

[54] **CONTACT LENS CASE**

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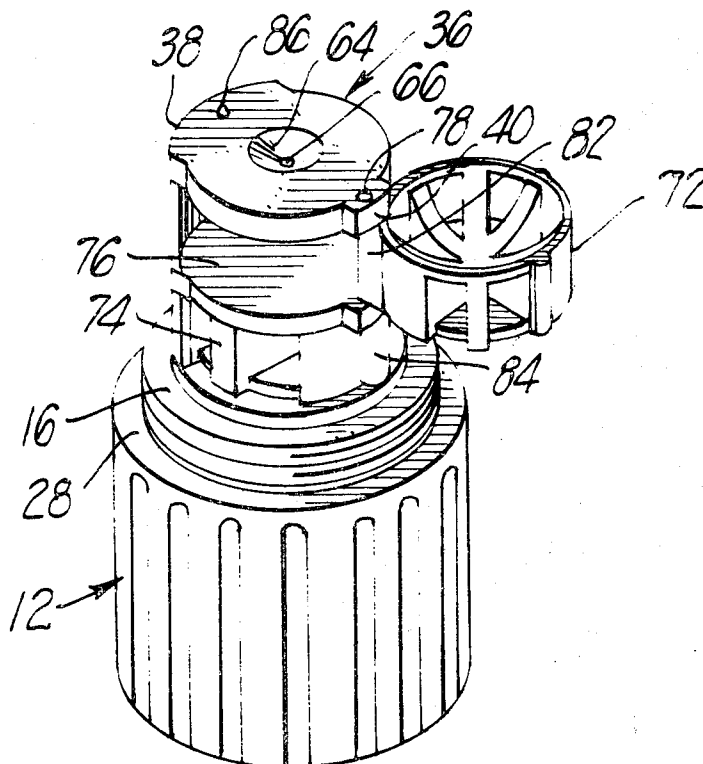
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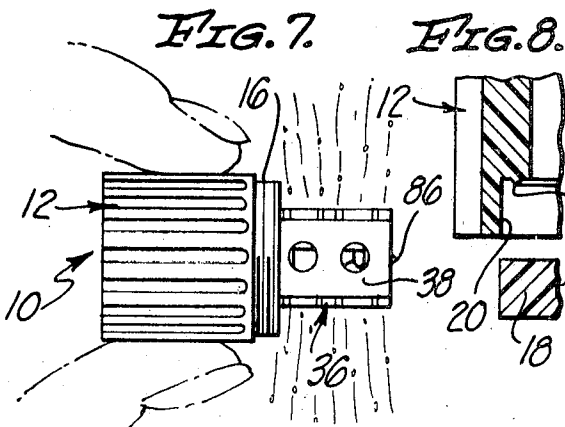
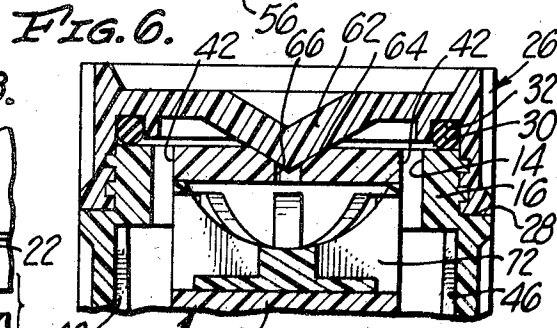
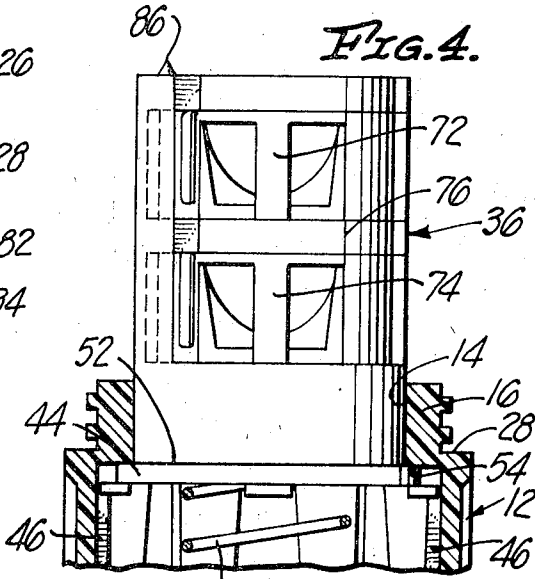
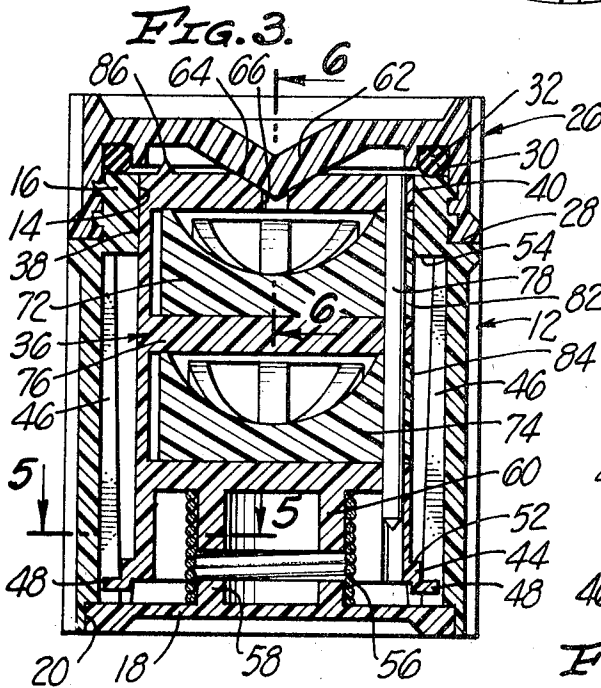
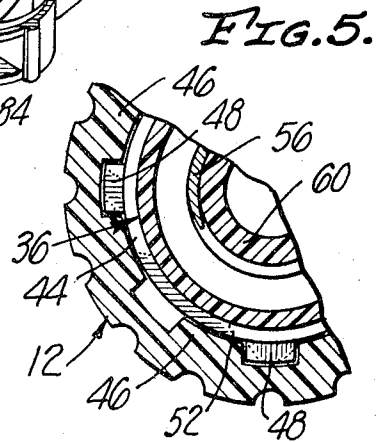
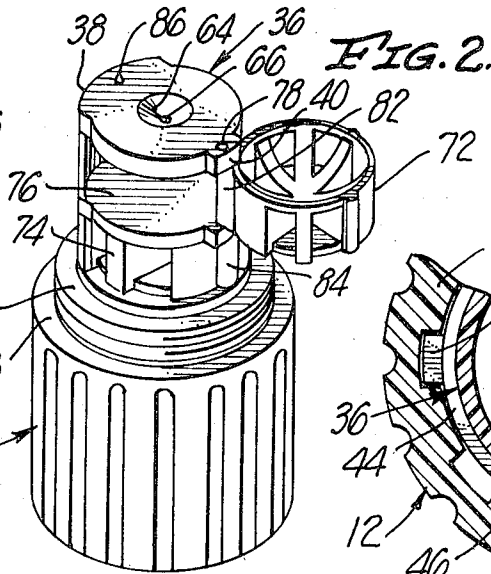
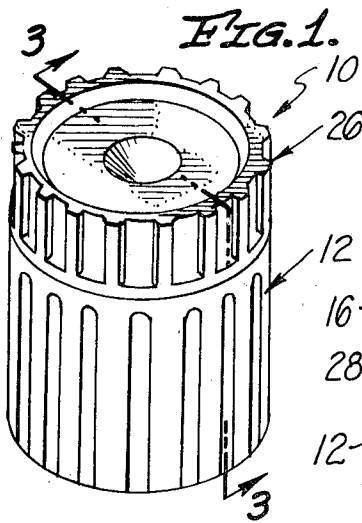
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[57] **ABSTRACT**

A case for storing and cleaning contact lenses, comprising: a container having an open end; a closure for the open end of the container; a receptacle carrier movable from a retracted position within the container to an extended position wherein it projects from the open end of the container; interengageable annular shoulders on the container and the carrier for limiting outward movement of the carrier and for closing the open end of the container to prevent loss of liquid therefrom when the carrier is in its extended position; a spring biasing the carrier toward its extended position; and two lens receptacles pivotable relative to the carrier, when the latter is extended, from aligned retracted positions to extended positions wherein the interiors of the receptacles are accessible for insertion or removal of contact lenses, the receptacles being pivotable about a common axis spaced laterally from and parallel to the central axis of the container. With the foregoing construction, the container is automatically sealed against loss of liquid therefrom when the carrier is extended, whereupon the lenses in the receptacles mounted on the carrier may be washed readily without any loss of liquid from the container.

9 Claims, 8 Drawing Figures





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CONTACT LENS CASE

BACKGROUND OF INVENTION

The present invention relates in general to a case in which contact lenses, or the like, may be stored and cleansed when not in use.

Contact lenses are ordinarily made of methyl methacrylate, which is a particularly suitable material since it has the necessary optical characteristics while being virtually unbreakable, thereby minimizing hazards to the wearer's eyes from this source. However, methyl methacrylate absorbs liquids readily and, therefore, contact lenses made of this material must be moistened with a suitable liquid before use, or they will absorb moisture from the surfaces of the wearer's eyes with consequent irritation. Because of this, and because such contact lenses tend to deteriorate if permitted to dry out, it is desirable to keep them moist or wet at all times when not in use by storing them in a suitable liquid environment. The liquid in which contact lenses of this type are desirably stored also serves to cleanse the lenses when not in use by dissolving therefrom salts and other impurities derived from the wearer's tears. Such materials, if not removed from the lenses frequently, irritate the user's eyes.

For reasons such as the foregoing, intensive efforts have been made to develop contact lens cases wherein the lenses may be kept moist or wet when not in use and wherein they may be cleansed of potentially irritating substances. However, prior efforts along these lines have not been entirely successful. More particularly, many prior contact lens cases, while perhaps performing their intended moistening and cleansing functions with reasonable effectiveness, are difficult to use in various respects. For example, it is very difficult to place the contact lenses in or retrieve them from prior devices, a situation which obviously creates problems for a user having impaired vision when his lenses are not in place. Another disadvantage of many prior devices is that they are difficult to clean whenever excessive accumulations of salts, or other foreign materials, must be disposed of. Also, with various prior devices of this nature, care must be taken to avoid loss of the liquid in which the lenses are stored when placing the lenses in the device, or when removing them.

SUMMARY AND OBJECTS OF INVENTION

With the foregoing background in mind, primary and important objects of the invention are to provide a contact lens case which performs its moistening or wetting and cleansing functions effectively, which is easy to use in placing the contact lenses in the case and in removing them therefrom, which is easily cleaned when necessary, and which automatically precludes any possibility of loss of liquid when inserting or removing the lenses.

In general, the invention contemplates a contact lens case, or the like, which includes: a container or housing having an opening therein, the container preferably being cylindrical and having an open end; a closure for the opening connectable to the open end of the container; a receptacle carrier movable relative to the container, upon removal of the closure, from a retracted position within the container to an extended position wherein it projects from the container through the opening; and lens receptacles mounted on the carrier.

An important object of the invention is to provide a contact lens case of the foregoing nature having interengageable means on the container and the carrier for limiting outward movement of the carrier and for closing the opening in the container to prevent loss of liquid therefrom when the carrier is in its extended position. A related object is to provide spring means in engagement with the carrier and the container for biasing the carrier toward its extended position so as to maintain the opening in the container closed when the carrier is extended.

With the foregoing construction, the opening in the container is automatically closed against loss of liquid upon removal of the closure and subsequent movement of the carrier

to its extended position. Thus, even if the container is tipped or inverted, inadvertently or deliberately, after removal of the closure, loss of liquid from the container is automatically prevented, which is an important feature of the invention.

Another important object of the invention is to provide lens receptacles which completely contain lenses therein when in their retracted positions, and which are pivotable from their retracted positions to their extended positions, when the carrier is extended, to provide access to the interiors of the receptacles for insertion or removal of contact lenses.

With the foregoing construction, there is no possibility of loss of a lens upon removal of the closure and subsequent automatic extension of the carrier and sealing of the container, the interiors of the lens receptacles remaining inaccessible until the receptacles are deliberately pivoted into their extended positions, which is an important feature.

Another object of the invention is to provide a construction wherein the lens receptacles are pivotally mounted in the carrier in axial alignment with each other in their retracted positions, and are pivotable relative to the carrier about a common pivot axis spaced from and parallel to the central axis of the case. With this construction, the lens receptacles are merely swung outwardly into extended positions to provide access to the interiors thereof, the receptacles preferably being pivotable about their common pivot axis in either direction.

Another object is to provide the carrier with a raised indicium on its outer end diametrically opposite the pivot axis of the lens receptacles. This raised indicium provides the user with a tactile indication of the locations of the free ends of the lens receptacles to facilitate swinging them outwardly into their extended positions.

A further object of the invention is to provide interengageable means on the container and the carrier for preventing rotation of the carrier relative to the container in response to pivoting of the lens receptacles between their retracted and extended positions.

An additional object of the invention is to provide the carrier in its outer end with a central, longitudinally inwardly convergent filling aperture to receive a filler spout, or the like, on a container of moistening and/or cleansing liquid.

Yet another and important object of the invention is to provide sufficient clearance between the carrier and the interior of the container to permit free passage of the moistening and/or cleansing liquid between the bottom of the container and the lens receptacles when the carrier is in its retracted position. Another object in this connection is to provide a plungerlike carrier which can be reciprocated to force the liquid in the container back and forth for thorough cleaning of all internal parts of the case when it is desired to remove accumulations of salts and other foreign substances.

The foregoing objects, advantages, features and results of the present invention, together with various other objects, advantages, features and results thereof which will be evident to those skilled in art to which the invention relates in the light of this disclosure, may be achieved with the exemplary embodiment of the invention illustrated in the accompanying drawing and described in detail hereinafter.

DESCRIPTION OF DRAWING

FIG. 1 is a perspective view of a contact lens case, or the like, in its closed condition;

FIG. 2 is a perspective view showing the case of the invention with a closure thereof removed and with a receptacle carrier and a lens receptacle thereof in extended positions;

FIG. 3 is an enlarged, longitudinal sectional view taken as indicated by the arrowed line 3—3 of FIG. 1;

FIG. 4 is a view similar to FIG. 3, but showing a receptacle carrier of the contact lens case in its extended position;

FIG. 5 and 6 are fragmentary sectional views respectively taken as indicated by the arrowed lines 5—5 and 6—6 of FIG. 3;

FIG. 7 is an elevational view on a reduced scale showing the manner in which the case of the invention may be used to rise contact lenses carried thereby;

FIG. 8 is an enlarged, fragmentary longitudinal sectional view illustrating two parts of a container or housing of the case prior to assembly.

DESCRIPTION OF EXEMPLARY EMBODIMENT OF INVENTION

In the drawing, the contact lens case of the invention is designated generally by the numeral 10 and includes a container or housing 12 provided with an opening 14 therein. Preferably, the container 12 is a relatively short, cylindrical barrel having at one end an externally threaded neck 16 of reduced diameter which forms the opening 14. The container or barrel 12 is preferably made of a suitable plastic and the end thereof opposite the neck 16 is closed by a plastic disc 18 suitably secured in an annular recess 20. The disc 18 may be secured in the annular recess 20 in the container 12 by cementing if desired. However, if the container 12 and the disc 18 are made of a heat sealable plastic, the inner end of the annular recess 20 may originally be provided with an annular rib 22, FIG. 8, engageable by the disc 18. Subjecting the container 12 and the disc 18 to ultrasonic vibrations while pressing the disc against the rib 22 will result in heat sealing of the disc in the recess 20, the ultrasonic energy transforming the annular rib 22 and the annular portion of the disc 18 in contact therewith into a plastic condition permitting heat sealing, coupled with flattening of the annular rib sufficient to result in the structural condition shown in FIG. 3.

The open end of the container 12 is normally covered by a closure 26 shown as having the form of a cap threaded on the neck 16 and seated against an annular shoulder 28 at the junction of the neck with the body of the container 12. An O-ring 30 disposed in an annular groove 32 in the inner face of the end wall of the closure 26 is engageable with the outer end of the neck 16 to provide a seal. Preferably, the circumferential surfaces of the container 12 and the closure 26 are longitudinally ribbed or fluted to provide convenient gripping surfaces for the user's fingers in opening and closing the case 10.

Moveable longitudinally or axially of the container 12 is a foraminous lens receptacle carrier 36, sometimes referred to as a basket. The carrier 36 is movable relative to the container 12, upon removal of the closure 26, from a retracted position, FIG. 3, within the container to an extended position, FIG. 4, wherein it projects from the open end of the container. Movement of the carrier 36 relative to the container 12 between its retracted and extended positions is achieved by sliding engagement therebetween in various areas. More particularly, diametrically opposed areas 38 and 40 of the carrier 36 slidably engage the interior of the neck 16, as shown in FIGS. 3 and 4. Between the areas 38 and 40 are clearances between the carrier 36 and the interior of the neck 16 through which a lens moistening and/or cleansing liquid in the container 12 may flow in draining it from the container, as will be described hereinafter. Such clearances are visible in FIG. 6 and are designated by the numeral 42. Continuing to consider the manner in which the carrier 36 slides relative to the container 12, the carrier is provided at its inner end with an annular flange 44 slidably engaging circumferentially spaced, longitudinal ribs 46, FIGS. 3, 4 and 5, within the container 12. Liquid flow around the annular flange 44 may take place through the grooves between the ribs 46. The annular flange 44 carries lugs 48 which extend radially outwardly into certain of the grooves between the ribs 46, as best shown in FIG. 5, to key the carrier 36 against rotation relative to the container 12, for a reason which will become apparent.

The annular flange 44 on the inner end of the carrier 36 provides an external annular shoulder 52 which engages an internal annular shoulder 54 in the container 12 adjacent the neck 16, when the carrier is in its extended position. The plastic or plastics of which the container 12 and the carrier 36

are made have characteristics such that the annular shoulders 52 and 54 form a liquidtight seal when interengaged. The inner end of the carrier 36 is imperforate so that, when the annular shoulder 52 is seated against the annular shoulder 54, the moistening and/or cleansing liquid in the container 12 cannot escape, even though the case 10 is inadvertently or deliberately tipped, or even inverted, which is an important feature.

The carrier 36 is biased toward its extended position by a spring means comprising a coil spring 56 acting in compression between the inner end of the carrier and the disc 18 forming the bottom of the container 12. Central, aligned bosses 58 and 60 on the container 12 and the carrier 36, respectively, are inserted into the respective ends of the spring 56 to hold it in place.

Normally, the closure 26 holds the carrier 36 in its retracted position against the action of the spring 56. More particularly, the closure 26 is provided on its inner face with a central, conical projection 62 which is seated in a central, inwardly convergent recess 64 in the outer end of the carrier 36, when the closure is in place, to hold the carrier in its retracted position.

With the foregoing construction, removal of the closure 26 results in automatic outward displacement of the carrier 36 by the spring 56 into its extended position. Outward movement of the carrier 36 is limited by engagement of the annular shoulder 52 on the carrier with the annular shoulder 54 in the container. Further, as hereinbefore indicated, engagement of the annular shoulder 52 with the annular shoulder 54 also results in encapsulating the liquid in the container 12 so that it cannot escape through the opening 14 despite tipping or even inverting of the container. Thus, removal of the closure 26 results in automatic extension of the carrier 36 and closing of the opening 14 to prevent liquid loss, which is an important feature of the invention.

The inwardly convergent recess 64 in the outer end of the carrier 36 forms part of a central filling aperture 66 through which the moistening and/or cleansing liquid may be introduced into the container 12 by placing a spout, not shown, of a container of the liquid in the recess 64 with the container 12 upright. The liquid may be introduced from a plastic squeeze bottle, or the like, not shown.

Mounted in the carrier 36 are two axially or longitudinally spaced foraminous lens receptacles 72 and 74 each capable of receiving a contact lens therein. As shown in FIG. 7, the area 38 of the carrier 36 is provided thereon with the indicia "R" and "L" opposite the receptacles 72 and 74 to indicate that these receptacles are respectively intended to receive the contact lenses for the user's right and left eyes. Additionally, the receptacles 72 and 74 may be of different colors for easier identification of the locations of the right and left lenses.

As will be apparent from FIGS. 2 and 3 in particular, the interiors of the lens receptacles 72 and 74 are downwardly concave to accommodate the convex sides of the lenses to be placed therein. The receptacles 72 and 74 are rendered foraminous by providing them with a skeletal structure of radial ribs which are circumferentially spaced apart to admit the moistening and/or cleansing liquid freely. The ribbed, skeletal construction of the receptacles 72 and 74 will be clear from FIG. 2 in particular so that a more detailed description is not essential.

The receptacle 72 is disposed between the outer end of the carrier 36 and a partition 76 when it is in its retracted position, and the receptacle 74 is disposed between the partition 76 and the inner end of the carrier when it is in its retracted position. The inner end of the carrier 36, the partition 76 and the outer end of carrier are longitudinally spaced apart by portions of the carrier structure which provides the slidable surface 38 discussed previously. The receptacles 72 and 74 are pivotable between their retracted and extended positions about a common pivot axis laterally spaced from and parallel to the central axis of the container 12, and diametrically opposite the slidable surface 38. More particularly, a pivot pin 78 extends longitudinally

inally through the outer end of the carrier 36, a hinged portion 82 of the receptacle 72 the partition 76, a hinged portion 84 of the receptacle 74, and the inner end of the carrier. Preferably, the pivot pin, which may be of plastic also, is permanently pressed or cemented in place relative to the structure of the carrier 36, the hinged portions 82 and 84 or the receptacles 72 and 74 being swingable relative to the pivot pin.

Preferably, the receptacles 72 and 74 are swingable from their retracted positions into their extended positions in either direction. Each receptacle may be swung out of its retracted position readily by pushing laterally thereon in the desired direction with the tip of a finger or fingernail, or a thumb or thumbnail, whereupon such receptacle may be grasped between a thumb and forefinger to complete swinging movement thereof into a fully extended position, wherein the concave interior thereof is accessible for insertion or removal of a contact lens. As an alternative, either receptacle may be swung out of its retracted position by hooking one of the exposed ribs forming its skeletal structure with a fingernail. Obviously, the receptacles 72 and 74 may be returned to their retracted positions merely by pushing laterally thereon with a thumb or forefinger. Preferably, the outer end of the carrier 36 is provided thereon with a raised indicium 86 diametrically opposite the pivot pin 78 to facilitate locating the end of either receptacle 72 and 74 on which a push laterally in displacing such receptacle out of its retracted position.

It is thought that the operation of the contact lens case 10 will, for the most part, be clear from the drawing and the foregoing description. Consequently, its operation will be discussed only briefly hereinafter with emphasis on particularly significant aspects of the mode of operation.

It will be understood, of course, that a quantity of the desired moistening and/or cleansing liquid sufficient to submerge the contact lenses when the carrier 36 is retracted, is maintained in the container 12, being introduced through the filling aperture 66 as hereinbefore described.

Upon removal of the closure 26, the spring 56 automatically extends the carrier 36, and simultaneously produces liquid-tight engagement of the annular shoulder 52 on the carrier with the annular shoulder 54 in the container 12, thereby trapping the liquid in the container so that loss thereof is prevented even if the container is tipped or inverted.

The contact lenses may be placed in or removed from the receptacles 72 and 74 readily after swinging these receptacles into extended positions in the manner hereinbefore described. After the contact lenses have been placed in or removed from the receptacles 72 and 74, the latter are restored to their retracted positions, whereupon the carrier 36 may be returned to its retracted position by inserting the conical projection 62 on the closure 26 in the complementary recess 64 in the carrier 36, and displacing the carrier inwardly in opposition to the action of the spring 56. Thereupon, the closure 26 may be rotated to connect it to the container 12 as shown in FIGS. 1 and 3.

If it is desired to rinse the contact lenses in the receptacles 72 and 74 in water, such as water running from a tap, this may be carried out readily merely by placing the extended carrier 36 under the tap in a generally horizontal position, as suggested in FIG. 7. Under such conditions, the running water flows through the various openings in the skeletal structures of the carrier 36 and the receptacles 72 and 74 to rinse the contact lenses. It will be understood, of course, that the interengaged annular shoulders 52 and 54 prevent loss of any of the liquid from the container 12, or the entry of any water thereinto, as this is done, which is an important feature.

If the liquid in the container 12 becomes excessively con-

taminated with salts, or other undesirable substances, the liquid may be removed by inverting the container 12, with the closure 26 removed and the carrier 36 extended, while simultaneously reciprocating the carrier relative to the container by alternately pressing longitudinally inwardly on and releasing the outer end of the carrier. Such reciprocatory motion of the carrier 36 results in considerable agitation of the liquid due to the pistonlike or plungerlike action of the inner end of the carrier, with the result that the internal parts are all thoroughly cleansed and with the ultimate result that substantially all of the liquid is drained from the container. The container 12 may then be righted and refilled. If desired, the entire interior of the case end may be rinsed with water and emptied, in substantially the same manner, before refilling.

Although an exemplary embodiment of the invention has been disclosed herein for purposes of illustration, it will be understood that various changes, modifications and substitutions may be incorporated in such embodiment without departing from the spirit of the invention as defined by the claims which follow.

I claim:

1. In a contact lens case, or the like, the combination of:

a. a container having an opening therein;

b. a closure for said opening connectable to said container;

c. a foraminous receptacle carrier movable relative to said container, upon removal of said closure, from a retracted position within said container to an extended position wherein it projects from said container through said opening;

d. foraminous lens receptacles pivotally mounted on said carrier and pivotable relative thereto, when said carrier is in its extended position, from retracted positions to extended positions wherein the interiors of said receptacles are accessible; and

e. interengageable means on said container and said carrier for limiting outward movement of said carrier and for closing said opening to prevent loss of liquid from said container when said carrier is in its extended position.

2. A contact lens case, or the like, according to claim 1 including spring means engaging said container and said carrier for biasing said carrier toward its extended position.

3. A contact lens case, or the like, as defined in claim 1 wherein said interengageable means comprise an internal annular shoulder on said container and an external annular shoulder on said carrier.

4. A contact lens case, or the like, as defined in claim 1 wherein said container and said carrier provide a central axis along which said carrier is movable relative to said container, said receptacles being pivotable relative to said carrier about a common pivot axis spaced from and parallel to said central axis.

5. A contact lens case, or the like, as set forth in claim 4 including interengageable means on said container and said carrier for preventing rotation of said carrier relative to said container in response to pivoting of said receptacles between their retracted and extended positions.

6. A contact lens case, or the like, according to claim 5 wherein said receptacles are axially aligned in their retracted positions.

7. A contact lens case, or the like, as set forth in claim 6 wherein said carrier is provided with a raised indicium on its outer end diametrically opposite said pivot axis.

8. A contact lens case, or the like, as defined in claim 1 wherein said carrier is provided in its outer end with a central filling aperture.

9. A contact lens case, or the like, according to claim 8 wherein said filling aperture diverges outwardly.

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