EYECUP AND SPRAY DISPENSER

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ABSTRACT OF THE DISCLOSURE

This invention relates to a combined eyecup and spray dispenser having a plunger actuator for discharging a medicament through a laterally directed nozzle, the eye-cup serving as a cover for the plunger and nozzle and adapted to be mounted on the nozzle to form an eyecup and shield and providing an illuminated target for attracting the eye so that medicament discharged from this nozzle can be directed into the center of the eye without involuntary blinking of the eye.

This invention relates to medication apparatus and relates particularly to apparatus for applying a medicament to the eyes, for laving the eyes and for treating eye diseases, infections, irritations, strain and the like.

The most common device for applying a medicament to the human eye is an eyecup formed of glass, plastic, metal or the like. While such eyecups have been used satisfactorily for the treatment of eyes, they are not without disadvantages. For example, in the hands of an unskilled user, the medicament frequently leaks or is spilled from the eyecup as it is applied to the eye. Moreover, the liquid in the eyecup is in a more or less quiescent state which renders it somewhat ineffective for removal of foreign particles or bodies from the eye. Because of these deficiencies of the ordinary eyecup, it has been proposed, heretofore, to provide eyecups with means for spraying a liquid into the eye of the user. For example, the container associated with the eyecup may be a squeeze bottle or provided with a syringe bulb, a pump or the like for squirting the medicament into the eye. These devices are not very satisfactory for the reason that a stream of the medicament is discharged with considerable force and volume into the eye. While in theory, the use of such a forceful stream will dislodge a foreign particle from the eye, in actual practice, the stream or jet causes the user to blink, with the result that the medicament may not reach the eye to exert its full washing effect.

Moreover, inasmuch as a relatively large volume of medicament is discharged into the eye, the eyecup must be applied tightly to the area around the eye to prevent leakage and careful handling is required to avoid spillage after use. Leakage can occur also due to inadvertent squeezing of the container or other actuating device during handling, shipping and the like.

The prior devices also are somewhat unwieldy for the eyecup usually extends outwardly from the container making its use, packaging and handling difficult.

Contamination of the prior dispensing eyecups by dust can occur for the reason that their inner surfaces are unprotected when not in use.

In accordance with the present invention, the difficulties and disadvantages of the prior devices are overcome by providing a spray dispenser for supplying a medicament to the eye in the form of a finely divided spray or mist and in a relatively small but adequate, metered amount. The dispenser has a shield to be applied over the eye to confine the spray to the eye area, the shield being removable and storable in a protective relation to the actuator by means of which the medicament is dispensed and with the inner surface of the eye shield protected from contamination.

More particularly, the new dispensing device includes a container for a medicament and a device for discharging the medicament from the container including an actuating member which extends through the top or cover of the container and is provided with a laterally facing orifice of very small diameter, e.g., about 0.01 of an inch through which the medicament is discharged in the form of a spray or mist. The eye shield is constructed and arranged so that it can be attached to and detached from the nozzle and can also be stored on the upper end of the actuating member in such a position that the open end of the eye shield engages the cover for the container and covers and protects the orifice as well as the inner surface of the eye shield and retains the actuating member against movement so that it cannot be operated inadvertently to cause discharge of a medicament from the container.

In use, the eye shield is attached to the lateral extension containing the orifice or nozzle and can either be brought adjacent to the eye or lightly into contact with the area around the eye. Upon movement of the actuating member, a small amount of the medicament is discharged in the form of a fine mist or spray directly into the eye without such sharp impingement as to cause blinking of the eye. The amount of the medicament is small so that little if any of it escapes from the eye and accordingly, the device can be used with a minimum of difficulty, spillage or waste under almost any circumstances.

For a better understanding of the present invention, reference may be had to the accompanying drawing in which:

FIGURE 1 is a front elevational view of a typical medicament dispenser of the type embodying the present invention with the eye shield attached to the top of the container in condition for shipment, handling or storage; FIGURE 2 is a side elevational view of the dispenser with the eye shield attached to the dispenser for application of the medicament to the eye;

FIGURE 3 is a plan view of the device shown in FIGURE 2;

FIGURE 4 is an exploded side elevational and partial sectional view of the dispenser;

FIGURE 5 is a side elevational view of a modified form of eyecup dispenser shown partly broken away;

FIGURE 6 is a view in section taken on line 6—6 of FIGURE 5; and

FIGURE 7 is a front elevational view of the dispenser of FIGURE 5 with the eye shield in stored position and with parts broken away to disclose details thereof.

The spray dispenser shown for purposes of illustration in FIGS. 1 to 4 of the drawings includes a container or bottle 10 formed of a glass, plastic or the like having a cover 11 which may be connected permanently or detachably to the upper end of the bottle 10. The cover 11 may be formed of plastic material or the like as desired. Mounted in the cover and extending downwardly into the container is a pump 12 of the plunger type such as that shown, for example, in U.S. Patent No. 2,362,080, dated November 7, 1944 and in my copending application Serial No. 260,216, filed February 21, 1963, now abandoned. The pump includes a piston (not shown) actuated by means of a plunger 13 which extends through the cover 11 and suitable check valves (not shown) which, upon downward movement of the plunger, cause a measured charge of the medicament to be discharged from the pump. Upon upward movement of the plunger 13 another charge of medicament is drawn into the pump. The pump plunger 13 is slidably received in a collar 14 which is mounted in the cover 11 of the container and carries the barrel or cylinder 15 of the pump which has its inlet near the bottom of the container.
On the upper end of the plunger 13 is a head 16 forming an actuator, the upper end of which may be pressed by or through a metered amount of medicament to be discharged through a nozzle 50 having an actuator 17a and comprising a projection or boss 18 extending laterally from the head 16. The nozzle 17 is disposed midway between the upper and lower ends of the actuating head and is adapted to receive an eye shield 19 thereupon.

As best shown in FIGURES 2, 3 and 4, the eye shield 19 includes a conical portion 20 having a rim 21 at its larger end adapted to engage the area around an eye and also, as shown in FIGURE 1, to engage the periphery of the cover 11 of the container. A tubular sleeve portion 22 extends from the smaller diameter end of the conical portion 20 and has an internal annular surface 23 provided with internal threads 24 which are adapted to frictionally engage the ribs 25 on the extension 18. Diagonally spaced arecuate notches 26 and 27 are formed in the end of the sleeve 22 so that it fits snugly against the side of the actuator 16.

Inasmuch as the ribs 25 extend outwardly from the extension 18, spaces are present between them through which light is visible from the interior of the shield 20 when the latter is in engagement with the face around the eye. The light forms a target for attracting the eye to enable the medicament to be injected into the orifice of the eye when the actuating member 16 is pressed. The eye shield need not be pressed tightly around the eye for the amount of medicament discharged preferably is relatively small in volume and accordingly, the excess, if any, which would run out of the eye is negligible.

As shown in FIGURES 2 and 3, the upper or outer end of the actuator 16 is provided with threads 28 which are adapted to mate with the threads 24 to allow the eye shield 20 to be stored on the end of the container as shown in FIGURE 1. Thus, the eye shield 20 may be removed from the nozzle extension 18, inverted and then screwed on the upper end of the actuator 16 to engage the rim 21 with the cover 11. In this position, the eye shield covers the nozzle 17 and locks the actuator 16 against movement. Moreover, the inner surface of the eye shield 19 and the nozzle 17 are protected against dust and other contamination.

It will be understood that other types of threads 24 and 28 or other types of fastening means such as, for example, a bayonet slot connection may be used for attaching the eye shield to the upper end of the actuator 16 or to the cover 11 when the eye shield is not in use.

For covering and attaching the eye shield to the actuator 16, the upper end of the actuator may have a suitable arrow 30 (FIG. 3) or other indicator pointing to the side where the eye shield should be attached.

As indicated above, the orifice in the nozzle 17 through which the medicament is discharged should be of such size as to cause the medicament to be discharged in a form of a mist or fog and to that end, the orifice preferably is between about 0.01 and 0.011 inch in diameter.

As a further protection for the dispenser, the upper end of the actuator and sleeve 22 of the eye shield may be covered by means of a cap 31 formed of plastic or the like which fits frictionally and detachably over the sleeve 22 of the eye shield.

By making the cover 11 removable from the container or the bottle 10, it is, of course, possible to refill the container as may be required or, the cover may be secured permanently to the container forming a "throw away" unit.

Other means for mounting the shield on the dispenser in condition for use and for storing the shield are equally suitable. As shown in FIGURE 5, the shield 40 is clipped to the actuating head 41 of the pump 42. Diagonally spaced grooves 43 and 44 are formed in the head and the cylindrical portion 45 of the shield 40 includes arms 46 and 47 having inwardly extending flanges 48 and 49 which can be snapped into or slipped into the grooves 43 and 44. In this form of dispenser, the nozzle 50 and the orifice 50a therein are substantially flush with the surface of the actuator 41. Also, the upper end portion 51 of the plunger is of reduced diameter so that the shield can be stored by slipping it over the plunger and the rim 52 of the shield either frictionally engaged with the collar 53 on the cap 54 or threaded on the threads 55 on the collar, as illustrated. If desired, the collar 53 can be omitted and the parts proportioned so that the rim 52 of the shield either frictionally engages the upper end of the closure cap 54 or engages threads thereon. With either structure, the tubular portion 45 extends sufficiently above the upper end of the actuating head 41 that it cannot be depressed accidentally when the shield is stored on the container. Protection against contamination is afforded by means of a cap 56 slidably received on the tubular extension 45 as shown in FIGURE 7.

Dispensers of the type described above can be readily packed in cartons, boxes or the like and can be shipped without danger of loss of the contents and without danger of contamination of the eye shield or those parts with which the medicament comes in contact. Moreover, when made in small sizes, the dispenser can be carried in a pocket, purse or the like without danger of leakage or becoming contaminated and thus is available for use at any time. Inasmuch as only small increments of the medicament are discharged, it is unnecessary to take any precautions in the use of the device and accordingly, it can be used whenever and wherever required.

Many other variations and modifications of the dispenser are possible and accordingly, the form of the invention described herein should be considered illustrative.

I claim:

1. A spray dispenser comprising a container for a medicament, a cover for said container, means mounted on said cover and extending into said container and having a plunger for discharging medicament from said container, an actuator on said plunger, a nozzle in said actuator for directing a spray of said medicament laterally from said actuator upon actuation of said plunger, an eye shield, a boss extending laterally from said actuator for detachably supporting said shield on said actuator with said shield extending laterally from said actuator substantially coaxial with said nozzle, a plurality of ribs and grooves on and extending longitudinally of said boss, first means in said shield frictionally engageable with said ribs and spacing said shield from said boss whereby said shield has a rigid connection between said boss and said shield, a boss having a rim engageable with said cover to prevent actuation of said plunger when said shield is connected to said actuator by said second means.

2. The dispenser set forth in claim 1 in which said shield comprises a hollow frusto-conical portion and a sleeve portion extending from the smaller diameter end of said frusto-conical portion, said threads being in said sleeve portion.

3. The eye cup dispensing means set forth in claim 1 in which said means for discharging medicament comprises a pump.

4. A spray dispenser for applying a medicament to the human eye and furnishing an illuminated target for attracting the eye and enabling the medicament to be introduced into the center of the eye, comprising a container for a medicament, a cover for said container, means mounted on said cover extending into said container and below the level of said medicament for flow of said medicament therethrough and having a plunger for discharging said medicament from said container, an actuator...
on said plunger, a boss extending laterally from said actuator having an orifice therein for directing a spray of said medicament laterally from said actuator upon actuation of said plunger, an eye shield, means on said eye shield for detachably connecting said eye shield to said container with said eye shield substantially coaxial with said plunger and covering said boss, and spaced frictionally engageable means on said boss and said eye shield spacing portions of said eye shield from said boss to provide openings extending lengthwise of said boss for passage of light therethrough whereby light is visible from the interior of said eye shield through said openings between said boss when said eye shield is in engagement with the space around the eye.

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