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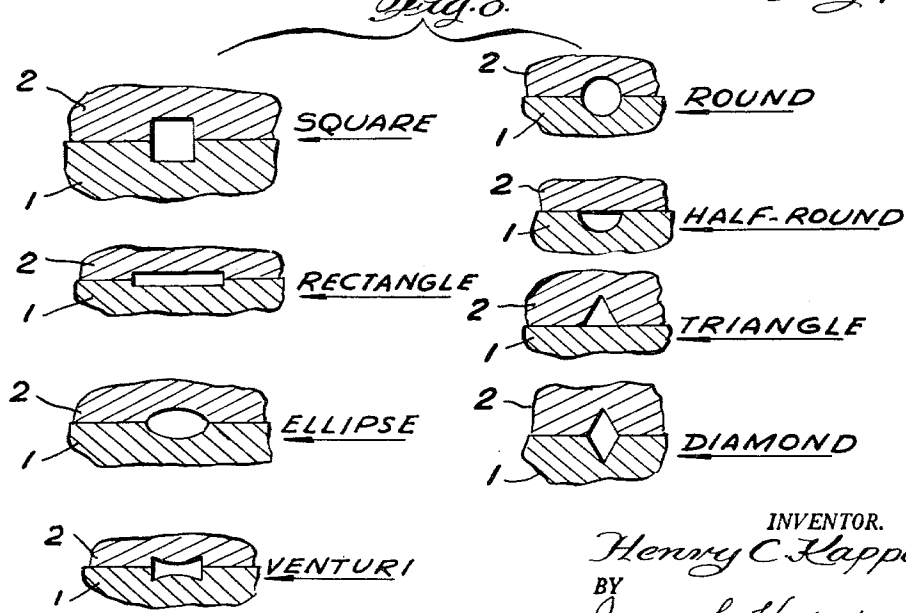
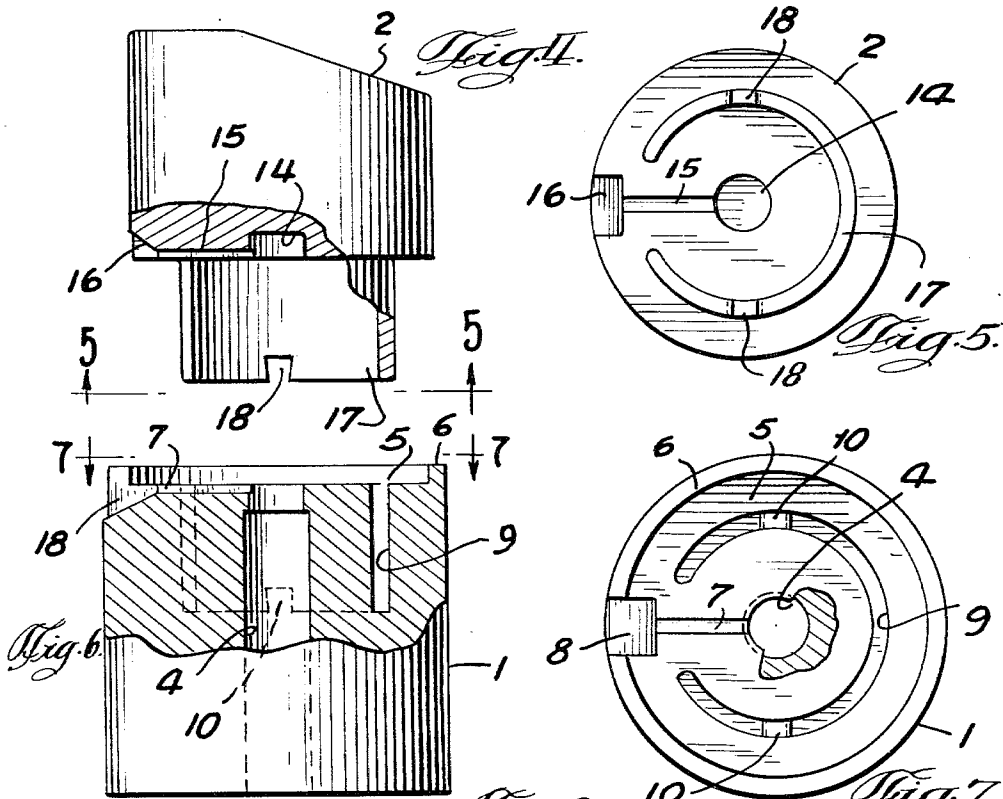
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TWO PIECE SPRAY NOZZLE

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2 Sheets-Sheet 2



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TWO PIECE SPRAY NOZZLE

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7 Claims. (Cl. 239-600)

This invention is directed to a new type of nozzle particularly adapted for use with an aerosol dispenser.

A wide variety of aerosol dispensers have been developed for dispensing such materials as insecticides, paints and cosmetics in a fine spray or mist. Frequently, dispenser nozzles are molded from a suitable plastic material as a single unit with a fixed spray pattern. A typical nozzle is illustrated in the patent to Beard, U.S. 2,932,432. Molding the usual nozzles from plastics presents certain disadvantages due to the necessity of employing retractable mold parts to permit formation of interconnecting channels or passages. Complex molds for this purpose are relatively expensive and, thus, result in increased manufacturing costs of parts molded. Additionally, in dispensing many materials it may frequently be advantageous to discharge a spray having a predetermined pattern to obtain maximum effectiveness or utility. The number of molds with retractable parts needed to produce a variety of nozzles required with different spray patterns would, further, increase costs.

Accordingly, it is one object of the present invention to provide a nozzle which may be formed having one of a variety of predeterminable spraying patterns.

Another object is to provide a nozzle of the foregoing type which may be molded from plastic materials without an appreciable increase of mold expense.

These and other objects will become more apparent from the hereinafter specification and associated drawing wherein FIGURE 1 is a side elevation of the nozzle in position on a dispenser.

FIGURE 2 is a front elevation of the nozzle in position on the dispenser.

FIGURE 3 is an enlarged side elevation of the nozzle, partly in section.

FIGURE 4 is a side elevation, partly in section, of the nozzle cap.

FIGURE 5 is a plan of the underside of the nozzle cap.

FIGURE 6 is a side elevation, partly in section, of the nozzle base.

FIGURE 7 is a plan of the top of the nozzle base.

FIGURE 8 is a cross section on line 8-8, illustrating various discharge orifice configurations.

Turning now to the drawings, the numeral 1 designates the base and the numeral 2 the complementary cap of the nozzle having an orifice 3. When the cap and base are assembled as an integral unit, as hereinafter described, opposing complementary recesses provided in each part form the orifice 3. Base 1 includes a centrally disposed vertical bore or passage 4 extending completely through the base, adapted to receive a tubular valve stem S through which the contents of the dispenser are discharged. A cavity 5 is provided at the top of the base, enclosed by peripheral wall 6. Cavity 5 has the approximate dimensions of and is adapted to receive and retain the lower part of cap 2 in a substantially snug fit.

Below the surface of the bottom of cavity 5, there is provided a radially extending relatively shallow recess or channel 7 connecting with bore 4 at one end and terminating in an enlarged cutaway or opening 8. Cutaway 8 extends from the side of base 1 through wall 6 into cavity 5, and, as shown, at a downward angle with the bottom of cavity 5.

Also provided is a C-shaped recess 9, extending down-

wardly from the bottom of cavity 5 into the body of base 1. C-shaped recess 9 is so located within the body of base 1 as to substantially surround or encircle bore 4. At the bottom of recess 9 are disposed one or more upwardly extending projections or protuberances 10, preferably formed with downwardly and inwardly tapering sides.

Cap 2, which is adapted to be united with base 1, has projections and recesses complementary to those described in connection with base 1. Thus, cap 2 is formed with a centrally located bore 14 extending upwardly from the bottom thereof a short distance into the cap body. When the cap and base are assembled, bore 14 constitutes a small extension of bore 4. A radially extending shallow recess or channel 15 provided in the bottom of cap 2 connecting with bore 14 at one end and terminating in an enlarged cutaway 16. Enlarged cutaway 16, as shown, extends at a downward angle from the outer surface of cap 2, to the under surface of the cap.

Depending from the bottom of cap 2 is a C-shaped projection 17 which is complementary to and adapted to be inserted into C-shaped recess 9 of base 1 when the nozzle is assembled. C-shaped projection 17 is provided with one or more notches or recesses 18 of a complementary configuration to that of projections 10 located in the bottom of recess 9.

In assembling the nozzle to form a single unit, C-shaped projection 17 of cap 2 is inserted into the complementary C-shaped recess 9 of base 1 and forced downwardly until the lower part of cap 2 is firmly nestled or disposed in position within cavity 5 of base 1. Preferably, the base and cap are formed of a plastic material having some degree of resiliency, whereby if projections 10 in recess 9 are outwardly flared as described above, complementary notches 18 may be forced over the projections 10, when the base and cap are assembled, thereby providing a mechanical lock between the two parts of the nozzle.

When the base 1 and cap 2 have been assembled, bore 14 of the cap will be aligned with bore 4 of the base, and channel 15 and cutaway 16 will be aligned with channel 7 and cutaway 8, respectively. Channels 7 and 15 when so aligned form a passageway extending radially from the inner bore to the enlarged orifice 3 formed by the two complementary cutaways 8 and 16.

The assembled nozzle is installed on a dispenser by inserting the upper portion of the valve stem S into the lower part of bore 4, as shown in FIGURE 3. Usually the dimensions of the bore 4 and the valve stem S are such that the nozzle is firmly retained on the stem by a press fit.

Discharge of the contents of a dispenser from its container is accomplished by downward or sidewise pressure on the nozzle, which, in turn, opens the valve, not shown. When the valve is thus opened, the fluidized contents of the dispenser are forced upwardly through the valve stem S into bore 4, then radially through the passage formed by channels 7 and 15, and out through orifice 3, usually as a fine mist.

By suitable design of the cross section of the radial passage formed by channels 7 and 15, the spray pattern discharged from orifice 3 may be varied. Typical cross sectional designs for this passage are illustrated in FIGURE 8, which will result in corresponding oval, rectangular, etc., discharge patterns of the fluidized contents of the dispenser.

When the nozzle is composed of two molded parts, as principally contemplated by the present invention, the formation of channels, such as channels 7 and 15, by appropriate mold design is a comparatively easy and relatively inexpensive operation as compared to the use

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of retractable mold members which would be required if the nozzle were molded from a plastic material as an integral piece.

C-shaped projection 17 when inserted in the complementary C-shaped recess 9 is designed so as to substantially surround bore 4 and, as a result of its dimensions and general configuration, serves not only to assist in retaining the two parts of the nozzle together but, also, as a barrier and offers substantial obstruction to any of the fluidized contents of the dispenser from possibly being forced out of the bore 4 and through the interface between the cap and base in the event the opposing surfaces of the two are incompletely flush or otherwise do not provide a thorough seal.

It can be seen that the assembly of the two parts of the nozzle to form a complete unit may be readily accomplished by a quick easy operation. Due to the general design of the parts their assembly will lend itself to the use of automatic assembly equipment.

Having described the invention and certain exemplary embodiments thereof, the same is only intended to be limited by the scope of the following claims.

I claim:

1. A nozzle comprising:

- a base member having an end face provided with a cavity therein and a passage extending therethrough, said passage terminating at said cavity; and
 a cap member having an end face and an outer surface defining the periphery of said end face thereof, said cap member being complementally received within said cavity with said outer surface in relatively close proximity to the portion of the base member defining the cavity and with said end face of the cap member being in juxtaposition to the end face of the base member, whereby to form a unitary nozzle body with said base member and to present a zone of juncture between the faces of said members, one of the members having a groove therein at said zone, said groove being in communication with said passage and extending laterally thereof to the exterior of the body when said cap member is received within said cavity.

2. A nozzle comprising:

- a base member having an end face provided with a cavity therein and a passage extending therethrough, said passage terminating at said cavity;
 a cap member having an end face and an end complementally received within said cavity with said end face thereof in relatively close proximity to the end face of said base member to form a unitary nozzle body with said base member and to present a zone of juncture between said members, one of the members having a groove therein at said zone, said groove being in communication with said passage and extending laterally thereof to the exterior of the body when said cap member is received within said cavity;

means on said end faces of said members for releasably securing said cap member to said base member and disposed for preventing said cap member from rotating relative to said base member when said members form said body.

3. A nozzle as set forth in claim 2, a first of said members being provided with a recess therein extending to said zone, said securing means including a projection on the other of said members at said zone, said projec-

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tion being releasably received in said recess when said members form said body.

4. A nozzle comprising:

- a base member having an end face provided with a cavity therein and a passage extending therethrough, said passage terminating at said cavity; and
 a cap member having an end complemental to said cavity and an end face, said end of the cap member being telescopically received within said cavity to form a unitary nozzle body with said base member, each of said end faces of said members having a groove therein, said members being disposed with the end faces thereof in juxtaposition to each other and with the grooves thereof in alignment when said members form said body, said aligned grooves presenting a channel communicating with said passage and extending laterally thereof to the exterior of said body.

5. A nozzle as set forth in claim 4, and means on the faces of said members for interconnecting the latter and for preventing relative rotation therebetween.

6. A nozzle comprising:

- a base member having an end face provided with a cavity therein and a passage extending therethrough, said passage terminating at said cavity;
 a cap member having an end complementally received within said cavity to form a unitary nozzle body with said base member and to present a zone of juncture between said members, one of the members having a groove therein at said zone, said groove being in communication with said passage and extending laterally thereof to the exterior of the body when said cap member is received within the cavity, a first of said members being provided with a recess therein extending to said zone and provided with a surface defining the bottom of said recess;
 a protuberance on said bottom of said recess and extending toward and being spaced from said zone; and
 a projection on the second of said members at said zone and being releasably received within said recess, said projection having a notch complemental to said protuberance and disposed for receiving the latter when said projection is received in said recess.

7. A nozzle as set forth in claim 6, said base member having a C-shaped recess extending into said face in partially surrounding relationship to said passage, said cap member having a C-shaped projection complementally received within said recess when said members form said body.

References Cited by the Examiner

UNITED STATES PATENTS

55	2,376,404	5/45	Thoms	222—394
	2,781,950	2/57	Pritchard	222—394
	2,789,012	4/57	Bretz	239—573
	2,915,225	12/59	Atkins	222—320
	3,085,753	4/63	Braun et al.	239—573 X
60	3,088,682	5/63	Venus	222—394 X
	3,095,127	6/63	Green	239—337 X
	3,112,074	11/63	Green	222—394 X

FOREIGN PATENTS

65	385,205	12/32	Great Britain.
	261,221	8/49	Switzerland.

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