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Gehres et al.

[11] 3,767,125
[45] Oct. 23, 1973

[54] MULTIPLE ORIFICE AEROSOL ACTUATOR

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[73] Assignee: **Union Carbide Corporation**, New York, N.Y.

[22] Filed: **May 28, 1971**

[21] Appl. No.: **148,167**

Related U.S. Application Data

[63] Continuation of Ser. No. 859,659, Sept. 26, 1969, abandoned, which is a continuation-in-part of Ser. No. 772,703, Nov. 1, 1968, abandoned.

[52] **U.S. Cl.** **239/552,** 239/600
[51] **Int. Cl.** **B05b 1/14**
[58] **Field of Search**.... 222/394, 145, 402.1–402.25; 239/304, 579, 318, 394, 337, 597, 594, 327, 552, 600

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[57] **ABSTRACT**

An aerosol actuator assembly having a multiple orifice discharge arrangement is provided by means of an insert placed within the dispensing conduit of an aerosol actuator button whose inner surface cooperates with the outer surface of the insert to form multiple dispensing conduits. The separately structured actuator button and insert provide an arrangement obviating molding problems which would arise with a one-piece multiple orifice actuator.

7 Claims, 12 Drawing Figures

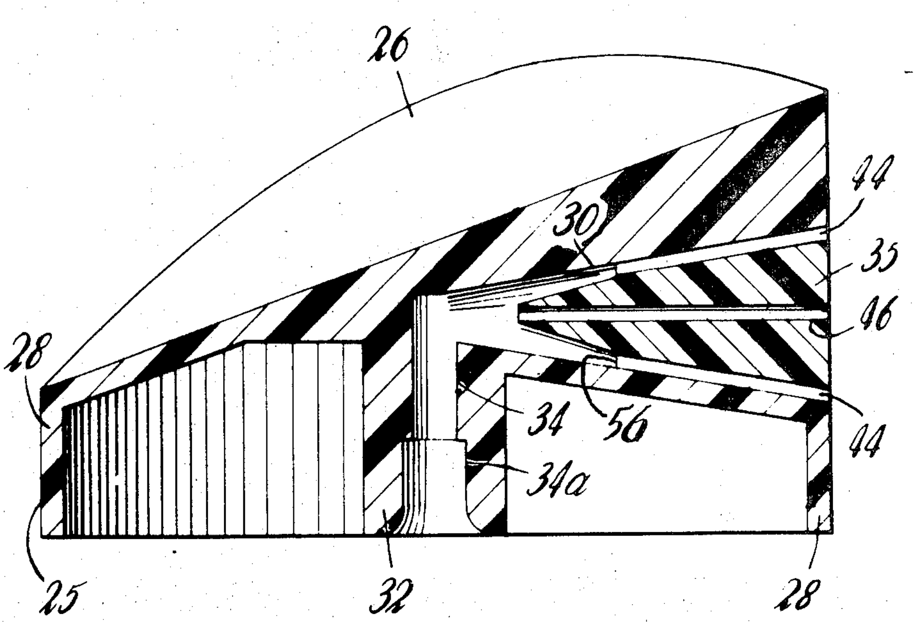


Fig. 1.

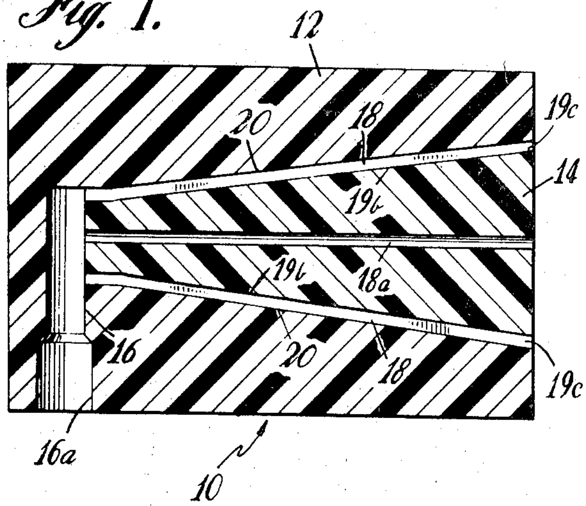


Fig. 2.

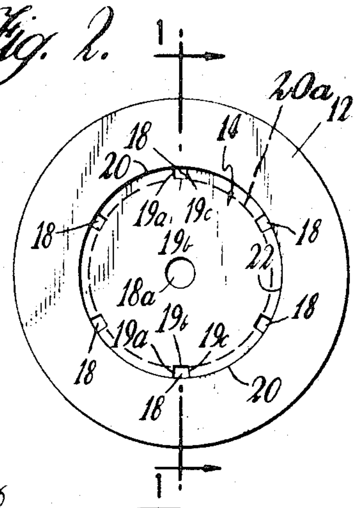


Fig. 3.

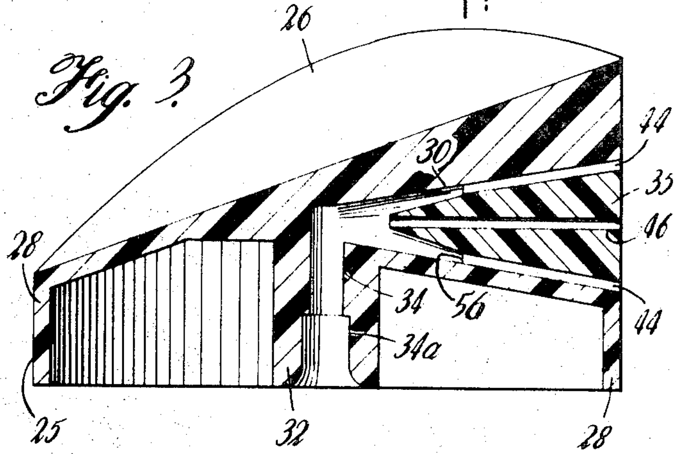


Fig. 6.

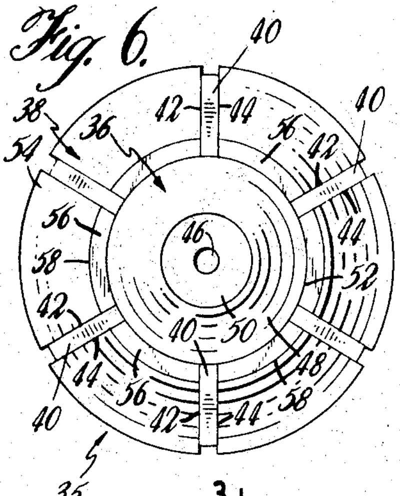
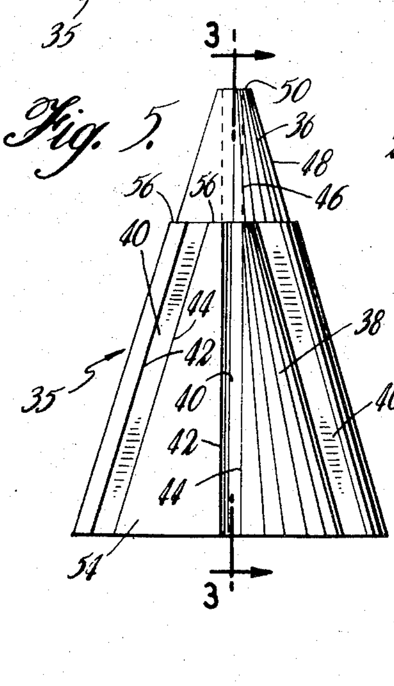


Fig. 5.



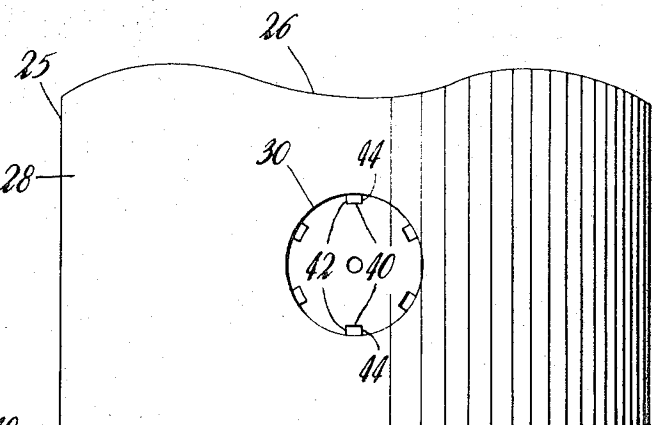


Fig. 4.

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Fig.7.

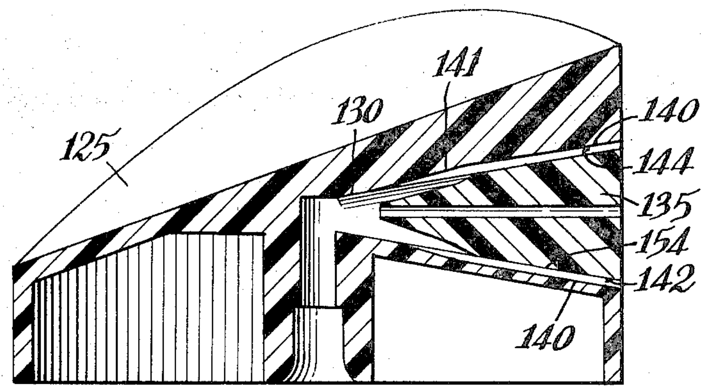


Fig.8.

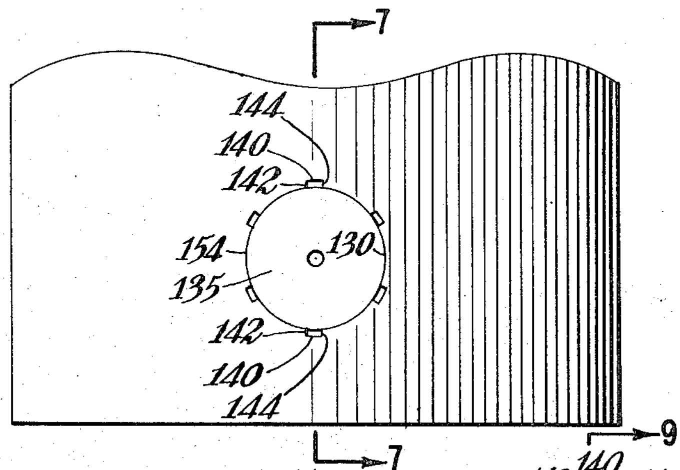
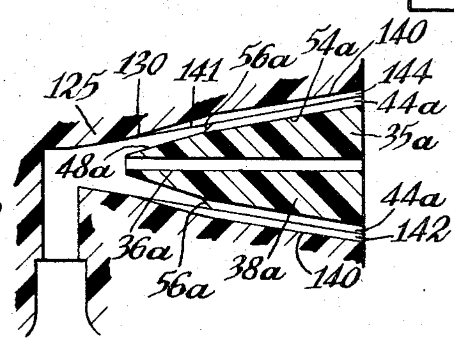


Fig.9.



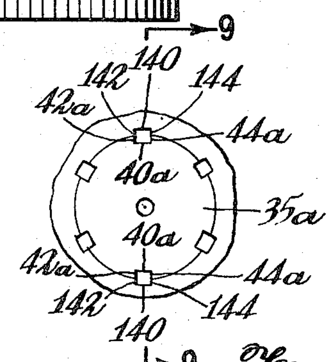
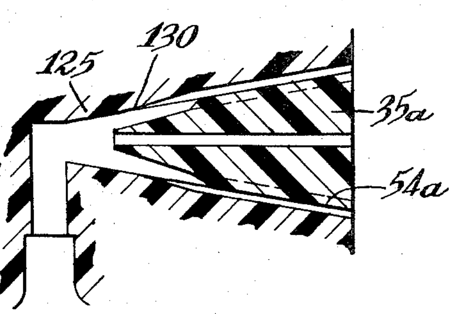


Fig.10.

Fig.11.



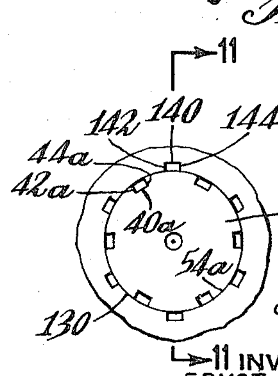


Fig.12.

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MULTIPLE ORIFICE AEROSOL ACTUATOR

The present application is a continuation of application, Ser. No. 859,659 filed Sept. 26, 1969, which is in turn a continuation in part of application, Ser. No. 772,703 filed Nov. 1, 1968, both now abandoned, and assigned to the same assignee as the present invention.

The present invention relates to aerosol dispensers, and more particularly to the structure and arrangement of an aerosol actuator, specifically the discharge orifice means thereof. The invention is particularly concerned with overcoming certain difficulties which may arise in the manufacturing procedures pertaining to an actuator discharge configuration involving multiple orifices. Furthermore, the invention is regarded as having particular utility in connection with dispensing of dry powder aerosol formulations.

Dry powder aerosols differ in many significant ways from liquid aerosol systems and, consequently, they may require different approaches with regard to dispensing structures and techniques. An example of a dry powder system contemplated in the utilization of the present invention is described and claimed in U.S. Pat. No. 3,081,223 issued Mar. 12, 1963 to P. E. Gunning and D. R. Rink. This patent relates to an aerosol system which differs basically from previously known systems, particularly systems utilizing a slurry type mixture, in that it involves a self-propelled powder which is delivered from a pressurized container in a dry spray which is substantially liquid-free. This dry powder system comprises a free-flowing powder composition which constitutes the active material to be dispensed from the container. At least one component of the powder composition comprises particles of a liquid propellant-sorbent material, with a varporizable liquid propellant being held in said sorbent material under the vapor pressure of the propellant normally existing in the container at ambient temperature. Upon exposure of the aerosol formulation to the ambient environment externally of the container, the propellant is vaporized by reducing the pressure to which it is exposed. The dry powder system contemplated herein comprises a three-phase system including a vapor phase and a homogeneous, free-flowing powdered composition, the latter containing a vaporizable propellant. The powder composition which constitutes a major portion of the system, provides the supporting phase. Thus, one important distinction between the dry powder system contemplated herein and the slurry systems previously mentioned resides in the fact that in the slurry system a liquid propellant constitutes the supporting phase whereas in the dry powder system referred to herein the powder is the supporting phase.

Other significant distinguishing features exist and because of these it becomes necessary to provide dispensing techniques and structures which are especially adaptable for utilization with dry powder systems in order to provide dispensing and application of the dry powder aerosol formulation in the most appropriate and advantageous manner.

One of the more significant aspects relating to successful, effective dispensing and utilization of dry powder aerosol formulations is the nature of the spray pattern achieved when the aerosol formulation is dispensed. The determination of a particular spray pattern which will be most advantageous under a particular set of circumstances will depend largely upon the nature of the aerosol formulation involved and the type of application intended. In general, the spray produced in dry powder aerosol systems tends to be a rather diffuse and billowy pattern. Control and direction of the spray may be accomplished by appropriate adaptation of the arrangement and configuration of the actuator assembly utilized with the aerosol system, particularly the internal conduit means provided which direct the aerosol formulation from the valve stem to the target area to which aerosol formulation is to be applied for ultimate use. Of particular importance is the arrangement and configuration of the orifice means located at the point on the actuator structure at which the aerosol formulation untimately exits from the dispensing assembly. The configuration and arrangement of the exit orifice means plays a very significant role in determining the nature and effect of the spray pattern of the aerosol formulation as it strikes the target area.

Another factor of significant importance relates to the cost of manufacture and the ability to apply presently known manufacturing techniques and apparatus in producing a particular aerosol actuator structure. The needs and requirements of the specific spray pattern desired must be successfully met in an actuator assembly which is arranged and configured in such a way that it may be readily manufactured with known techniques and apparatus at a cost which is not prohibitive and which will permit marketing of the aerosol system in a commercially competitive manner. Most aerosol actuators are made from molded thermoplastic materials and they must, therefore, be adaptive to known molding techniques and equipment.

Accordingly, it is an object of the present invention to provide an improved aerosol actuator assembly, especially adapted for utilization with dry powder aerosol systems, which can provide desired control of the dispensing spray pattern of an aerosol formulation and which may be manufactured in an economical and efficient manner utilizing presently known manufacturing techniques and apparatus.

Briefly, the present invention may be described as an aerosol actuator assembly comprising an actuator button having an internal conduit defined therein and separately formed insert means mounted within said internal conduit with the surface of said insert means cooperating with the wall of said internal conduit to form therebetween multiple dispensing conduit means.

In accordance with the invention there may be provided in a two-piece structure comprising an actuator button and insert means, a plurality of aerosol formulation dispensing conduits which may be arranged in non-parallel relationship while avoiding serious manufacturing obstacles which would arise if such a dispensing arrangement were to be molded in a single piece.

The multiple conduit arrangement enabled by the present invention permits more advantageous control of the spray pattern of a dispensed dry powder formulation. Because of the multiple conduits, a wider dispersion of aerosol formulation is possible with much greater control within the target area desired then would be possible with a single orifice configuration. By utilizing multiple conduit dispensing, greater flexibility of spray pattern configurations can be achieved while at the same time enabling more predictable control of the density and quantity of aerosol formulation inpinging upon a target area within the particular spray pattern effected.

A better understanding of the invention may be had by reference to the following detailed description of the preferred embodiment thereof taken in connection with the accompanying drawings wherein:

FIG. 1 is a cross sectional view taken along the line 1—1 of FIG. 2, of an actuator assembly embodying the principles of the present invention;

FIG. 2 is a front view of the embodiment of FIG. 1, showing the pattern of multiple orifices through which aerosol formulation is dispensed;

FIG. 3 is a sectional elevation of another aerosol actuator assembly embodying the principles of the present invention;

FIG. 4 is a front view of the actuator assembly of FIG. 3 showing the pattern of multiple orifices through which aerosol formulation is dispensed;

FIG. 5 is an elevational view depicting the insert of the present invention which is shown in cross section in FIG. 3;

FIG. 6 is a top view of the insert of FIG. 5;

FIG. 7, 9 and 11 are sectional elevations of alternative embodiments of the invention taken, respectively, along the lines 7—7, 9—9 and 11—11 of FIGS. 8, 10 and 12, with FIGS. 9 and 11 partially broken away; and

FIGS. 8, 10 and 12 are, respectively, from views of the embodiments of FIGS. 7, 9 and 11 showing the patterns of multiple orifices through which aerosol formulation is dispensed.

Referrring now to the drawings wherein like reference numerals designate similar structural elements, particularly FIGS. 1 and 2 thereof, there is shown an actuator assembly **10** comprising a base member **12** and an insert **14** of molded thermoplastic material. In many respects, the actuator assembly **10** comprises a conventional structural configuration. For example, the base member **12** includes a cylindrically shaped conduit defined by an inner wall **16** with a lower portion **16***a* defining a larger diameter opening adaptable to fit securely over the valve stem (not shown) of an ordinary aerosol container. Flow of aerosol formulation through the actuator **10** for dispensing may be effected in a conventional manner by depressing the actuator **10** thereby to depress the valve stem positioned within conduit **16a** whereby aerosol formulation is caused to flow from the valve stem through the conduit **16***a*, **16**.

The conduit **16** communicates in flow relationship with a plurality of conduits **18** and a centrally located conduit **18***a*. As shown in FIGS. 1 and 2, the conduits **18** extend from conduit **16** in non-parallel directions and terminate in a circular pattern about centrally located conduit **18***a*.

Base member **12** comprises a conically shaped conduit **20**, while insert **14** is similarly conically shaped and comprises an outer wall **22**, with the wall of conduit **20** and outer wall **22** laying firmly against each other thereby maintaining the insert **14** by frictional engagement within the base member **12** in the manner depicted in FIGS. 1 and 2.

The insert **14** has formed on the outer wall **22** thereof six channels each defined by three side walls **19***a*, **19***b* and **19***c* which form three of four sides defining a conduit **18**. The fourth side of conduit **18** is defined by the surface of conduit **20** overlying and opposite the side **19**b of the channels of insert **14**.

The base member **12** and the insert **14** are molded separately, and without the insert **14** in position within the base member **12**, the member **12** by itself would comprise an aerosol actuator having a single, conically shaped exit conduit **20**. However, by insertion of insert **14**, this single, conical conduit may be converted into a plurality of conduits **18** and **18***a*, there being a total of seven such conduits shown in the drawing of FIGS. 1 and 2.

Of course, it will be apparent that the channels defining the conduits **18** may also be formed in the base member **20** instead of on the surface of the insert **14**. In order to accomplish this, it would merely be necessary to reduce the diameter of conduit **20** to that depicted by dotted line **20***a*. Channels would then be formed within the base member **12** with the insert **14** comprising a smooth outer surface adapted to define one side of channels **18** coinciding with side **19***b*.

The advantages of manufacturing the actuator assembly **10** in two parts as described herein will be more clearly understood by considering the molding difficulties that would be involved with a one-piece, unitary actuator having plural conduits as depicted in FIGS. 1 and 2. Such a one-piece actuator would require molding procedures and techniques of great complexity and difficulty in order to produce an arrangement similar to that of conduits **18**. Assuming that such a molding procedure could be accomplished, it would involve an expense resulting in an actuator cost that would either be prohibitive or necessitate a virtually noncompetitive selling price.

Accordingly, it will be clear that one of the more important benefits of the present invention relates to the fact that a multiple orifice actuator may be provided with achievement of the benefits and advantages resulting therefrom, while avoiding the serious obstacles and problems that would be inherent in the manufacture of a one-piece arrangement.

A preferred embodiment of the invention which is basically similar to that previously described in connection with FIGS. 1 and 2 is depicted in FIGS. 3–6, which show an actuator button **25** of molded thermoplastic material comprising an upper curved surface **26** whose contour is adapted to comfortably accommodate the finger of a user of the aerosol system upon which the button **25** is mounted. Button **25** is formed with a generally cylindrical side wall **28**, with a conical conduit defined by a conically shaped internal wall **30** terminating at the surface **28** and forming a circular opening therein as depicted in FIG. 4. A centrally located, cylindrically shaped dependent leg **32** adapts the button **25** for cooperative engagement with the valve stem (not shown) of an aerosol container by means of a cylindrical conduit defined by cylindrically shaped internal walls **34** and **34***a*. The larger diameter portion **34***a* is sized to fit tightly about an aerosol valve stem to effect actuation of the stem in a manner similar to that described in connection to the embodiment of FIGS. 1 and 2. Accordingly, it will be apparent that aerosol formulation may flow through the conduit **34** to the conduit defined by conical wall **30** which is in flow relationship therewith. A conically shaped insert **35** of molded thermoplastic material similar in configuration and operation to the insert **14** previously described is adapted to fit securely with frictional engagement within the conical wall **30** of button **25**.

The insert **35** comprises an upper section **36** and a base section **38** both shaped as a conical frustum, with the base section **38** having a plurality of channels formed therein, said channels each being defined by a base surface 40 and a pair of side surfaces 42 and 44. Additionally, the insert 35 has a centrally located cylindrical conduit 46 extending completely therethrough in an axial direction. The insert 35 is shaped and sized to fit tightly in frictional engagement within conical wall 30 of button 25.

Although the insert 35 is securely held within conical wall 30, it is possible to effect removal therefrom by application of an outwardly pulling force. Thereby, it would be possible to replace the insert 35 with another insert which might provide a different multiple orifice arrangement for the aerosol system. For example, instead of providing seven orifices as described in the present embodiment, a different insert might provide a different number of orifices arranged in a different pattern. Accordingly, it should be noted that the inserts of the present invention can be made interchangeable with other inserts thereby to enable variation of the structure controlling the spray pattern of the aerosol formulation. In this manner, there may be enabled adaptation of the spray pattern to comply with requirements of a particular aerosol formulation as well as of the specific application intended therefor.

In some cases it may be necessary to provide means other than frictional engagement to retain the insert means within the dispensing conduit. Such a need may arise, for example, if the material used comprises too smooth a surface or if the aerosol system employed produces too great a pressure within the dispensing conduit. In such a situation, any suitable means, which could involve ordinary mechanical skill, may be utilized to assist in retaining the insert means in position. For example, expedients within the ordinary knowledge of those skilled in the art might include a suitable adhesive applied to the surface of the insert means, or the insert means could be configured to include a mechanical holding arrangement.

It should be further noted that the channels defined by walls 40, 42 and 44 are provided only in the base section 38 of insert 35, and that the upper section 36 comprises a smooth conical outer surface 48 having no channels formed therein. As depicted in FIGS. 5 and 6, the surface 48 of upper section 36 terminates at its upper end at a flat, annular surface 50 which has cylindrical wall 46 terminating thereat. At its lower or base portion, upper section 36 comprises a base diameter 52 which coincides with the upper terminations of the surfaces 40 of the channels formed in base section 38. Accordingly, it will be apparent that the depth of the channels formed in base section 38, and consequently the width of the side walls 42 and 44, will be equivalent to the distance from base diameter 52 to an outer surface 54 on the lower section 38. Therefore, the width of a group of flat, horizontal curved surfaces 56 which lie between the base 52 and the upper termination 58 of side wall 54 will be equivalent to the depth of the channels defined by the walls 40, 42 and 44.

The particular configuration of the insert 35 depicted herein, with the upper section 36 comprising a smooth outer surface 48 having no channels therein, is intended to adapt the insert 35 for utilization and insertion within an opening similar to the opening defined by conical wall 30 which comprises a diminished cross section of flow area at a point approaching the valve stem conduit 34. As the flow area of the opening 30 diminishes, the cross sectional dimension of the insert 35 likewise must diminish and it is conceivable that the cross sectional area of the openIng 30 could become too small to enable provision of multiple conduits having a constant cross sectional flow area extending completely to the inner end of the insert 35. Accordingly, in order to permit an insert configuration which tapers to a relatively small dimension, while simultaneously maintaining a constant cross sectional flow area along the entire length of the conduits formed in base section 38, the channels formed by the walls 40, 42 and 44 are provided only upon the base section 38 of insert 35 which corresponds to the end of opening 30 having a sufficiently large cross sectional area to accommodate an insert with channels therein.

Furthermore, it is considered advantageous to provide the smallest feasible cross sectional area at the innermost end of the insert means, e.g. at surface 50, in order to avoid packing and agglomeration of the aerosol formulation, particularly in assemblies utilizing the aforementioned dry powder aerosol system of U.S. Pat. No. 3,081,223. A large cross sectional area at the innermost end of the insert would tend to enhance the tendency for the powder to accumulate there, and thus a tapering or conical configuration is preferred.

It will be apparent that the two-piece configuration for the actuator button and the insert depicted and described herein will provide a structural arrangement which obviates serious molding problems that would arise with a one-piece integral arrangement. The button 25 represents an aerosol actuator button which may be molded in any acceptable manner known to those skilled in the art. With an insert similar to either insert 14 or 35, arranged as a separate member, it becomes a relatively simple operation to mold a multiple conduit actuator, as depicted herein. Furthermore, with the insert arranged as a separate, removable element, an ordinary actuator button having the appropriate orifice configuration may be adapted to provide a variety of multiple orifice configurations, with the orifices having the potential for being arranged in differing patterns or with a different total number of orifices. In this manner, spray pattern control may be effected to adapt a particular aerosol structure to effect a spray pattern most suitable for the specific aerosol formulation utilized as well as for the particular application intended.

Some further variations in structure and in discharge orifice patterns which are attainable by means of the present invention are depicted in FIGS. 7–12. FIGS. 7 and 8 show an arrangement wherein an insert member 135 having a smooth outer surface with no channels formed therein is positioned within an actuator button 125 comprising an internal conically shaped conduit 130 having six channels formed therein. It will be apparent that the construction depicted in FIGS. 7 and 8 is basically similar to that depicted in FIGS. 3–6 except that the channels which define the multiple conduits are formed in the actuator button internal surface rather than upon the outer surface of the inset member.

Insert 135 shown in FIG. 7 is basically similar to insert 35 shown in FIGS. 3–6 with the exception that the channels formed by side walls 40, 42 and 44 in the base section 38 are not provided in insert 135. Accordingly, insert 35 may be adapted to the configuration of insert 135 by forming the outer surface 54 of the base section 38 as a smooth conical surface having no channels formed therein. The conduit 130 formed in the interior of actuator button 135 comprises a plurality of channels formed therein, said channels each being defined by a base surface **140** and a pair of side surfaces **142** and **144**. Accordingly, it will be apparent that with the insert member **135** in position within conduit **130** there will be provided six nonparallel conduits through which aerosol formulation may be dispensed, each of said conduits being defined between surfaces **140, 142** and **144**, and an outer smooth surface **154** of insert **135.**

For the purpose of maintaining a smooth flow path, the channels in the conduit **130** are tapered at the inlet end, and as will be apparent from FIG. **7**, the surface **140** comprises a tapered inlet portion **141** which terminates at the surface of conduit **130** forming a smooth merger therewith. The surfaces **142** and **144** taper to a point at the inlet end of conduit **130** where surface **141** merges with the surface of conduit **130.** This configuration is intended to provide a smoother flow path avoiding flat surfaces upon which aerosol formulation, particularly the dry powder type, might tend to agglomerate.

FIGS. **9** and **10**, and FIGS. **11** and **12**, depict, respectively, two other alternative embodiments of the invention. In the alternative embodiment of FIGS. **9** and **10**, both the insert member and the actuator button are formed with channels therein. In this manner, the cross-sectional flow area of each of the multiple conduits may be increased-or doubled if the channels in the insert are of equal depth with the channels in the actuator button-merely by aligning the channels in each member so that they are juxtaposed each opposite another as shown in FIG. **10**. In the alternative embodiment of FIGS. **11** and **12** the number of dispensing conduits may be doubled when the insert member is slightly rotated so that the channels formed therein are positioned between the channels formed in the actuator button, with each of the channels in one member being juxtaposed opposite a smooth portion of the surface of the other member.

Referring now in further detail to the alternative embodiment of FIGS. **9** and **10**, there is shown an insert member **35A** and an actuator button **125** which is identical to the actuator button of FIGS. **7** and **8.** The insert **35A** is identical with the insert **35** shown and described in FIGS. **3–6**, with the exception that in FIG. **9**, a sloped or slanted surface **56A** replaces the horizontal curved surfaces **56** shown in the embodiment of FIGS. **3–6.** The reason for slanting the surface **56A** relates to the tendency previously described of the dry powder aerosol formulation to accumulate or agglomerate upon a flat surface. With the slanted surface **56A**, a smoother flow path is produced. With the exception of surface **56A** the insert member **35A** is formed identically to insert **35** and comprises channels defined by walls **40A, 42A** and **44A** formed only in the base section **38A** of insert **35A**, with the upper section **36A** thereof comprising a smooth outer surface **48A**.

As previously described, the actuator button **125** comprises an internal dispensing conduit **130** having formed therein a plurality of channels defined by walls **140, 142** and **144.** In FIGS. **9** and **10**, the insert member **35A** is placed within the conduit **130** in an angular position whereby the channels in the insert member are juxtaposed directly opposite the channels in conduit **130.** Thus, each of the conduits in the embodiment of FIGS. **9** and **10** will comprise a cross-sectional flow area which is double that of the conduits shown in FIGS. **7** and **8.** Of course, this assumes that the depth of the channels in the insert member **35A** is equivalent to the depth of the channels in the conduit **130.** Other dimensional configurations will be clearly apparent to anyone skilled in the art.

By the expedient of angularly displacing the channels in the insert member **35A**, the number of dispensing conduits may be doubled while the flow area of each conduit is halved. This embodiment is shown in FIGS. **11** and **12**, which comprises a structure identical to the structure shown in FIGS. **9** and **10** with the insert member **35A** rotated to place the channels formed therein between the channels formed in the internal conduit **130.** As best shown in FIG. **12**, the channels in the insert member **35A** which are formed by walls **40A, 42A** and **44A** are placed opposite the smooth outer surface **54A** of insert member **35A**, surface **54A** being that portion of the outer surface of the insert member **35A** extending between the channels formed therein. The channels defined by walls **140, 142** and **144** which are formed in conduit **130** are likewise positioned between the channels formed in the outer surface of the insert member **35A**. The channels in conduit **130** are juxtaposed opposite the smooth surface **54A** of insert member **35A**. Thus, it will be apparent that in the embodiment depicted in FIGS. **11** and **12** there has been effected a doubling of the number of discharge conduits by the expedient of forming channels in both the insert member and in the actuator button and by placement of the insert member within the actuator button in an appropriate angular position.

Accordingly, it will be apparent that several alternative structural embodiments are possible within the concepts of the present invention. By replacing or rotating the insert member, a single actuator button may be utilized to effect one of a variety of differing multiple conduit patterns and arrangements. Thus, an actuator assembly for an aerosol system could be configured to adapt to a variety of differing applications and uses, with the present invention being particularly advantageous when utilized with a dry powder aerosol system since there may be provided control and variation of the spray pattern whereby the active aerosol ingredient may be deposited upon a target area in a more advantageous manner.

What is claimed is:

1. An aerosol actuator assembly comprising an actuator button including means for engaging a valve stem of an aerosol container having aerosol formulation therein, said button being operative to actuate said valve stem to effect discharge of said aerosol formulation therefrom, conduit means defined by an internal surface of said actuator button directing flow of said aerosol formulation from said valve stem to a dispensing location, and insert means positioned within said conduit means structurally distinct and separately formed from said actuator button, the surface of said insert means and said internal surface of said actuator button defining therebetween a plurality of nonparallel channels for dispensing said aerosol formulation, said insert means comprising two integrally formed sections with one of said sections comprising said channels and with the other of said sections comprising a tapered configuration forming the smallest cross-sectional area of said insert means and adapted to be placed within said conduit means at a location within the flow path defined thereby which is closest to said valve stem.

2. An aerosol actuator assembly according to claim 1 Wherein said insert means is removably mounted within said conduit means in tight frictional engagement therewith.

3. An aerosol actuator assembly according to claim 1 wherein said insert means includes a conduit completely defined by an internal surface of said insert means extending through said insert means in a manner whereby aerosol formulation may be dispensed therethrough.

4. An aerosol actuator assembly according to claim 1 wherein said insert means and said actuator button are separately molded from thermoplastic material.

5. An aerosol actuator assembly comprising an actuator button including means for engaging a valve stem of an aerosol container having aerosol formulation therein, said button being operative to actuate said valve stem to effect discharge of said aerosol formulation therefrom, conduit means defined by an internal surface of said actuator button directing flow of said actuator formulation from said valve stem to a dispensing location, and insert means positioned within said conduit means structurally distinct and separately formed from said actuator button, the surface of said insert means and said internal surface of said actuator button having formed therein a plurality of channels for dispensing said aerosol formulation, said insert means being variably positionable within said actuator button thereby to vary the juxtaposition between the channels in said button and the channels of said insert means.

6. An aerosol actuator assembly according to claim 5 wherein said insert means is positioned within said actuator button conduit means with the channels on said insert means and the channels in said button juxtaposed opposite each other to form between them said plurality of dispensing conduits.

7. An aerosol actuator assembly comprising an actuator button including means for engaging a valve stem of an aerosol container having aerosol formulation therein, said button being operative to actuate said valve stem to effect discharge of said aerosol formulation therefrom, conduit means defined by an internal surface of said actuator button directing flow of said actuator formulation from said valve stem to a dispensing location, and insert means positioned within saId conduit means structurally distinct and separately formed from said actuator button, the surface of said insert means and said internal surface of said actuator button having formed therein a plurality of channels for dispensing said aerosol formulation, said insert means being positioned within said actuator button in a manner whereby the channels in said conduit means are angularly displaced from the channels on said insert means.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,767,125 Dated October 23, 1973

Inventor(s) Ernst Gehres et al.

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Column 8, lines 15-23 (page 14, lines 21-26 of Application No. 148,167),"smooth outer surface 54A of insert member 35A, surface 54A being that portion of the outer surface of the insert member 35A extending between the channels formed therein. The channels defined by walls 140, 142 and 144 which are formed in conduit 130 are likewise positioned between the channels formed in the outer surface of the insert member 35A. The channels in conduit 130 are juxtaposed"

should read

-- smooth portions of the surface of conduit 130 extending between the channels formed therein. In a similar fashion, the channels formed in conduit 130 which are defined by walls 140, 142 and 144 are likewise positioned between the channels formed in the outer surface of the insert member 35A, being juxtaposed -- .

Signed and Sealed this

twenty-eight **Day of** *October 1975*

[SEAL]

Attest:

RUTH C. MASON
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents and Trademarks