United States Patent [19]

Carroll et al.

[11] 3,841,533

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[54] **SPRAY DISPENSER AND SHIELD**

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[73] Assignee: **Schmid Laboratories, Inc.**, Little Falls, N.J.

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[21] Appl. No.: **309,232**

[52] **U.S. Cl.**..... **222/402.13**, 128/173, 239/288.5, 222/567

[51] **Int. Cl.**..... **B65d 83/14**

[58] **Field of Search**..... 222/567, 547, 402.13; 239/288.3, 288.5; 128/173

[56] **References Cited**

UNITED STATES PATENTS

2,985,382	5/1961	Coplan	239/288.5
3,012,555	12/1961	Meshberg	222/402.13 X
3,191,867	6/1965	Helms	239/288.5
3,314,426	4/1967	Carroll	128/173 R

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Assistant Examiner—Norman L. Stack, Jr.
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[57] **ABSTRACT**

A device for dispensing fluids into a predetermined location, such as the eye, including a nozzle and a shield in which the nozzle head has at least one rib and the shield has a complementary groove, or grooves which mate with the rib, or ribs to respectively place the shield on the nozzle with the proper orientation so that the fluid can be dispensed into the eye as the shield covers it and to cover the nozzle orifice by a closed portion of the shield when the device is to be stored or transported.

11 Claims, 6 Drawing Figures

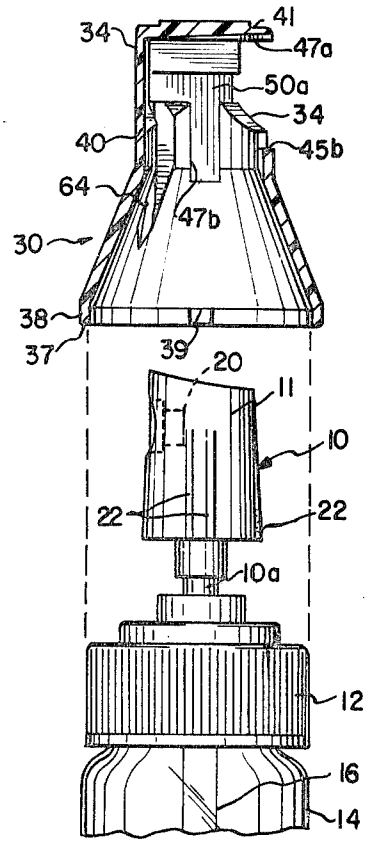


FIG. 1

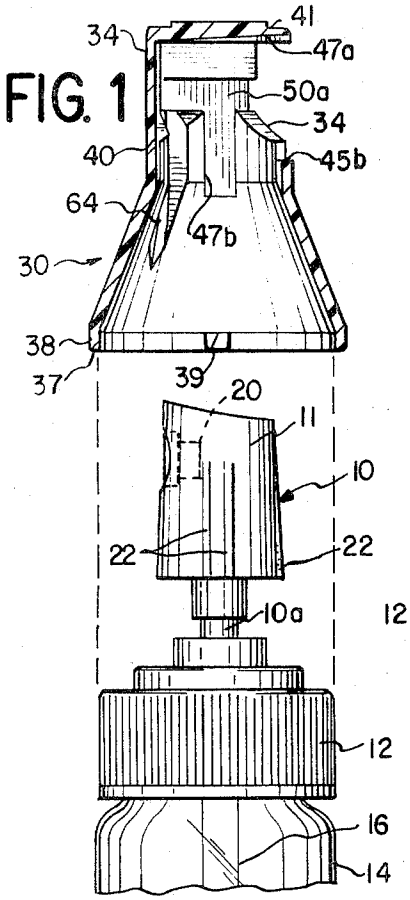


FIG. 2

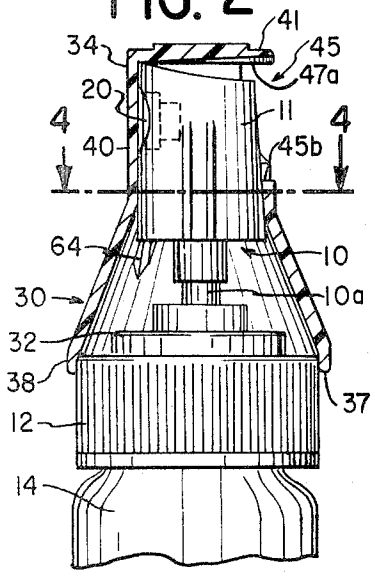


FIG. 3

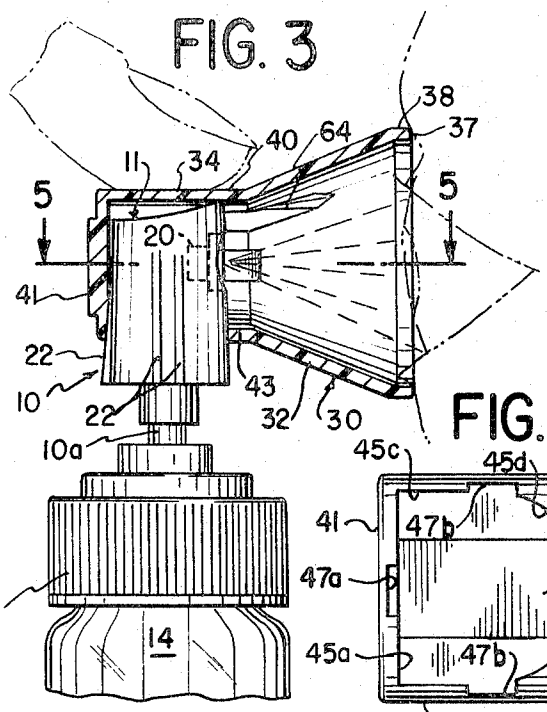


FIG. 6

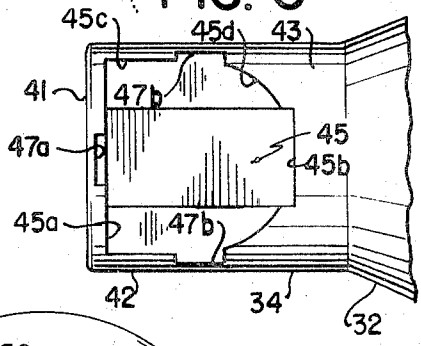


FIG. 4

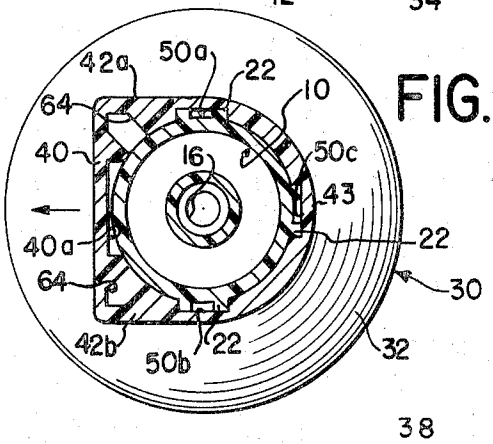
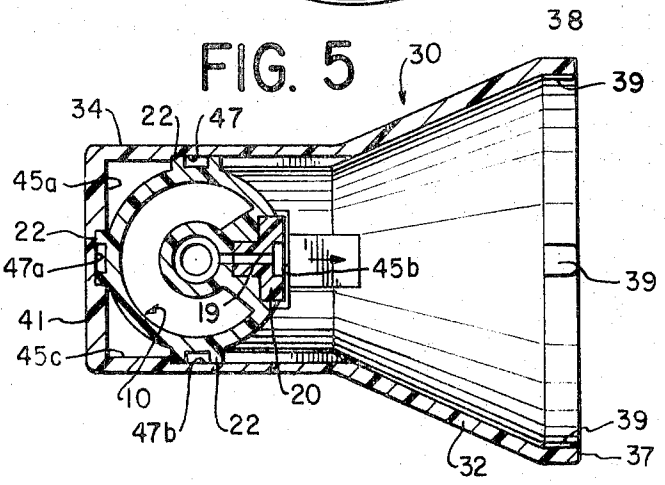


FIG. 5



SPRAY DISPENSER AND SHIELD

Many situations exist where it is desired to administer fluids in spray form, such as pharmaceuticals and other medicinal preparations, to the eye. In general, a problem exists in that the fluid must be administered in at least approximately predetermined dosages, for example one or two drops, and the eye must be held open to keep it from blinking.

One device for dispensing fluids into the eye is disclosed in U.S. Pat. No. 3,314,426 to Albert Carroll. In the device of that patent, an eye shield is attached to the spray nozzle of a bottle of the fluid preparation. The attachment of the eye shield is made in such a way to provide spaces between the two to permit light to enter the shield. The light permits the eye to be focused onto the spray nozzle orifice from which the liquid exits. This assures that the liquid will enter the eye at the correct location. While the device of that patent is operable, the arrangement for attaching the eye cup to the nozzle are relatively complex and therefore expensive to make on a high-volume basis. In addition, the presence of the open spaces permits contaminates to enter into the shield.

In U.S. Pat. No. 2,985,382 to Rachel Coplan, a spray director is disclosed which is to be located over a nozzle containing an orifice. Proper alignment is obtained between the nozzle and the director by having a rib on the nozzle and a keyway on the director. The device of this patent is primarily for directing the spray and no provision is made for any illumination of the spray nozzle orifice so that the eye can be directed towards it to receive the maximum spray. In addition, when the director is placed in a position to cover the nozzle when the device is not being used, it is possible for the orifice to be forcing the open keyway on the director, thereby permitting the orifice to be contaminated.

The present invention is directed to a novel arrangement of a shield and a spray dispenser nozzle. The nozzle has formed thereon one or more aligning means, such as ribs, and the shield has one or more mating aligning means, such as grooves. The aligning means of the nozzle and the shield permit the shield to be positioned on the nozzle when the spray is to be dispensed only in such a manner so that the orifice of the nozzle is aligned with the central axis of the shield. The shield which is constructed preferably of a translucent plastic material. It also has a second set of aligning means, preferably also in the form of grooves, formed thereon. The second set of aligning means, when in the form of grooves, can permit additional illumination of the interior of the shield so that the eye can focus upon the orifice of the nozzle as a target. This aids in directing the maximum amount of fluid into the proper location of the eye.

The second set of aligning means on the shield also mate with ribs on the nozzle head to properly align the shield to serve as a cover for the nozzle orifice. This prevents the nozzle from being contaminated when the device is to be stored or transported.

The shield of the present invention is relatively simple in construction and can be easily molded on a high speed basis. Also the shield is easily moved and aligned between its two positions of use and storage.

It is therefore an object of the present invention to provide a spray nozzle and shield in which the shield has novel aligning means to permit it to be placed on the nozzle to either expose the nozzle orifice or to cover it.

Another object is to provide a spray nozzle and shield in which aligning means on the shield which are used to orient the shield on the nozzle to cover the orifice also admit light into the shield interior when the fluid is to be dispensed.

An additional object is to provide a novel eye shield for a spray dispenser having means through which light is admitted so that the eye can focus on the orifice when the spray is dispensed.

Other objects and advantages of the present invention will become more apparent upon reference to the following specification and annexed drawings, in which:

FIG. **1** is an elevational view of the top portion of the bottle and sprayer with the eye shield shown in cross-section;

FIG. **2** is a view similar to FIG. **1** with the eye shield in an assembled position on the bottle;

FIG. **3** is an elevational view showing the eye shield in cross-section on top of the bottle in position to be used;

FIG. **4** is a cross-section looking down along lines **4—4** of FIG. **2**;

FIG. **5** is a cross-section looking down taken along the lines **5—5** of FIG. **3**; and

FIG. **6** is a bottom view of a portion of the eye shield.

Referring to the drawings, the invention includes an atomizing spray nozzle **10** having a head, or cap, **11** on top of a plunger **10***a* which passes through a collar **12** formed as part of a closure fastened on top of a bottle **14.** The bottle contains the liquid, such as a medicament or other solution (not shown) which is to be sprayed. The spray nozzle **10** is of conventional construction and includes a stem **16** with suitable metering and check valve devices therein (not shown) which extends into the liquid in the bottle **14.**

The plunger of the nozzle when depressed will cause a predetermined amount of the liquid in the bottle **14,** for example, one or two drops, to exit through an orifice **19** formed in an orifice piece **20** at the upper end of the nozzle. The piece **20** is an extension of the stem **16** and is separate from the head **11.** It is preferred that the piece **20** be made of a different color than the head **11** for reasons to be explained below.

The head **11** also has a plurality of aligning means, such as ribs **22** formed thereon. The ribs are formed in pairs and, as shown in the various drawings, there are three pairs of ribs **22** spaced substantially 90° apart on center around the skirt of the head **11.** Two of the pairs of ribs are spaced 90° on each side of the orifice **19** and the third piece 180° from the orifice. The head is hollow at the bottom of its skirt wall so that it is somewhat flexible. The ribs **22** also taper outwardly slightly from their tops to their bottoms.

An eye shield **30** is provided which is made of a suitable plastic, preferably of a translucent material, which can pass light if the wall thickness is thinned down sufficiently. The eye shield includes a generally frustoconical front portion **32** and a rear sleeve **34.** The front portion **32** terminates in a ring or wall **38** having a smooth front edge **37.** Wall **38** is generally parallel to the longitudinal axis of the shield and the diameter of its inner circumference is somewhat less than the outer diameter across the top of the bottle closure **12.** Slightly

raised projections **39** also can be formed on the interior of wall **38.**

The sleeve **34** of the shield has a generally flat top wall **40,** a rear wall **41,** two flat side walls **42** and a curved bottom wall **43** which joins the two side walls.

The curved bottom wall **43** of the sleeve has a keyway **45** formed therein from the sleeve back wall **41** to a point just short of the commencement of the shield's conical front portion **32.** Keyway **45** is shaped generally to conform to the profile of the cap nozzle head **11.** Specifically, the keyway includes a straight back edge **45***a* and a straight front edge **45***b* which are parallel to each other. Each of the sides of the keyway includes a straight portion **45***c* starting from the back edge **45***a* and a curved portion **45***d* which terminates at the front edge **45***b.*

The keyway **45** is cut on the curved bottom wall **43** of the sleeve **34.** The back edge **45***a* of the keyway has a slot **47***a* which continues into the rear wall **41** of the sleeve and a slot **47***b* in each of the side edges of the keyway between the portions **45***c* and **45***d.* The slots **47** are generally transverse to the central longitudinal axis of the shield. As seen in FIGS. **3** and **5,** the slots **47***a* and **47***b* form a first set of aligning means on the sleeve which are positioned to mate with the three pairs of ribs **22.** The two curved portions **45***d* of the side edges of the slot will engage the cap **11** of the nozzle when the shield is in the position shown in FIG. **3.**

Due to the spacing of the three sets of ribs **33** and the slots **47** in the keyway, the eye shield **30** can only be positioned on the head **11** of the nozzle with the nozzle orifice **19** facing the opening **39** at the front of the conical portion of the cut and aligned generally on the shield's central axis. This is shown in FIGS. **3** and **6.**

A second set of aligning means, in the form of three grooves **50***a*, **50***b* and **50***c*, are provided on the interior of the sleeve **34.** The grooves **50***a* and **50***b* are generally parallel with the longitudinal axis of the shield and are located on the interior of the respective side walls **42***a* and **42***b*. They extend substantially from an intermediate point of the keyway **45** to a point slightly into the conical front portion **32** of the shield. This is shown in FIG. **1.** The groove **50***c* is formed on the bottom wall **43** from a portion just forward of the front wall **45***b* of the keyway into the conical portion of the shield. The three grooves **50** have substantially the same length.

Each of the grooves **50** has substantially the width of a pair of ribs **22** and is substantially the same depth as the ribs. The grooves **50** are positioned so that they will mate with the pairs of ribs **22** on the head **11** when the shield **30** is placed in the position shown in FIG. **2,** that is, when the bottle is to be stored.

The interior of the shield also has grooves **64** formed at the point where the top wall **40** of sleeve **34** joins the side walls **42.** This is shown best in FIGS. **1** and **4.** Grooves **64** extend beyond the flat top wall **40** into the conical area of the shield. Each groove has a pointed end **64***a*. The interior terminating portion **64***b* of each groove **64** is also tapered to a point to reduce the thickness of the shield wall.

The operation of the sprayer and eye shield is as follows. For transportation or storage, the eye shield is in the position shown in FIG. **2** with the sleeve **34** over the nozzle head **11.** The second set of grooves **50** in the sleeve align and mate with the respective pairs of ribs **22** (see FIG. **4**). Since there are only three pairs of ribs, spaced 90° apart, the shield can only be placed one way on the nozzle head. This is with the flat top wall **40** of the sleeve covering the orifice piece **20** and the orifice to protect the orifice from being contaminated. It is not possible to place the sleeve of the shield on the nozzle with the orifice piece facing the keyway **45.**

As shown in FIG. **4,** the interior of the sleeve top wall **40** is also dished out slightly at **40a** so that the orifice piece **20** will have some clearance in the event it is not flush with the cap **11.** The eye shield is pushed down to the position shown in FIG. **2** until the top edge of the closure **12** rests against the area of the interior of wall **38** and projections **39** at the front of the conical portion of the shield. When in this position, it is not possible to push the plunger down to eject any fluid from the bottle. A friction fit is produced between the pairs of ribs **22** and the grooves **30** and/or between wall **38** and closure **12** so that the shield will not fall off the bottle.

When it is desired to dispense fluid from the bottle, the eye shield **30** is pulled straight up off of the bottle, as shown in FIG. **1.** It is then turned to a position where the first set of transverse slots **47***a*, **47***b* and **47***c* in the keyway are aligned with the three pairs of ribs **22** on the head **11.** Due to the spacing of the ribs, it is only possible to place the eye cup onto the nozzle in the position where the orifice **19** faces toward the front end **39** of the shield.

The sprayer is now ready to be operated. The user opens his eye and places the front end **39** of the shield over the eye with the eyelid open, as shown in FIG. **3.** At this point, the second set of longitudinal aligning grooves **50** and the slots **64** serve a useful function. That is, they thin down the wall of the shield to admit more light into its interior. Thus, the eye will have sufficient light within the shield to enable it to focus on the orifice **19.** The pointed ends **64***a* of the slots **64** also aid in directing the pupil of the eye to focus on the orifice. The orifice piece **20** is preferably a different color than the cap **11** to make it easier for the eye to focus properly. Since the light will be soft and diffused there will be no blinking of the eyelid due to either the absence of light or to the presence of too strong a light. The light is admitted into the interior of the shield without there being any opening or space, between the nozzle and the eye through which foreign material, such as dust or dirt, can enter when the spray is operated.

As shown in FIG. **3,** when the plunger is operated, a measured amount of fluid is conveyed from stem **16** out through the orifice **19** directly into the eye. The eye is completely shielded at all times. It should be understood that the fluid does not normally contact the interior wall of the conical portion of the shield. The purpose of the shield is to keep the eye open and to make sure that the center of the eye is directed towards the target which is the differently colored orifice piece **20.**

To store the shield when its use is finished, it is pulled off the nozzle, from the position shown in FIG. **3** and turned until the second set of longitudinal grooves **50***a* are aligned with the pairs of ribs **22.** Due to the slight resiliency of the lower portion of the skirt wall of the head **11** and the taper of the ribs **22,** a friction fit is established, as shown in FIG. **4.** This prevents the shield from dropping off the nozzle. As pointed out above, due to the presence of the grooves **50,** the shield can be placed back onto the nozzle only in the position shown in FIG. **2** with the top wall **40** covering the ori-

fice piece 20. This protects the orifice piece from having any dirt or other foreign material lodge therein. This aids in preserving the relative cleanliness of the device.

While the aligning arrangement has been shown to include pairs of ribs on the nozzle head, it should be understood that single ribs can be used. There can be as many ribs spaced as needed to insure proper alignment of the shield.

What is claimed is:

1. A dispenser system for administering fluid to a confined location, such as the eye, comprising a spray nozzle having a head with an orifice, the head having at least one first aligning means thereon, an eye shield having an opening at one end thereof and a sleeve at the other, said sleeve being a closed surface except for a keyway therein which is formed with a shape substantially complementary to that of the head and at least one second aligning means substantially transverse to the longitudinal axis of the shield to mate with the first aligning means on the head, said first and second aligning means positioned to align the orifice toward the shield opening when the keyway of the sleeve is placed over the nozzle head with said first and second aligning means in a mating relationship when the shield is in a position of use to dispense fluid, the sleeve also having formed thereon at least one third aligning means substantially parallel to the longitudinal axis of the shield to mate with the first aligning means on the head, said first and third aligning means positioned to align the shield in a storage position with a closed portion of the sleeve remote from the keyway covering the orifice of the head when the nozzle head is inserted into the shield through its said opening at one end thereof.

2. A dispenser system as in claim 1 wherein said first aligning means is a rib and is formed on said nozzle head at a position spaced from the orifice.

3. A dispenser system as in claim 2 wherein said first aligning means is located on said head at a position opposite to the orifice, said sleeve having a curved bottom wall on which the keyway is formed and a back wall, said second aligning means formed on said back wall.

4. A dispenser system as in claim 3 wherein the front portion of the keyway remote from the back wall is curved to conform to the shape of the nozzle head when the sleeve is on said head in a position of use to surround the lower portion of the head adjacent the orifice.

5. A dispenser system as in claim 1 wherein said first aligning means comprises at least one rib and said third aligning means comprises at least one groove.

6. A dispenser system as in claim 5 wherein said shield is of translucent material and said at least one groove comprising said third aligning means is of reduced thickness with respect to the area of the shield on which it is located to aid in the admission of light into the interior of the shield.

7. A dispenser system as in claim 1 wherein there are a plurality of first aligning means on the nozzle head, and a corresponding number of second aligning means on said shield.

8. A dispenser system as in claim 1 wherein said shield is of translucent material and said sleeve of said shield has a substantially flat top wall opposite the portion on which the keyway is formed, and at least one groove formed on the interior of the sleeve adjacent the top wall to reduce the thickness of the shield material to admit additional light into the shield in the area of the orifice when said shield is in a position of use mounted by said keyway on the nozzle.

9. A dispenser system as in claim 1 wherein the portion of the head surrounding the orifice is of a different color from the remainder of the head.

10. A dispenser system as in claim 1 wherein the lower portion of the head is hollow and has an amount of resiliency thereto, the second aligning means being sized with respect to the first aligning means on the head, a portion of which is located on the resilient part of the head, to produce a friction fit when the sleeve is both in the use postion and in the storage position.

11. A dispenser system as in claim 1 wherein said shield is of translucent material.

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