A contact case is provided with a lid that allows for easy gripping and opening of a contact lens case. The lid includes two surfaces, a soft gripping outer surface and an inner surface. The soft gripping outer surface provides friction between the user's fingers and the lid, thus allowing a contact lens case to be easily grasped and opened. Preferably, the inner surface is a hard polypropylene and the soft gripping outer surface is a thermoplastic elastomer that covers the entire inner surface. The invention also provides a method of making the above described lid.
CONTACT LENS CASE HAVING A LID WITH SOFT GRIPPING SURFACE

BACKGROUND

[0001] The present invention relates to the field of contact lens cases, specifically, contact lens storage cases.

[0002] Contact lens cases are available in a variety of shapes, sizes and colors. Typically, contact lens cases consist of a hard, molded plastic base and an accompanying lid, made of a similar material, that is either threaded or press-fit onto the base. Further, a contact lens case has two compartments with two lids to accommodate and enclose two contact lenses.

[0003] Inherent in the process of inserting or storing contact lenses is the need for solutions that clean or hydrate the contact lenses. These solutions frequently get onto the contact lens case and lid as well as the hands of the contact lens wearer. As the typical contact lens case lid is made of a hard plastic, it is slippery when it is wet, which can make it difficult to open and close the contact lens case. The slipperiness of the case also increases the likelihood of dropping the case and potentially displacing the contact lens therein. While others have made improvements to contact lens case lids to make them less slippery or easier to grip, by adding grooves or indentations on the sides of the lid, these efforts have not solved the problem.

[0004] Even when the contact lens case is dry, it can be difficult to open, particularly for children and elderly users.

[0005] Therefore, there is needed in the art for a contact lens case that is easy to handle and open, particularly when the contact lens case is wet.

BRIEF SUMMARY

[0006] An advantage provided by the contact lens case of the present invention is a lid that is easy to grip. This easy to grip lid provides the advantage of making the contact lens case easier to open and close, as the surface of the lid provides friction between the lid and the fingers of the user. Further, as the lid is easy to grip, it is less likely that it will be dropped or slip from the fingers of the user, particularly when the user’s fingers are wet.

[0007] In one embodiment, the present invention provides a contact lens case including a base and a lid with a soft gripping surface.

[0008] In another embodiment, the present invention provides a contact lens case including a base and at least one lid. The lid includes an inner surface and a soft gripping outer surface, and the inner surface is composed of a first material and the soft gripping outer surface is composed of a second material. The first material is different from the second material.

[0009] In another embodiment, the present invention provides a contact lens case including two lids and a base. The base has two wells and a bridge connecting the wells. The lid has an inner surface and a soft gripping outer surface. The inner surface is composed of a first material and the soft gripping outer surface is composed of a second material, and the first material is different from the second material. Further the soft gripping outer surface completely covers the inner surface.

[0010] In another embodiment, the present invention is a method of making a contact lens case. The method includes injecting a first material into a mold to make a pre-lid; removing the pre-lid from the first mold; placing the pre-lid into a second mold; and injecting a second material over the pre-lid to form a lid and providing a base. The second material completely covers the pre-lid and the lid sealingly engages the base.

[0011] In another embodiment, the method of making a contact lens storage and shipping case with lids having a soft gripping outer surface is provided. The method includes injecting a first material into a first mold to make a pre-lid; removing the pre-lid from the first mold; placing the pre-lid into a second mold; and injecting a second material over the pre-lid to form a lid, providing a contact lens shipping and storage case base with at least one well; inserting a contact lens hydration medium into a well; and closing the well by placing the lid on the base.

[0012] In another embodiment, the invention provides a contact lens case having two lids and a base, where the base has two wells connected by a bridge and the two wells are cylindrically shaped with top threaded regions and then taper to a bottom. The lids of the contact lens case are hard and threaded on an inner wall surface. The invention provides the improvement of a lid with a soft gripping outer surface and an inner surface, preferably where the inner surface is made of polypropylene and the soft gripping outer surface is a thermoplastic elastomer and where the inner surface is completely covered by the soft gripping outer surface.

[0013] A further advantage of the preferred contact lens case of the present invention is that the lid has not only a soft gripping surface, but also a hard under surface that sealingly engages the wells of the base. This arrangement provides a good connection between the lid and the base and therefore the lens therein is held in a secure, fluid-tight compartment. Therefore, the addition of the soft gripping surface adds the advantages described above, without compromise to the structural integrity and usefulness of the contact lens case.

BRIEF DESCRIPTION OF THE DRAWINGS

[0014] FIG. 1 is a perspective view of an embodiment of a contact lens case having a base with two wells for contact lenses and two lids in accordance with the present invention;

[0015] FIG. 2 is a side elevation view, partially in cross-section, of the contact lens case of FIG. 1;

[0016] FIG. 3 is a cross-sectional view of an embodiment of a pre-lid in accordance with the present invention;

[0017] FIG. 4 is a cross-sectional view of an embodiment of the lid used in the contact lens case of FIG. 1 showing both the pre-lid and the soft gripping surface;

[0018] FIG. 5 is a side elevation view of an embodiment of the pre-lid of FIG. 3;

[0019] FIG. 6 is a side elevation view of the lid FIG. 4;

[0020] FIG. 7 is a perspective view of an embodiment of a contact lens storage and shipping case with lids having a gripping surface in accordance with the present invention; and
FIG. 8 is a perspective view of a second embodiment of a contact lens storage and shipping case with lids having a gripping surface in accordance with the present invention.

DETAILED DESCRIPTION OF THE DRAWINGS AND PREFERRED EMBODIMENTS

In a preferred embodiment, shown in FIGS. 1 and 2, a contact lens case 2 is provided with two wells 7, each designed for housing one contact lens, and two lids 4. The two wells 7 are independent of one another and are cylindrically shaped. The interior of the wells provides a cavity for housing a contact lens. The exterior of the wells are cylindrical and threaded at the top region in order to accept a screw-type lid 4 that also has a threaded region 12 (best seen in FIGS. 3 and 4). Each lid 4 with a threaded region 12 may turn on the threaded region of the well 7 approximately 2-4 times in order to secure lid 4 on the well 7. The wells 7 taper, from the top region, down to a curved or flat bottom 9. The wells 7 are connected by a bridge 20 at the exterior convergence of the upper cylindrical portion and the bottom 9 portions of the wells 7. The width and length of the bridge 20 may vary. Together, the two wells 7 and the bridge 20 form the base 6 of contact lens case 2.

In an alternative embodiment, the top region of the wells 7 may be non-threaded or smooth and engage a smooth lid 4. In this embodiment, the lid 4 engages the well 7 in a press-fit manner to securely close the cavity.

The lid 4 with a soft gripping outer surface layer 10, described below, may be used with the contact lens case 2 described above, or with any conventional contact lens case. For instance, an exemplary contact lens case is described in U.S. Pat. No. 6,679,373, incorporated herein by reference.

In a preferred embodiment, each lid 4 of the contact lens case 2 has a soft gripping outer surface 10 and an inner surface (or pre-lid) 8 that is hard and engages the wells 7 of the base 6. The pre-lid 8 is made of a hard, conventional thermoplastic-type material. As shown in FIGS. 2-3, the pre-lid 8 has a top 26 and a wall 28 that extends down therefrom. The inside of the wall 30 of the pre-lid 8 is threaded 12 and engages the threaded surface of the well 7. The top 26 of the pre-lid 8 has an upper surface and an upper surface 19. The under surface 19 faces the cavity of the well 7 of the base 6. The upper surface of the top 26 of the pre-lid 8 engages the under surface of the soft gripping outer layer 10 of the lid 4. In a preferred embodiment, the pre-lid 8 has a flange 24 at the bottom of the pre-lid 8 that provides a place upon which the bottom of the soft gripping outer layer 10 may rest. This creates a lid 4 with a smooth, flush meeting of the pre-lid 8 and soft gripping outer layer 10. The soft gripping outer layer 10 of the lid 4 are irreversibly joined to the pre-lid 8 (FIGS. 2 and 4). The soft gripping outer layer 10 covers the entire top 26 and wall 28 of the pre-lid 8 around the entire circumference of the pre-lid 8, as shown in FIG. 4. The soft gripping outer layer 10 is not as hard as the pre-lid 8, which thus makes it easier to grasp and maintain a grip on the lid 4. The soft gripping outer layer 10 is compressible and somewhat resilient, particularly when compared to the hard pre-lid 8. This gives the soft gripping outer surface of layer 10 a different tactile sensation than the hard inner surface or pre-lid 8. The soft gripping outer layer 10 is gripped by the contact lens wearer and provides a surface that is easy to grasp and hold. The soft gripping outer layer 10 makes it less likely that, when wet or dry, the lid 4 (and contact lens case 2, if attached) will slip out of the hands of the user. The soft gripping outer layer 10 further provides friction between the fingers of the user and the lid 4 which makes it easy to open and close the contact lens case 2.

In addition, the soft gripping outer layer 10 may include additional elements to facilitate gripping, opening and closing of the contact lens case. Examples of these additional elements include: grooves 22 (as shown in FIGS. 1, 2, 5-6), and raised features such as bumps, lines or logos.

In a preferred embodiment, referring to FIG. 5, the pre-lid 8 of the contact lens case 2 has a height (H2) of approximately 9 to 13 mm, and a diameter (D1) of approximately 32 to 36 mm. The total lid 4 (including the pre-lid 8 and soft gripping outer surface layer 10) has a height (H2) of 0.75 to 1.75 mm, and a diameter (D2) of from about 32 to 36 mm. Preferably, the height of the pre-lid 8 is approximately 11.5 mm (see FIG. 5) and the diameter is approximately 34.5 mm. The preferred soft gripping outer surface layer 10 is approximately 1.0 mm thick, giving the preferred lid 4 a total height of approximately 12.5 mm and a diameter of 34.5 mm, as shown in FIG. 6.

The pre-lid 8 and soft gripping outer surface layer 10 of the lid 4 are made of different materials. The pre-lid 8 may be made of any suitable conventionally used material currently known in the art, such as polypropylene.

In a preferred embodiment, the soft gripping outer surface layer 10 of the lid 4 is made of any suitable thermoplastic elastomer, such as styrenic thermoplastic elastomers and styrene-butylene-ethylene-styrene (SEBS) derived thermoplastic elastomers, such as a thermoplastic rubber made from a styrene-butadiene copolymer and combinations thereof. Other non-limiting examples include: Aaroprene® (Aaron Industries, Leominster, Mass.), Centron® (Centerplast s.r.l., Via Granarolo, Italy), Chemitron® (Franplast s.r.l., Provario (L’Isa, Italy)), Dryflex® (VTC Elastoteknik AB, Sweden), Dynaflex® (GLS Corp, McHenry, Ill.), Ektar FB® (Eastman, Kingsport, Tenn.), Ellexa® (Teknor Apex, Pawtucket, R.I.), Epofriend® (Daicel Chemical Industries, Tokyo, Japan), Evoprene® (Alpha Gary, Leominster, Mass.), Herflex® (Radici Plastics, Blacksburg, S.C.), J-Flex® (J-Von, Leominster, Mass.), Kraton® (Kraton Polymers, Houston, Tex.), Lachloc® (Silac, Champlite, France), Laprene® (DTR s.r.l., Arese, Italy), Monprene® (Teknor Apex, Pawtucket, R.I.), Nexflex® (Solvay Engineered Polymers, Mansfield, Tex.), PonoFlex® (Pongs & Zahn, Frankfurt, Germany), Sevrene® (Vi-Chem Corporation, Grand Rapids, Mich.), Tefabloc® (Tissendorla Group, Belgium), Tekbond® (Teknor Apex, Pawtucket, R.I.), and other thermoplastic rubbers as well as any other suitable materials so long as the materials chosen produce a soft gripping outer surface layer 10 that is able to be permanently adhered to a hard material from which the pre-lid 8 is made.

Methods of making the lid 4 include any injection molding process including: dual injection molding, co-injection molding, two-shot molding, multi-injection molding, as well as any other conventional means. The soft gripping outer surface layer 10 and pre-lid 8 of the lid 4 may
be formed independently and subsequently irreversibly joined after each is fully formed. Alternatively, the soft gripping outer surface layer 10 and pre-lid 8 may be formed during the same molding process and joined as each material is added to a mold. A preferred method of producing a lid 4 is dual injection molding. In a preferred embodiment, a dual injection molding technique is employed where a first mold is injected with a first material, preferably polypropylene, to create the pre-lid 8. While the pre-lid 8 is still hot, it is removed by pushing it out of the first mold and then it is subsequently placed in a second mold. In the second mold, a second material, preferably thermoplastic rubber material, is injected around the pre-lid 8 such that the entire top 26 and outer wall 28 are completely covered with the thermoplastic elastomer material. Thus, the two parts, the soft gripping outer surface layer 10 and the pre-lid 8, are adhered to one another within the second mold. Other dual injection molding methods are also possible, such as those where only one mold is used, however this method is more expensive than the presently preferred dual injection method utilizing two molds. These techniques are well known in the art and may be chosen and adapted to best suit the needs of the user.

[0031] In one embodiment, the lid 4, made by the above described methods, is placed on a base 6 to provide a contact lens storage case 2. In another embodiment (FIG. 7), a contact lens shipping and storage case 30 having a lid 34 with a soft gripping outer surface layer 40 is provided. The case 30 includes a base 36 that can snap together with a similar case to form a complete contact lens storage case for both left and right contact lenses. In this embodiment, a contact lens and hydration medium are placed in the cavity of the well at the time of manufacture, and the lid 34 with a soft gripping outer surface layer 40 is subsequently placed onto the well to enclose the contact lens and hydration medium therein.

[0032] FIG. 8 shows another embodiment of a combined contact lens storage and shipping case 50 having a lid 54 with a soft gripping outer surface 60. In this embodiment, two cases 50 snap into a base 56 to form a complete contact lens case. Examples of contact lens shipping and storage cases 30 and 50 are shown in WO 2004/024573, which is incorporated by reference herein.

[0033] The soft gripping outer surface 10 may be a variety of colors and textures. As a contact lens case 2 typically has wells 7 for two contact lenses, the soft gripping outer surfaces 10 of the two lids 4 may be the same or different. That is, the colors and textures of the two lids 4 of a contact lens case 2 may be different colors or the same color. They may both be textured or only one may be textured. Further, when both are textured, the texturing may be the same or different for each contact lens case 2 lid 4. It is also contemplated that the soft gripping outer surface 10 may be the same or a different color as the pre-lid.

[0034] It is therefore intended that the foregoing detailed description be regarded as illustrative rather than limiting, and that it be understood that it is the following claims, including all equivalents, that are intended to define the spirit and scope of this invention.

1. A contact lens case comprising a base and a lid, wherein said lid comprises a soft gripping surface.

2. The case of claim 1 wherein said lid further comprises an inner surface and an outer surface and wherein said outer surface provides said soft gripping surface.

3. The case of claim 2 wherein said soft gripping surface completely covers said inner surface.

4. The case of claim 3 wherein said soft gripping outer surface and said inner surface are comprised of different materials.

5. The case of claim 4 wherein said inner surface comprises polypropylene.

6. The case of claim 4 wherein said soft gripping outer surface comprises a material selected from the group consisting of styrene thermoplastic elastomers and styrene-butylene-ethylene-styrene derived thermoplastic elastomers and styrene-butadiene copolymers.

7. A contact lens case comprising a base and at least one lid wherein said lid comprises an inner surface and a soft gripping outer surface, wherein said inner surface is composed of a first material and said soft gripping outer surface is composed of a second material, and wherein said first material is different from said second material.

8. The case of claim 7 wherein said outer soft gripping surface completely covers said inner surface.

9. The case of claim 8 wherein said soft gripping outer surface is a different color from said inner surface.

10. The case of claim 7 wherein said soft gripping outer surface comprises a material selected from the group consisting of styrene thermoplastic elastomers and styrene-butylene-ethylene-styrene derived thermoplastic elastomers and styrene-butadiene copolymers.

11. The case of claim 7 further comprising two wells and two of said lids and wherein lids sealingly engage said wells.

12. A contact lens case comprising two lids and a base, wherein said base comprises two wells and a bridge connecting said wells and wherein each of said lids comprises a soft gripping outer surface and an inner surface, wherein said soft gripping outer surface is composed of a first material and said inner surface is composed of a second material, and wherein said first material is different from said second material, and wherein said soft gripping outer surface completely covers said inner surface.

13. A method of making a contact lens case comprising:
   a) injecting a first material into a first mold to form a pre-lid;
   b) removing said pre-lid from said first mold;
   c) placing said pre-lid into a second mold;
   d) injecting a second material over said pre-lid to form a lid, and
   e) providing a base;

   wherein said second material completely covers said pre-lid and wherein said lid sealingly engages said base.

14. The method of claim 13 wherein said first material is polypropylene.

15. The method of claim 14 wherein said second material is a thermoplastic elastomer.

16. The method of claim 15 wherein said second material is selected from the group consisting of styrene thermoplastic elastomers and styrene-butylene-ethylene-styrene derived thermoplastic elastomers and styrene-butadiene copolymers.
17. A method of making a contact lens shipping and storage case comprising:
   a) injecting a first material into a first mold to make a pre-lid;
   b) removing said pre-lid from said first mold;
   c) placing said pre-lid into a second mold;
   d) injecting a second material over said pre-lid to form a lid;
   e) providing a contact lens shipping and storage case base with at least one well;
   f) inserting a contact lens and a hydration medium into said well; and
   g) closing said well by placing said lid on said base.
18. The method of claim 17 wherein said first material is selected from the group consisting of polypropylene.
19. The method of claim 17 wherein said second material is selected from the group consisting of styrene-butylene-ethylene-styrene derived thermoplastic elastomers and styrene-butadiene copolymers.
20. An improved contact lens case having two lids and a base, said base having two wells connected by a bridge, said two wells being cylindrically shaped with top regions that are threaded and which taper down to a bottom, said lids of said contact lens case being threaded on an inner wall surface to engage the threads on the cylindrical wells, wherein the improvement comprises:
   the lids each having a soft gripping outer surface.
21. The improved contact lens case of claim 20 wherein said inner surface of the lids comprise polypropylene and said soft gripping outer surface comprises a thermoplastic elastomer.
22. The improved contact lens case of claim 20 wherein said inner surface of the lid is completely covered by said soft gripping outer surface.