sectional side view, and in depressed position relative to the aerosol dispenser body (actuated or discharge position).

FIG. 3 shows a horizontal sectional view of the ejection device as shown in FIGS. 1 and 2, along the plane indicated by III—III in these figures;

FIG. 4 shows another horizontal sectional view of the ejection device shown in FIGS. 1 and 2, but along a plane IV—IV below that in which FIG. 3 is taken;

FIG. 5 is a transversal section through the valve stem of the aerosol dispenser shown in FIGS. 1 and 2, the ejection device as shown in the preceding figures being especially adapted to be mounted this stem; and

FIG. 6 shows the same ejection device mounted on an aerosol dispenser body of somewhat different construction, and in a partially sectional view, the section of the ejection device being taken along the plane indicated by VI—VI in FIG. 3.

The particular embodiment of the dispenser shown in FIGS. 1 and 2 is designed for spraying a multi-component product in liquid form. Furthermore, in FIGS. 3 to 6 there is illustrated a preferred embodiment of the ejection device according to the invention as applied to the valve shaft of a multi-component product dispenser.

In the embodiment shown in FIGS. 1 and 2, the multi-component product to be sprayed can therefore consist of, or contain, two or more components which are not compatible with each other, or would react with each other instantaneously with formation of products tending to clog a conventional Venturi nozzle.

This multi-component product dispenser comprises an outer casing or mantle 1, a cap 2 for the casing which cap is provided with a central opening 2a and is mounted on the upper rim 1a of the casing 1. The dispenser is further provided with valve means comprising a valve housing 3 and a valve shaft or stem 4, a propellant reservoir e.g., a cartridge 5 which is attached to the underside of the valve housing 3, and, finally, in the embodiment of the aerosol dispenser shown in FIGS. 1 and 2, with two product containers 6 and 7 consisting of flexible, compressible or collapsible bags each of which serves to hold one of two different product components and which are attached to the valve housing 3 by connecting tubes 8 and 9.

Outflow of propellant gas from the propellant cartridge 5 into an axial opening, e.g., a central bore 10 of valve shaft 4 is controlled by a high pressure obturator which comprises a propellant flow-controlling annular

gasket 11, and outflow of product components from bags 6 and 7 into separate ducts 12, 13 of the valve shaft 4 is controlled by low pressure obturators comprising a first annular gasket 14 for controlling product flow from bag 6 and a second annular gasket 15 for controlling the flow of the other product component from bag 7.

The valve housing 3 is provided with a hollow interior chamber or passageway consisting of zones 16, 17 and 18 and is fitted with its upper portion 3a into a sleeve like annular projection 2b depending from the inner face of cap 2, the central cap opening 2a being coaxially aligned with the central passageway 16, 17, 18 of valve housing 3. Annular gasket 14 is held in position with its outer peripheral portion in an annular recess 2c of annular projection 2b and with its central annular portion between an annular ridge 2d on the inside of cap 2 about the central opening 2a on the one side, and the rim of the upper portion 3a of the valve housing 3 on the other. The central passage 16, 17, 18 through the valve housing 3 is provided with a shoulder 19 narrowing the zone 17 of the passageway and with an annular rib 30 protruding into that narrower zone 17 of the passageway, and having a central opening 30a through which the upper and narrowed central zone 17 of the passageway is in communication with the lower or bottom zone 18 thereof, opening into an enlarged recess 31 being open toward the propellant reservoir 5.

Annular gasket 14 controls the flow of a first product component from bag 6 via connecting tube 8 which latter is firmly inserted into a corresponding bore 32 and via a channel 33 in the housing 3 which channel opens into the upper zone 16 of the central passageway of the housing and then into ducts 12 of valve shaft 4.

Annular gasket 15 about against shoulder 19 in the central passageway of the valve housing 3 and is held against that shoulder 19 by means of an internal retaining ring 34 which is press-fitted into the central passage 17 and is provided at its lower end with an inwardly directed annular flange 34a, against the lower side of which the central part and outer edge of the annular gasket 15 may abut.

Annular gasket 11 which controls the flow of propellant from the cartridge 5 is mounted in the lower zone 18 of the hollow chamber of the valve housing and is held against the underside of annular rib 30 of the latter by means of an external retaining ring 35 having approximately the shape of an upside-down mushroom, which ring 35 is mounted with its outwardly flared portion 35a, which projects out of the bottom recess 31, onto the underside of the sleeve-shaped valve housing portion 3b encircling said recess 31 and is held in position on said housing portion 3b by a crimped portion 5a of the neck of the propellant cartridge 5. The valve shaft 4 is mounted in the central passageway of the valve housing 3 so as to be displaceable along the central axis of the passageway; it protrudes with its upper end through central cap opening 2a and, with its lower end which faces the propellant reservoir 5 and is shaped as a head 40 which is thicker than the adjoining narrower portion of the shaft, protrudes out of the opening in the annular rib 30 of the valve housing into the lower zone 18 of the central passageway and optionally into the enlarged recess 31 of the valve housing.

The central bore 10 in the valve shaft 4 opens on one end in the middle of the upper end of the valve shaft and on the other via several orifices 41 in the neck zone of the valve shaft just above the valve shaft head 40. This neck zone of shaft 4 is engaged by gasket 11 of the high pressure obturator so that orifices 41 in this zone are obturated as in the position of valve shaft 4 shown in FIG. 1, and so that they are opened for the flow of propellant therethrough when the valve shaft is in the actuated position of the dispenser shown in FIG. 2.

When the valve shaft 4 is not actuated by pressure upon the ejection device according to the invention serving as pushbutton of the dispenser, it is held in the position shown in FIG. 1 by means of a spring 36 which rests with its one end on annular flange 34a of retaining ring 34 and urges with its other end against the underside of a thickened portion or flange 42 provided on shaft 4 in the central zone of the latter.

Valve shaft 4 is further provided with a plurality of product ducts 12 and 13, the latter extending in the interior of the shaft parallel to, but separate from the central shaft bore 10, whereas the ducts 12 extend above the annular flange 42 as grooves in the outer wall of the shaft separated from each other by longitudinal ribs 44, the open portion of said grooves being terminated by the inner wall of the sleeve 21. The ducts 13 open at their lower end in an annular grooved zone 43 of valve shaft 4, which is engaged sealingly by gasket 15, so that the openings of the ducts 13 in this zone 43 are obturated when the valve shaft 4 is in the position shown in FIG. 1, whereas when in the position shown in FIG. 2, the annular gasket is released, thus freeing the openings for the flow of product component into the ducts 13 from the central passage zone 17 of the hollow interior of the valve housing and product bag 7 connected with this zone. Product bag 7 is fastened to the valve housing by means of a connecting tube 9 inserted in a bore 38 in said valve housing.

The product ducts 12 open at their lower end through orifices 45 above said annular flange 42; these orifices 45 are closed off by gasket 14 from the zone 16 of the passageway in the housing when the valve shaft 4 is in the position shown in FIG. 1, in which case gasket 14 rests on and is urged upwardly by the beveled surface of annular flange 42 serving as a valve seat; they are open to zone 16 of the central passageway of valve housing 3 when the valve shaft is in the position shown in FIG. 2 owing to the fact that the beveled lower rim of sleeve 21 of the ejection device depresses the inner annular rim portion of annular gasket 14 for the flow of product component from product container 6, as described hereinbefore, into ducts 12 of the valve shaft.

The gasket 11 prevents at all times the flow of propellant into the zones 17 and 18 and the escape of product of bag 7 from zone 17 into zone 18 of the central passageway of the valve housing; likewise gasket 15 prevents at all times the leakage of the same product from zone 17 into zone 16 and, vice versa, the flow of the product of bag 6 from zone 16 into zone 17 of the central passageway. Finally, gasket 14 prevents at all times an undesired outflow of the product from bag 6 and zone 16 of the central passageway outside of ducts 12, and also prevents the passage of air from the outside into the central passageway of the valve housing via air inlet port 39.

At its upper end the valve shaft 4 is preferably provided with a beveled face 46 which hermetically sealingly abuts against a correspondingly beveled face of recess 22 of a sleeve 21 of the ejection device. Ducts 13 open preferably at the upper end of the shaft into an annular groove 46a which is open to the outside.

Having described in detail in the foregoing, as shown in the embodiment of FIGS. 1 and 2, the structure and functioning of a multi-component dispenser up to the actual ejection operation, in the following a preferred embodiment of the ejection device according to the invention will be shown in detail which in particular is suited for use as pushbutton for the said dispenser, particularly described in which this preferred embodiment is shown in various sectional views. In all of these figures, like reference numerals designate like parts.

This embodiment of the ejection device comprises, as has been mentioned above, a sleeve 21 which is joined to the lower surface 20a of the actual ejection device 20 and preferably protrudes therefrom in the direction of the cap. A manifold 23 is provided in the interior of the ejection device 20, which manifold communicates with the recess 22 of the sleeve 21 via the propellant inlet duct 24 which is preferably a single propellant inlet channel, the orifice of the duct 24 being so located in the inner wall of recess 22 as to register with the opening of central propellant passageway 10 of valve shaft 4.

The manifold 23 is in free communication with the wider open ends of the convergent chambers 25a, 26a of two Venturi-type nozzle elements 25 and 26, while the opposite narrower open ends of the convergent chambers 25a and 26a are connected via neck portions 25b and 26b with the narrower open ends of the two divergent chambers 25c and 26c, respectively. Product chambers 27 and 28 are in free communication with necks 25b and 26b via inlet ducts 27a and 28a, respectively, and in turn with feed ducts 27b and 28b, respectively, leading from the recess 22 in the sleeve 21 of the ejection device. In the inner wall of the recess 22 an annular feed chamber 29 is provided into which feed duct 28b opens and is in free communication with the ducts 12 in the valve shaft. The opening of the feed duct 27b is so located in recess 22 that it is in free communication with the annular groove 46a at the upper end of the valve shaft and with the product ducts 13 opening into this groove.

The wider open ends opposite the narrower open ends of divergent chambers 25c and 26c of nozzle elements 25 and 26 open directly into a common mixing and discharge space 50 which, in the embodiment shown, is provided as a recess in the sidewall of the ejection device 20, which sidewall extends substantially perpendicularly to the lower surface 20a.

This multi-Venturi nozzle comprising the Venturi nozzle elements 25 and 26 functions in a very simple manner as follows: propellant gas from central bore 10 of the valve shaft 4 passes into the manifold 23 via propellant duct 24 and from there, in a weight ratio depending on the construction of the convergent chambers of the nozzle elements 25 and 26 into the latter. This weight ratio is 1:1 if, as in the embodiment shown, the dimensions of both nozzle elements are identical. From the convergent chambers 25a and 26a the separate propellant streams then pass through nozzle

necks 25b and 26b into the divergent chambers 25c and 26c. Depending on the amount and flow rate in which propellant gas passes through the neck 25b, the first product component is aspirated from valve shaft ducts 13 via groove 46a, feed duct 27b, product chamber 27 and product inlet duct 27a, whereas the second product component is aspirated from valve shaft ducts 12 via feed chamber 29, feed duct 28b, product chamber 28 and product inlet duct 28a into the neck 26b. In divergent chamber 25c the first product component is atomized, and in divergent chamber 26c, when the nozzle elements are constructed as in the embodiment shown, an equal weight rate of flow of the other product component is atomized, and the sprays are ejected simultaneously at an acute angle into the mixing space 50 in which they are intimately mixed and agitated, and ejected from mixing space 50 as an homogeneous spray.

Owing to the fact that in the entire passageways within the ejecting device there is no mechanical obstacle or other influencing factor causing fluctuation of the proportions of propellant entering the convergent chambers of the nozzle elements, the ratio of the amounts of propellant flowing through necks 25b and 26b remains constant during actuation of the dispenser, even when the actual amount of propellant gas diminishes which reaches the mixing space from the propellant reservoir. Thus also the ratio of the amounts of product components to be atomized which are led through the product inlet ducts 27a and 28a into the two divergent chambers 27 and 28 and there atomized, remains practically constant and consequently also the ratio of the amounts of two atomized product components leaving the mixing space 50. Fluctuations in the compositions of the mixture that could occur due to discontinuities in viscosity or variable thermal convection when two liquid products are mixed in a common product duct or product inlet chamber prior to atomization in a common Venturi nozzle are thus avoided.

In FIG. 6, the same ejection device as illustrated in the preceding figures is mounted on the upper end of a valve shaft of a dispenser in which there is provided a product bag 7 as in FIGS. 1 and 2, holding one of the product components, while a second product component is held in the outer casing 1 which thus serves directly as product container. In this embodiment, a dip tube 51 is inserted in a bore 52 of the valve housing 3. This tube 51 dips in a liquid product present in container 1. All other parts of this dispenser are the same as those for the embodiment described in connection with FIGS. 1 and 2.

The construction of the multi-component product aerosol dispenser according to the invention is relatively simple and most of the parts can be produced of plastic material by the usual molding process. Likewise, the assembly of the atomizer can be mass-produced in a simple manner.

What is claimed is:

1. An ejection device for producing a mixed spray of a product consisting of at least two fluid product components through aspiration and ejection by a gaseous propellant, and comprising an ejector housing and nozzle means therein, characterized by

a. a manifold chamber in said housing, and by

b. at least two Venturi-type nozzle elements in said nozzle, each of which elements is adapted for aspiration, by a gaseous propellant passing therethrough, of one of said fluid product components, and each of which nozzle elements comprises

i. a convergent chamber having a narrower and opposite this a wider open end which latter is in free communication with said manifold chamber,

ii. a divergent chamber having a narrower and opposite this a wider open end, and

iii. a neck portion connecting the narrower end of said divergent chamber and the narrower end of said divergent chamber with each other, and having a product inlet therebetween,

c. a mixing recess, open to the outside, in a wall of said housing, into which recess the divergent chambers of all of said nozzle elements open with their wider open ends,

d. at least one duct means in said housing, opening at one end in a wall of the latter spaced from said mixing recess therein, and being at its other end in communication with said manifold chamber, for the free flow of propellant gas therethrough into said convergent chambers of all of said nozzle elements, and

e. separate conduit means in said housing, corresponding in number to that of said nozzle elements each of which conduit means opens at one end in a wall of said housing spaced from the opening of said mixing recess and from the opening or openings of said duct means, and each of which conduit means is, at its other end, in communication with the said product inlet of the neck portion of a different one of said nozzle means.

2. An ejection device as described in claim 1, wherein said housing is in the form of a pushbutton head adapted for use with an aerosol spray dispenser.

3. An ejection device as described in claim 1, wherein there are provided two of said Venturi-type nozzle elements.

4. An ejection device as described in claim 3, characterized in that the central longitudinal axes of the spray cones ejected from the divergent chambers of said two nozzle elements intersect with each other inside or outside said mixing recess at an angle of from about 5° to 60°, and preferably at an angle of about 20° to 50°.

5. An ejection device as described in claim 3, characterized in that the main axes of the two Venturi nozzle elements are located in a plane which extends substantially parallel to the bottom wall of said housing, and that said mixing recess is provided in the sidewall of said housing, while said propellant duct means and said conduit means possess entry openings in the bottom wall of said housing.

6. An ejection device as described in claim 5, characterized in that said housing consists of two halves joined together in the plane in which said main axes are located.

7. An ejection device as described in claim 2, wherein said housing has an inlet recess in a wall thereof, remote from the wall of said housing containing said mixing recess, in which inlet recess said duct means and said separate conduit means open spacedly

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from each other said inlet recess being adapted for being fitted on a valve stem of a spray dispenser having separate conduits for the flow of said products therethrough, and a propellant duct means spaced from said separate conduits.

8. An ejection device as described in claim 7, charac-

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terized in that the wall portion of said housing containing said inlet recess is in the form of a dependent sleeve portion, said inlet recess being the hollow of said sleeve portion.

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