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3,192,611

METHOD OF MAKING AND ASSEMBLING THE COMPONENTS  
OF AN AEROSOL DISPENSER BUTTON

Filed Aug. 31, 1961

FIG. 1.

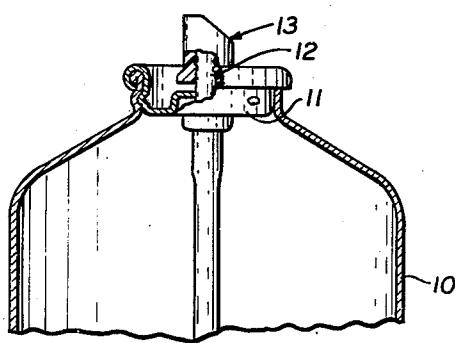


FIG. 2.

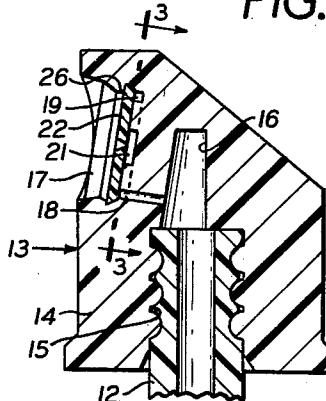


FIG. 4.

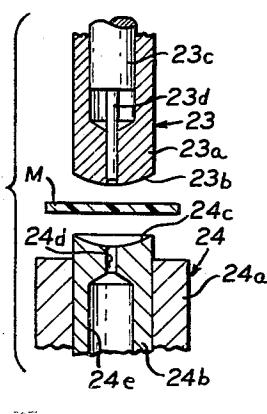


FIG. 5.

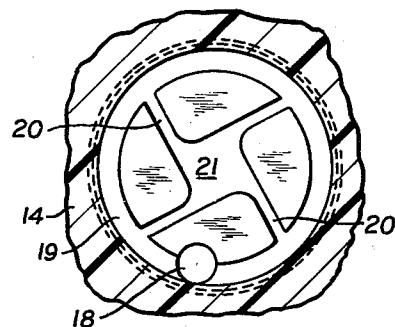
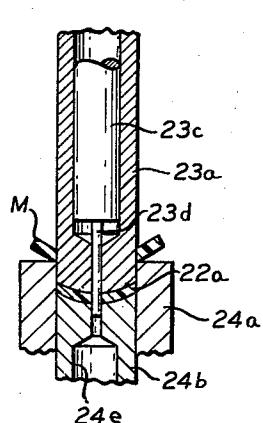


FIG. 3.

FIG. 7.

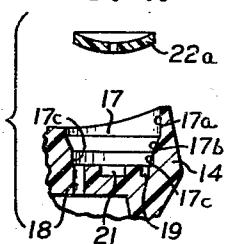


FIG. 8.

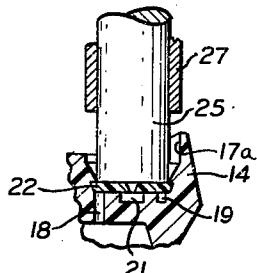


FIG. 6.



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## METHOD OF MAKING AND ASSEMBLING THE COMPONENTS OF AN AEROSOL DISPENSER BUTTON

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4 Claims. (Cl. 29—157)

The present invention relates to the method of making and assembling the components of an aerosol dispenser button.

The art of dispensing aerosols is making great strides at the present time and with certain aerosol formulations it is necessary to break-up the discharge spray as completely as possible. To do this the break-up button of conventional aerosol dispensers are provided with a disc formed with a break-up groove or with a conical orifice or both. To make this disc inexpensively and mount it in a dispenser button has heretofore posed a somewhat difficult problem.

It is accordingly an object of the present invention to provide a method of making a discharge break-up button for an aerosol dispenser which can be economically produced and assembled.

A further object of the invention is to provide a novel disc for an aerosol discharge button and a novel method of assembling such disc in the dispensing button whereby the resulting structure will effectively break-up the discharge spray.

The foregoing and other objects of the invention not specifically enumerated, I accomplish by first blanking out a concave perforated disc by shearing it with cylindrical punches while the material of the disc is flexed into concave form. The disc is then inserted into a socket in the discharge button and subjected to the actions successively of a punch for flattening the disc and of a riveting sleeve which transforms the wall of the socket to provide a ring-like retainer for the disc. Since the disc with the orifice therein is first formed concave with cylindrical side walls it will be apparent that when such disc is flattened its peripheral wall and its orifice wall will become frustoconical which are desirable features for both the assembly and use of the dispenser button.

The invention will be better understood from the detailed description which follows when considered in connection with the accompanying drawing wherein:

FIG. 1 is a fractional diametrical section through an aerosol dispensing container embodying the invention, parts of the dispensing unit being shown in elevation.

FIG. 2 is an axial section, on an enlarged scale, of the dispensing button embodying the invention.

FIG. 3 is a section taken on the line 3—3 of FIG. 2.

FIG. 4 is a diametrical sectional view showing the relationship of the blanking dies and material preparatory to forming the disc element of the dispenser button.

FIG. 5 is a view similar to FIG. 4 showing the relationship of parts upon completion of the disc forming operation.

FIG. 6 shows a diametrical section of the disc element after being flattened and assembled in the button as shown in FIGS. 2 and 8.

FIGS. 7 and 8 are axial sectional views of the relationship of parts in assembling the disc element in the button.

Referring to the drawing, in the various figures of which corresponding parts are indicated by the same reference characters, the reference numeral 10 indicates an aerosol container of conventional design, in the open top of which is mounted an aerosol dispensing check valve assembly 11 of any preferred construction, the valve element (not

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shown) of which has a tubular valve stem 12, on the outer end of which is fitted a dispenser button 13.

The dispenser button 13 consists of a body member 14 formed preferably of a molded resinous material and has an axial socket 15 for engagement on the valve stem 12, a secondary socket 16 leading from the socket 15 and a disc receiving socket 17 communicating with the socket 16 through a duct 18. The base of the socket 17 is formed with an annular groove 19 which communicates with the duct 18 and in turn with passages 20 which extend substantially radially to the groove 19 and lead to a substantially rectangular central recess 21. Overlying the base of socket 17 is a centrally perforated disc 22 which forms with the base of the socket 17 a whirl chamber wherein the aerosol prior to being discharged from the socket 17 is given a centripetal whirling motion for release through the central perforation in the disc 22. Basically the construction and arrangement of parts thus far described may be conventional.

The present invention relates to the construction and method of assembling the perforated disc within the dispenser button.

Referring now to FIGS. 4 to 8 of the drawing there is shown the construction and method by which the disc 22 is formed and then assembled in the socket 17 of the dispenser button. In FIGS. 4 and 5 the method of constructing the disc 22 is disclosed. As will be apparent from these latter figures, a strip of suitable dimensionally stable sheet material M is fed to pairs of cooperating compound dies 23 and 24, the die 23 consisting of a primary plunger 23a having a convex end 23b and a secondary plunger 23c movable relatively to the plunger 23a and having a perforating cylindrical pin 23d. The die 24 consists of a fixed member 24a having a cylindrical bore to accommodate the primary plunger 23a and a relatively movable plunger 24b having a concave end 24c complementary to the convex end 23b and a small bore 24d leading from said concave end surface 24c to an enlarged chamber 24e. The respective elements 23a and 23c of the die 23 are independently movable whereas only the element 24b of the die 24 is movable. With the dies 23 and 24 in the relation shown in FIG. 4, the strip of flat disc forming material M is fed between the dies whereupon operation of the dies the material M is first deformed into concavo-convex form and while held in such form is blanked out to provide a concavo-convex centrally perforated disc as shown at 22a in FIGS. 5 and 7, the central perforation and the periphery of the disc each having a cylindrical wall. The manner of controlling the sequential movements of the dies is well known in the art and detailed showing and explanation thereof is not deemed to be necessary.

The discs 22a after being blanked out are individually fed to the socket 17 in the body member held in a suitable jig (not shown) with the concave side of the disc facing upwardly or outwardly. The socket 17 as shown in FIG. 7 has coaxially, an outer cylindrical portion 17a, an intermediate inwardly tapered wall 17b and a cylindrical wall 17c adjacent the base of the socket, the diameters of said socket portions being such as to accommodate the disc 22a for reception on the base of the socket 17. Axial force is then applied to the disc by a suitable punch 25 to flatten the disc. In such action the cylindrical walls of the perforation and the periphery of the disc are transformed into correspondingly directed tapered surfaces 22b and 22c as shown in FIG. 6. Also under such flattening force the peripheral wall of the disc may bite into the socket wall portion 17c as shown in FIG. 8. However, to firmly hold the disc in place against being blown out by the pressure of the aerosol being dispensed, said disc may be staked in place by having portions of the inner wall portion 17b of the socket 17 deformed into overlying engaging relationship to the rim of the disc as

shown at 26 in FIG. 2. The flattening of the disc 22a and the anchoring thereof in the base of the socket 17 may be readily accomplished by the plunger 25 and the staking by a secondary acting swaging sleeve 27 surrounding the plunger in a manner well known in the art.

Materials which may be employed in the construction of the dispenser button are preferably polymers of organic resins having suitable properties and which are resistant to attack by the aerosol compositions being dispensed.

From the foregoing detailed description it will be apparent that I have provided an efficient aerosol dispenser button which can be economically produced and assembled to accomplish the objects of the invention as set forth in the opening statement of this specification.

Although I have shown and described a preferred embodiment of the invention it is to be understood that changes in details of construction, materials employed and the method of assembling the parts may be varied within the field of mechanical and engineering skill without departing from the spirit of the invention as hereinabove claimed.

What I claim is:

1. The method of forming a dispenser button comprising a body member having a whirl chamber therein and a disc overlying the whirl chamber and having a central perforation therein which is flared outwardly toward the discharge end of the button, said method comprising inserting into a substantially cylindrical socket in such body member into overlying relation to the whirl chamber a concavo-convex disc of somewhat smaller diameter than the cylindrical socket with the concave surface facing outwardly and having a cylindrical central perforation and flattening said disc to transform the cylindrical wall of the perforation into a tapered wall and anchoring said disc in situ by deforming part of the wall of the socket into overlying engaging relation to the rim of the disc.

2. The method according to claim 1 wherein both the central perforation and the outer periphery of the disc are cylindrical and the flattening of the disc will also transform the cylindrical peripheral wall into a tapered wall which will bite into the cylindrical wall of the socket in the body member.

3. The method of forming a dispenser button comprising a body member having an outwardly facing socket therein and a disc overlying the base of the socket and having a central perforation therein which is flared outwardly toward the discharge end of the button, said method comprising inserting into a substantially cylindrical

cylindrical socket in such body member in overlying relation to the base of the socket, a concavo-convex disc of somewhat smaller diameter than the cylindrical socket with the concave surface facing outwardly and having a cylindrical central perforation and a cylindrical peripheral wall, then flattening said disc to transform the cylindrical wall of the perforation and the peripheral wall into tapered walls and anchoring said disc in situ by causing the resulting tapered peripheral wall to bite into the cylindrical wall of the socket in the body member.

4. The method of forming a dispenser button comprising a resilient stiff plastic body member having a whirl chamber therein and a disc of harder material than said body member overlying the whirl chamber and having a central perforation therein which is flared outwardly of said body, said method comprising inserting into a substantially cylindrical socket in such body member in overlying relation to the whirl chamber a concavo-convex dished disc having a cylindrical central perforation and a cylindrical peripheral wall of a diameter substantially equal to the diameter of the socket at its whirl chamber and the concave surface of said disc facing outwardly of said socket and deforming said disc by axial pressure thereon to flatten the disc and transform the cylindrical wall of the perforation into an outwardly flared wall and the peripheral wall thereof into a tapered wall which will bite into the wall of the socket and hold the disc therein.

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CHARLIE T. MOON, Examiner.