Title of the Invention: Contact Lens Package and Assembly

Background of the Invention

The present invention relates to packaging and more particularly relates to a novel package and package assembly for contact lenses.

Soft contact lenses have been increasing in popularity ever since they were first introduced in the 1970's. Improved manufacturing methods have led to reduced manufacturing costs to the point where disposable contact lenses are an economically viable and attractive alternative for the consumer. This, coupled with very strong competition in the contact lens market, creates the need for innovative, inexpensive, and easy to use disposable packages in which soft contact lenses may be individually packaged, safely shipped and stored until ready to use by the consumer, at which time the contact lens is removed from the package which is then discarded.

Contact lenses are very small, delicate articles which must be handled with great care from the time they are manufactured to the time they are used and ultimately discarded. Once manufactured, they are inspected and packaged for shipping to the consumer, usually in the hydrated state. A popular contact lens package which is especially designed for packaging single contact lenses is the so-called "blister pack" which generally comprises a molded, rigid, plastic container having a planar top surface with a concave-shaped well formed therein and wherein a single contact lens is placed with a quantity of storage fluid. A flexible cover is sealed about the perimeter of the top surface of the container whereupon the blister packs are boxed and shipped to the consumer who peels back the flexible cover to retrieve the lens. An example of a

disposable contact lens blister package may be seen in commonly owned U.S. Pat. No. 5,722,536 .

Contact lenses which are frequently replaced by the consumer (e.g., daily, weekly) have become very popular since they do not need to be cleaned and sterilized as often as contact lenses used in a traditional wearing regime. Consumers of frequent replacement lenses of course need to maintain a larger supply of lenses on hand than do consumers of contact lenses using a traditional wearing regime. It is thus desirable to maintain as small a package as possible while making it easy for the consumer to open the package and retrieve the lens, while also having a package wherein a plurality of such packages may be easily and unobtrusively carried by the consumer (e.g., in a pocket, purse or suitcase). Efficient shipping and subsequent handling of a plurality of disposable contact lens packages by the consumer are thus very important packaging design criteria, especially for frequent replacement lenses.

Summary of the Invention

A disposable package and package assembly are disclosed for contact lenses. A single package comprises a flange with a well formed therein for holding a contact lens in solution. A flexible cover sheet extends over the flange and is sealed about the perimeter of the well to seal the lens and solution in the well. The cover sheet may be easily peeled from the flange by a user to access the lens held therein. First and second support structures are formed opposite each other and extend generally perpendicularly from the flange. The support structures are configured to stably support the package on a flat surface such as a table.

Each support structure includes a major wall and a minor wall lying in generally spaced, parallel planes to each other although the major and minor walls may interconnect or touch along one or more points thereof. In a preferred embodiment, the minor wall is located inwardly of a respective major wall.

A package assembly is also disclosed including a second package configured substantially the same as a first package wherein the first and second packages may be releasably attached to each other with the first and second support structures of each in meshing engagement with each other.

Brief Description of the Drawing

Figure 1A is a perspective view of a package according to a preferred embodiment of the invention;

Figure 1B is the view of Fig. 1A showing the cover sheet attached thereto;

Figure 1C is the view of Fig. 1B showing the cover sheet partially lifted from the package;

Figure 1D is a fragmented, cross-sectional view of the package well and raised surface surrounding the well;

Figure 2 is a front elevational view of Fig. 1A;

Figure 3 is a rear elevational view thereof;

Figure 4 is a side elevational view of Fig. 1B;

Figure 5 is a side elevational view opposite Figure 4;

Figure 6 is a top plan view of Fig. 1A;

Figure 7 is a bottom plan view thereof;

Figure 8 is a perspective view showing a package assembly comprising first and second packages removably attached together;

Figure 9 is a front elevational view thereof;

Figure 10 is a rear elevational view thereof;

Figure 11 is a side elevational view thereof;

Figure 12 is a side elevational view thereof opposite the view of Figure 11;

Figure 13 is a top plan view thereof;

Figure 14 is a bottom plan view thereof; and

Figure 15 is a side elevational, cross-sectional view taken generally along the line 15-15 in Fig. 14.

Detailed Description

Referring to the drawing, there is seen in Figures 1-7 a first contact lens package designated generally by the reference numeral 10. Package 10 includes a base member 12 preferably formed of a plastic material such as polypropylene, for example, although other materials may be used as desired. Base member 12 is preferably formed by an injection molding process as a unitary piece. For the purpose of providing points of reference herein, the reference letter "F" denotes what is considered the front of the package 10, "R" denotes what is considered the rear of the package, and S_1 and S_2 denote what is considered the opposite sides of the package (Fig. 1). Base member 12 includes a flange 13 having a top surface 14a and opposite bottom surface 14b (Fig. 7). Flange 13 extends from the perimeter 16a of a well 16, the well being appropriately shaped and sized to hold a contact lens 20 and a quantity of solution 22 therein in sealed containment

by a cover sheet 18 (Figs. 1B, 1C, 4 and 5) until ready for use. A raised surface 16b is formed about well perimeter 16a against which cover sheet 18 is sealed (usually with the application of pressure and/or heat) with the remaining cover sheet portions remaining unsealed. As seen best in Figs. 1A and 1D, a ledge 16c is formed between raised surface 16 and well perimeter 16a. Should raised surface 16b compress during the sealing operation, it may spread as indicated at 16b'. By providing ledge 16c, lens 20 may be slid out of well 16 without encountering spread portion 16b' and potential damage to the lens is thereby averted.

In the preferred embodiment shown and described herein, flange 13 has an outer perimeter 13' preferably having substantially straight, parallel, opposite sides S_1 and S_2, and curved front and rear portions F and R having opposite ends F' and R' defined along the maximum length L_{MAX} of base member 12 (Figs. 3 and 6). When placed on a flat surface such as surface 40 (Figs. 4 and 5), it is preferred that front end F' contacts the flat surface 40 while rear end R' is raised relative thereto (see Fig. 3).

In one aspect of the invention, well 16 is dimensioned to substantially center lens 20 therein while at the same time provide a configuration which intuitively informs a user how to slide the lens 20 from well 16. More particularly, well 16 is substantially symmetrical about the x and y axes and the radius of curvature R_1 along the x axis is larger than the radius of curvature R_2 of the y axis. Well 16 including well perimeter 16a tapers inwardly about axis x from the center of the well 16 (where x and y intersect) toward front portion F to create a narrowing slope. A user seeing this narrowing slope will intuitively slide lens 20 along the slope and out of the well 16.

In a preferred aspect of the invention, well 16 is dimensioned to substantially center lens 20 therein while at the same time provide a configuration which intuitively informs a user how to slide the lens 20 from well 16. More particularly, well 16 is substantially symmetrical about the x axis and the perimeter 16a tapers inwardly about axis x from the center of the well 16 (where x and y intersect) towards front portion F to create a narrowing slope and an overall egg-shaped appearance to well 16. A user seeing this narrowing slope will intuitively slide lens 20 along the slope and out of the well 16. The egg-shaped bottom of the well is slightly flattened and the radius of curvature of the sidewall is substantially the same completely around the perimeter.

In another aspect of the invention, base member 12 includes first and second support structures 24, 26 extending from the flange 13 and located opposite each other (Fig. 2). Each support structure 24, 26 includes a major wall 28a,b and a minor wall 30a,b, respectively. Major wall 28a,b lies in a generally spaced, parallel plane to a respective minor wall 30a,b, although they may overlap, touch or interconnect at one or more points such as at 32a, b thereof (see Fig. 7). In a preferred embodiment, each minor wall 30a, b tapers inwardly and terminates at a rounded point 30a', b'. In a further preferred embodiment, each major wall 28a, b includes in a linear edge 28a', b' which supports base member 12 when placed on a flat surface 40 such as a table (see Figs. 4 and 5). In yet a further preferred embodiment, major wall 28a, b includes a sloped side edge 28c, d, respectively, which forms an angle "a" with the adjacent side edge 30c, 30d of minor wall 30a, b, respectively, when viewed from the side. In a further embodiment, linear edge 28a', b' blends into a curved wall portion 28e, f, respectively, the bottom edge of which extends upward toward flange 13 and terminates at rear end R'.

Referring to Fig. 7, one or more ribs 35a-d may be formed on the inwardly facing surface of major walls 28a and 28b to increase the rigidity and strength thereof.

In a further preferred embodiment, flange 13 curves slightly downwardly at the front portion F of the package 10 to form a "tongue" portion 13a. It is preferred that well 16 has a length L_1 that is about the same as the length L_2 of tongue portion 13a as viewed from above (Fig. 6), although this may vary as desired. The curvature of tongue portion 13a allows a user to grasp it between an index finger and thumb, the index finger pressing against the underside of tongue portion 13a and the thumb resting on the top surface of the tongue portion 13a. The tongue portion 13a curves gently about the roundness of the finger and the finger may further abut up against the minor wall portions 30a, 30b to provide a secure yet comfortable hold on the package using either the right or left hand. Cover sheet 18 extends in covering relation over substantially the entirety of flange 13, including tongue portion 13a (Figs. 1B, 4 and 5). To remove lens 20 from well 16, a user first lifts cover 18 at front portion F (Fig. 1C) and then peels cover sheet 18 from raised surface 16b. This may be easily accomplished by using one hand to grasp and pull cover sheet 18 while simultaneously stabilizing base member 12 with the other hand as described above.

In another aspect of the invention, tongue portion 13a may include a through hole 13b wherein the unsealed portions of cover sheet 18 extending thereover may be pressed to form a recessed dimple 18a within through hole 13b (see Figs. 4 and 5). This creates an interference fit between the unsealed portions of cover sheet 18 and flange tongue 13a which helps maintain the unsealed portions of cover sheet 18 in place over tongue portion 13a during storage of lens 20 in well 16. When a user wishes to open package 10, the user

presses a finger from beneath and up against recessed dimple 18a to disengage dimple 18a from through hole 13b. Cover sheet 18 may then be easily lifted away from flange 13 and peeled off raised surface 16b to expose well 16 and lens 20 contained therein.

The package 10 has been designed to create a center of gravity closer to rear portion R than to front portion F. This is particularly useful during manufacturing operations where temporary vertical stacking of packages 10 is required (all in the same orientation). When stacked in this manner (not shown), the support structures of the upper package rests on the flange 13 of the lower package yet the tongue portions remain spaced from each other. If the center of gravity were closer to front portion F, the upper package may tip and create an unstable stack of packages. By making the center of gravity closer to the rear portion R, the front of the packages do not tip and the stack is stable.

In yet another aspect of the invention, a package assembly 50 is disclosed comprising first and second packages 10, 100 which may be releasably attached to one another in nesting relationship (see Figs. 8-15). Parts of package 100 which correspond to parts on first package 10 have been increase by a factor of 100. Since second package 100 is essentially identical to first package 10, detailed description of the parts of second package 100 is not deemed necessary.

To releasably attach first and second packages 10, 100 together, the bottom surfaces thereof 14b, 114b are placed in facing relation with the wells 16, 116 of each placed in side-by-side relation. In this orientation, first package 10 is rotated 180° relative to second package 110. The support structures 24, 26 and 124, 126 of each package are placed in meshing engagement with the angled edge 28c, 28d of each major wall 28a,

28b of the first package 10 lying in abutting relation to the angled edges 128c, 128d of each major wall 128a, 128b of the second package 110, respectively. The minor walls 30a, 30b of first package 10 are in coplanar, yet spaced relation and located inwardly of major walls 28a, 28b, 128a, 128b, respectively (i.e., toward a respective well 16, 116). The minor walls 28a, 28b and 128a, 128b are hidden from view when the packages 10, 100 are attached together (see Figs. 8, 11 and 12). The frictional contact between the meshing support structures of packages 10, 110 are such that the packages may be handled as a single unit, yet are easily separated at time of use.

In the preferred embodiment, when in this nested configuration of packages 10 and 110, the perimeter (as defined by the major walls, major wall curved portions and front and rear ends of each attached package) of the package assembly 50 is completely closed as seen best in Figs. 8-12. To form a completely closed perimeter, the lower-most edges of the entire perimeter of first package 10 are configured so that they align in closely abutting relation with the lower-most edges of the entire perimeter of second package 110. This is accomplished by making the curvature of the front F of a package the reverse profile of the curvature of the rear R of the same package. As such, by rotating one package 180° with respect a second, inverted package, the front F of one package 10 matches the profile of the rear R of the attached package 100 and vice-versa. The combined packages form a package assembly 50 which is easy to handle and attractive, and easy to use.

What Is Claimed Is:

1. A package for a contact lens comprising:

a) a base having a flange;

b) a well formed in said base, said flange extending from the perimeter of said well, said well configured for holding a contact lens and quantity of solution therein;

c) first and second support structures extending substantially opposite each other from said flange, said first and second support structures each including a major wall and a minor wall, said major and minor walls lying in spaced, parallel planes.

2. The package of claim 1 wherein said minor wall is located inwardly of a respective major wall.

3. The package of claim 2 wherein said package is a first package and further comprising a second package in substantially the same configuration as said first package whereby said second package may be releasably attached to said first package with said first and second support structures of said first package in meshing engagement with said first and second support structures of said second package, respectively.

4. The package of claim 3 wherein when said first and second packages are in meshing engagement, said major walls of each package lie in coplanar, abutting relation.

5. The package of claim 2 and further comprising a cover sheet sealed about the perimeter of said well and lying in contacting, covering relation to said flange.

6. The package of claim 1 wherein said flange includes a curved tongue portion extending in a direction away from said well.

7. The package of claim 6 wherein said tongue portion includes a through hole.

8. The package of claim 7 and further comprising a cover sheet sealed about the perimeter of said well, said cover sheet extending over said flange including said tongue portion and said hole.

9. The package of claim 8 wherein said cover sheet extends at least partially within said hole.

10. The package of claim 1 wherein said minor wall and a respective major wall at least partially overlap.

11. The package of claim 10 wherein said minor wall is substantially triangularly shaped.

12. A package for a contact lens comprising:

a) a base;

b) a curved well having a perimeter formed in said base, said well being symmetrical about perpendicular x and y axes, the radius of curvature along the x axis being larger than the radius of curvature along the y axis, said well perimeter tapering inwardly about said x axis from a point where the x and y axes intersect to provide a narrowing slope along which a user may slide and retrieve the lens from the well.

13. A package for a contact lens comprising:

a) a base;

b) a curved well having a perimeter formed in said base, said well being symmetrical about one axis, the well perimeter tapering inwardly about said axis to form an egg-shaped perimeter to provide a narrowing slope along which a user may slide and retrieve the lens from the well, the well having a bottom and a sidewall extending from

the bottom to the perimeter which has substantially the same radius of curvature completely around the perimeter.

14. The package of claim 12 or Claim 13, and further comprising a flange extending outwardly from said well and first and second support structures extending substantially opposite each other from said flange, said first and second support structures each including a major wall and a minor wall, said major and minor walls lying in spaced, parallel planes.

15. The package of claim 14 wherein said minor wall is located inwardly of a respective major wall.

16. The package of claim 14 wherein said package is a first package and further comprising a second package in substantially the same configuration as said first package whereby said second package may be releasably attached to said first package with said first and second support structures of said first package in meshing engagement with said first and second support structures of said second package, respectively.

17. The package of claim 16 wherein when said first and second packages are in meshing engagement, said major walls of each package lie in coplanar, abutting relation.

18. The package of claim 14 and further comprising a cover sheet sealed about the perimeter of said well and lying in contacting, covering relation to said flange.

19. The package of claim 14 wherein said flange includes a curved tongue portion extending in a direction away from said well.

20. The package of claim 19 wherein said tongue portion includes a through hole.

21. The package of claim 20 and further comprising a cover sheet sealed about the perimeter of said well, said cover sheet extending over said flange including said tongue portion and said hole.

22. The package of claim 21 wherein said cover sheet extends at least partially within said hole.

23. The package of claim 14 wherein said minor wall and a respective major wall at least partially overlap.

24. The package of claim 14 wherein said minor wall is substantially triangularly shaped.

25. A package for a contact lens comprising:

a) a base having a flange;

b) a well formed in said base, said flange extending from the perimeter of said well, said well configured for holding a contact lens and quantity of solution therein;

c) a raised surface surrounding said well;

d) a cover sheet placed in covering relation over said well and said flange and secured to said raised surface with pressure and/or heat, said raised surface forming a spread portion; and

e) a ledge formed between said raised surface and said well to accommodate said spread portion thereby preventing the lens from striking the spread portion upon removal of said lens from said well.

26. A package for a contact lens comprising:

a) a base having a flange;

b) a well formed in said base, said flange extending from the perimeter of said well, said well configured for holding a contact lens and quantity of solution therein; said flange including a curved tongue portion extending in a direction away from said well;

c) a through hole formed in said tongue portion; and

d) a cover sheet sealed about the perimeter of said well, said cover sheet having unsealed portions extending over said flange including said tongue portion and said hole, said cover sheet unsealed portions extending at least partially within said hole to create an interference fit between said cover sheet unsealed portions and said flange.