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COMBINATION EYE CUP AND EYE FLUID APPLICATOR

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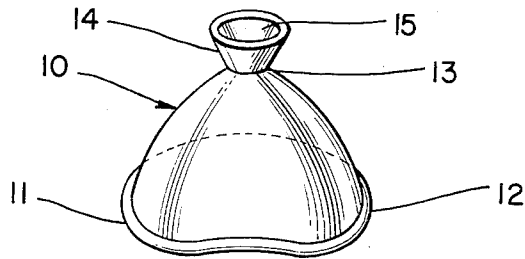


FIG. 1.

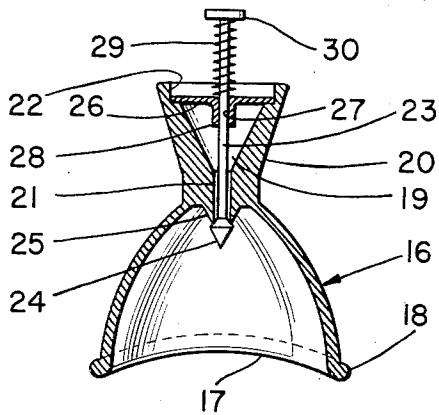


FIG. 2.

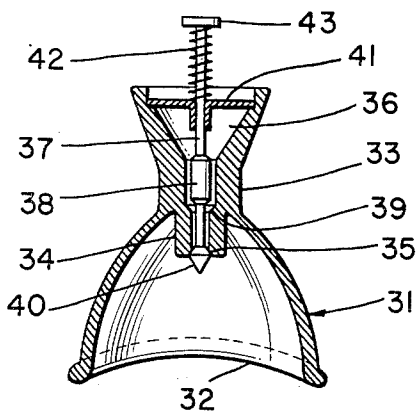


FIG. 3.

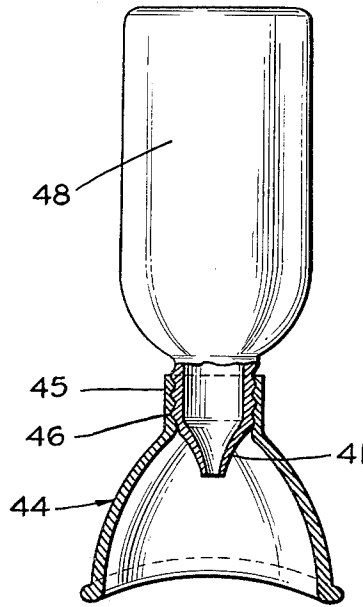


FIG. 4.

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COMBINATION EYE CUP AND EYE FLUID APPLICATOR

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5 Claims. (Cl. 128—249)

This invention generally relates to an improved fluid applicator for human eyes, and more particularly concerns a combined eye cup and eye drop applicator for treatment of the eyes.

The present invention is primarily directed toward applications in which drops of fluid must be deposited on the cornea or eyeball in conjunction with the treatment of various diseases of the eye, for example, glaucoma. Thus, the present invention is most advantageously employed in conjunction with the depositing of minute drops or quantities of fluid on the center of the cornea as contrasting devices primarily adapted for use in washing or rinsing the front portion of the eye as a whole.

At the present time, in order to treat the human eye by placing drops of fluid thereon, it is normally necessary to hold a fluid container in a position above the eye and cause a drop of fluid to fall therefrom onto the eye. This type of treatment is particularly difficult to perform especially in cases where it is self administered. Thus, the individual being treated or treating himself will normally have a tendency to blink or flinch his eye as a result of the natural instinct of resistance towards permitting anything to be deposited or strike against the front portion of the eyeball cornea. Also, in cases of self-treatment, it is difficult to control the quantity of fluid being deposited since it is necessary to actuate the fluid container from a rather awkward position while at the same time endeavoring to maintain the eye open and the eye in a position to receive the drop of fluid or drops as the case may be.

Conventional eye cups have been provided in the past which are used as a receptacle for eye wash or other medical fluids for treatment of the eyes. These eye cups are designed to fit snugly about the cornea and seal against the flesh of the eyelids and the cheek. Although these cups have been satisfactory for applying substantial quantities of the eye wash fluids, they have not to this date had any application with respect to the depositing of minute drops or droplets of fluid on the eyeball.

It is therefore, an object of the present invention to provide a combined eye cup and eye fluid applicator which embodies as one of its structural elements a conventional, but improved eye cup for functioning together with a fluid applicator designed to apply drops of fluid on the cornea and primarily on the center portion thereof.

Another object of the present invention is to provide an improved eye cup and eye fluid applicator which will enable minute drops of fluid to be deposited on the eye in a convenient manner without the likelihood of flinching or blinking preventing proper treatment.

Another object of the present invention is to provide a combined eye cup and eye fluid applicator which enables more precise quantities of fluid to be placed upon the eye ball or cornea, particularly in cases where self treatment is used.

Another object of the present invention is to provide a combined eye cup and eye fluid applicator which may be economically constructed with a minimum amount of materials, and which in part constructed with a minimum amount of materials, and which in part embodies a modified conventional eye cup design.

Another object of the present invention is to provide an improved eye cup and eye fluid applicator which will enable the application of eye treating fluid without the pos-

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sibility of waste or run off as oftentimes accompanies the use of conventional devices for eye treatment or eye rinsing purposes.

Still another object of the present invention is to provide a combined eye cup and eye fluid applicator which enables the precise placement of the eye drops being deposited on the cornea in a manner such that the cornea will be properly treated throughout its entire arcuate surface with a minimum amount of fluid being employed.

These and other objects of the present invention are generally achieved by providing in an eye cup means defining a first opening functioning as an eye fitting or as an eye piece together with means defining a second opening in spaced relationship to the first opening. In a preferred embodiment of the present invention, valve means are mounted in the eye cup for opening and closing the second opening.

A better understanding of the present invention will be had by reference to the drawings, showing merely illustrative embodiments, and in which:

FIGURE 1 is an isometric view of one embodiment of the present invention for the combined eye cup and fluid applicator;

FIGURE 2 is a sectional view of a modified construction of the eye cup and fluid applicator of FIGURE 1;

FIGURE 3 is a sectional view of a modified construction of the eye cup and fluid applicator of FIGURE 2; and,

FIGURE 4 is a modification of the combined eye cup and fluid applicator of FIGURE 1, illustrating its use in co-operation with a fluid container.

Referring now to the drawings, there is shown in FIGURE 1 an eye cup 10 of partially conventional design including the usual eye fitting opening 11 with a flange 12 provided thereabout for convenient sealing of the eye cup 10 about the human eye area. The eye cup 10 itself is provided at its upper end, as viewed in FIGURE 1, with a necked down portion 13 merging into an auxiliary fluid chamber portion 14. The auxiliary fluid chamber 14 tapers inwardly down to the necked portion 14 from an outer relatively enlarged opening 15.

Thus, with the construction shown in FIGURE 1, the conventional eye cup known in the prior art has been modified to include the auxiliary chamber 14, whereby a separate fluid container may be actuated to deposit fluid through the opening 15 to thereafter pass downwardly through the chamber 14 and thus fall substantially through the center of the interior of the eye cup 10 onto the cornea of the eye. By using a tapered construction for the chamber 14, fluid may be more readily deposited through the enlarged opening 15 and yet will be permitted to pass only in small quantities through the necked down portion 13 prior to depositing on the eyeball.

Although the construction of the improved eye cup and fluid applicator of FIGURE 1 will suffice for general treatment of the eye, it will be appreciated that no means is provided for holding or limiting the quantity of fluid falling downwardly or passing onto the eye. Also, it is evident that it is necessary to hold both the eye cup 10 and the fluid container in position above the eye during treatment.

To obviate the above difficulties, the construction of FIGURE 2 may be employed. In FIGURE 2, there is shown an eye cup 16 similar to the eye cup 10 of FIGURE 1 in that it includes a conventional eye fitting opening 16 and lower flange 18 encircling the opening. The eye cup 16 also includes a chamber 19 for receiving fluid, the chamber 19 being defined by tapered sidewalls 20 merging into a passage portion 21 communicating with the interior of the eye cup 16. The chamber 19 terminates at its outer end in a relatively enlarged opening 22 sim-

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ilar to the opening 15 in the improved eye cup and fluid applicator of FIGURE 1.

Axially extending through the chamber 19 is a valve stem 23 provided at its lower end with a valve member 24. The valve member 24 is designed to co-operate with an inner annular valve seat 25 integrally formed with and extending from the sidewalls of the eye cup 16.

A support bar 26 extends diametrically across the chamber 19 and is rigidly secured in the tapered sidewalls 20 thereof. The support bar 26 is provided with a bore 27 through which the valve stem 23 extends. Desirably, the support bar 26 further embodies a hub portion 28 which tends to center and guide movement of the valve stem 23.

At the upper end of the valve stem 23, there is provided a spring 29 which is held between the support bar 26 and a finger actuating button 30. Thus, the spring 29 tends to bias the valve stem 23 in an axially upward direction, as viewed in FIGURE 2, such that the valve 24 seats against the annular valve seat 25.

In the operation of the improved eye cup and fluid applicator according to the construction of FIGURE 2, it is merely necessary for the individual user to deposit the treating fluid in the upper chamber 20. Thereafter, he may place the eye cup 16 in the conventional manner over his eye such that the eye fitting opening 17 extends thereabout. To place a drop of the fluid upon his eyeball, it is merely necessary to depress the button 30 to overcome the biasing action of the spring 29 and open the valve 24 from its seat 25. As this action is occurring, a portion of the fluid in the chamber 20 will pass downwardly and drop through the lower end of the passage 21 down through the axial center of the eye cup 16 onto the eyeball or cornea. Although the construction of FIGURE 2 is preferred for most applications, it is possible in certain cases that it may be desirable to even more precisely control the amount of fluid deposited on the eyeball. Towards this end a modified construction is shown in FIGURE 3.

In FIGURE 3, there is shown an eye cup 31 similar to the eye cup 16 of FIGURE 2 and eye cup 10 of FIGURE 1 in that it is provided with an eye fitting opening 32. At its upper end as viewed in FIGURE 3, the eye cup 31 is provided with a neck portion 33. The eye cup 31 further includes a downwardly extending, integral, inner sleeve 34 which terminates in valve seat 35.

The neck portion 33 defines a fluid receiving chamber 36 similar to the chamber 19 of the construction shown in FIGURE 2. Extending axially through the chamber 36 is a valve stem 37 including a first or upper valve means 38 normally open but designed to seat and close upon valve seat 39 formed in the upper end of the sleeve 34. The valve stem 37 further includes a lower or second valve means 40 designed to co-operate seat upon the valve seat 35 heretofore described. The valve means 40 is similar to the valve means 24 of FIGURE 2 and is normally closed.

Corresponding to the construction of FIGURE 2, a cross bar 41 is diametrically positioned between the sidewalls of the chamber 36 and rigidly secured therein. The cross bar 41 may similarly be provided with a center bore and connecting hub as with the construction of FIGURE 2. Furthermore a spring means 42 is retained between cross bar 41 and an actuating button 43.

In the operation of the improved eye cup and fluid applicator of FIGURE 3, fluid is first deposited within the chamber 36 from a conventional container. Thereafter, the eye cup 31 is positioned over the eye substantially vertically in a similar manner as the eye cup 16 of FIGURE 2. Once positioned over the eye, the button 43 is actuated to open the valve 40 and close the valve 38, whereby a controlled definite size drop of fluid may be passed downwardly through the passage defined by the sleeve 34 to drop upon the cornea of the eye. It will be appreciated with the construction of FIGURE 3,

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assuming proper design and dimensions are used, that a particular size drop may only be allowed to pass through the passage defined by the sleeve 34 before it is closed off by the upper valve means 38 coming into contact with the valve seat 39. By varying the diameter of the passage within the sleeve 34 as well as the length thereof in conjunction with the diameter of the valve stem 37, various sized drops may be caused to pass through the eye cup as desired.

It should be noted that the valve stem 37 and valve means 38, 40 are limited in movement such that it is impossible for these elements to inadvertently strike or come close to the eye.

In instances where fluid containers are available which embody means for controlling emission of fluid therefrom, the construction of the improved eye cup and fluid applicator of FIGURE 1 may be modified as in FIGURE 4.

Thus, referring to FIGURE 4, there is shown an eye cup 44 which is provided at its upper end with the neck portion 45 having internal threads 46. The internal threads 46 are adapted to be coupled to a threaded neck portion 47 of a conventional fluid container 48. In some instances, it may be feasible to integrally mold the neck portions 45 and 47. With the construction of FIGURE 3, the eye cup 44 serves its primary function of directing the fluid towards the center of the eye as well as closing out light to the eye as fluid is deposited from the receptacle 48 in a convenient manner.

It should be emphasized that in all the constructions shown in FIGURE 1 through FIGURE 4, the eye cup material should be opaque such that light will be excluded from the eye and the individual using the eye cup will not be able to anticipate or see the drop falling upon the eye, whereby the natural impulse to close or blink the eye is avoided.

It will be appreciated that many modifications and changes may be made to the various constructions and embodiments shown without departing from the spirit and scope of the invention as set forth in the following claims.

What is claimed is:

1. In an eye cup: an auxiliary fluid receiving chamber opening to the exterior of said cup; a passage communicating between said chamber and the interior of said eye cup; and, a manually operable, elongated integral stem and valve member coupled to said eye cup and protruding outwardly of said chamber for opening and closing said passage.

2. A combination eye cup and fluid applicator comprising: an opaque cup member defining at its open end an eye piece; a fluid receiving chamber opening to the exterior of said cup; a passage communicating from said chamber to the interior of said cup at a point spaced from said open end; and, a manually operable, elongated integral stem and valve member coupled to said cup and protruding outwardly of said chamber for opening and closing said passage.

3. A combination eye cup and fluid applicator, according to claim 2, in which said passage is axially spaced in opposing relationship to said eye piece, and spring means retained by said cup and biasing said stem and valve member to a closed position.

4. A combination eye cup and fluid applicator, according to claim 2, in which said chamber is integrally formed with said cup.

5. A combination eye cup fluid applicator comprising: an opaque cup member defining at its open end an eye piece; a fluid receiving chamber opening to the exterior of said cup, said chamber being integrally formed with said cup; a passage communicating from said chamber to the interior of said cup at a point spaced from said open end; a valve stem coupled to said cup and operable from a first position to a second position; first valve

means formed on said stem at the chamber inlet to said passage, said first valve means being open in said first position and closed in said second position; second valve means formed on said valve stem at the cup end of said passage, said second valve means being closed in said first position and open in said second position.

References Cited in the file of this patent**UNITED STATES PATENTS**

2,352,610	Bonilla	July 4, 1944
2,898,911	Taylor	Aug. 11, 1959
2,919,696	Rinaldy	Jan. 5, 1960