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PACKAGING ARRANGEMENT FOR CONTACT LENSES

CROSS-REFERENCE TO RELATED PATENT APPLICATIONS

This application is a continuation-in-part
5 patent application of Serial No. 08/257,796, filed June
10, 1994; which is a continuation-in-part of Serial No.
08/146,754, filed November 2, 1993.

BACKGROUND OF THE INVENTION

10 1. Field of the Invention

The present invention relates to a packaging
arrangement for the containment of at least one
hydrophilic contact lens in a sterile aqueous solution.
More specifically, the invention pertains to a packaging
15 arrangement wherein a plurality of disposable
hydrophilic contact lenses are contained in a specific
number of individual packaging arrangements adapted to
be collectively and compactly housed in a box-like
container or carton so as to provide a specified or
20 essentially measured supply of contact lenses for use by
a consumer over a predetermined and possibly lengthy
period of time.

The packaging of hydrophilic contact lenses in
a sterile aqueous solution is well known in the contact
25 lens manufacturing technology. In particular, such
packaging arrangements generally consist of so-called
blister packages which are employed for the storage and
dispensing of the hydrophilic contact lenses by a
medical practitioner or to a consumer who intends to
30 wear the contact lenses. Generally, such hydrophilic
contact lenses, which may be disposable after a single

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1 wear or short-term use, are manufactured from suitable
hydrophilic polymeric materials. These materials may
be, amongst others, copolymers of hydroxyethyl
methacrylate containing from about 20% to 90% or more of
5 water, depending upon the polymer composition.
Generally, such contact lenses must be stored in a
sterile aqueous solution, usually in isotonic saline
solution in order to prevent dehydration and to maintain
the lenses in a ready-to-wear condition.

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2. Discussion of the Prior Art

Heretofore, contact lens manufacturers
normally utilized stoppered glass bottles containing
sterile saline solutions in which the hydrophilic
15 contact lenses were immersed as storage and shipping
containers for individual contact lenses. Each bottle
was sealed with a suitable silicone stopper and provided
with a metal closure as a safety seal in the
configuration of an overcap. When the contact lens was
20 intended to be removed from the bottle for use by a
patient, the metal closure safety seal was required to
be initially torn off the bottle, thereafter the stopper
withdrawn and the lens lifted out from the bottle
through the intermediary of a suitable plastic tweezer
25 or pouring the contents out. This entailed the
implementation of an extremely complicated procedure,
since the contact lens was difficult to grasp and remove
from the saline solution contained in the bottle due to
the transparent nature of the contact lens which
30 rendered it practically invisible to the human eye.

-3-

1 More recently, containments in the form of
blister packages have been developed for hydrophilic
contact lenses, and which enable the storage and
shipping of the hydrophilic contact lenses in a simple
5 and inexpensive expedient manner, while concurrently
facilitating the conveniently easy removal of the
contact lens by a practitioner or a patient.

For instance, a blister package which is
adapted to provide a sterile sealed storage environment
10 for a disposable or single-use hydrophilic contact lens,
wherein the lens is immersed in a sterile aqueous
solution; for example, such as in an isotonic saline
solution, is described in U.S. Patent No. 4,691,820 to
Martinez; which is assigned to the common assignee for
15 the present invention, and the disclosure of which is
incorporated herein by reference.

Thus, in the above-mentioned U.S. patent, the
blister package for storing and dispensing a hydrophilic
contact lens includes an injection-molded or
20 thermoformed plastic base portion incorporating a molded
cavity which is surrounded by an outstanding planar
flange about the rim of the cavity. A flexible cover
sheet is adhered to the surface of the flange so as to
sealingly enclose the cavity in a generally liquid-tight
25 mode. Within the cavity of the base portion, a
hydrophilic contact lens is immersed in a sterile
aqueous solution, such as an isotonic saline solution.
A portion of the side wall of the cavity is inclined to
form a ramp extending upwardly towards the flange from
30 the bottom of the cavity, and the cover sheet is adapted
to be stripped from the flange in order to expose the

-4-

1 cavity and inclined side wall whereupon the lens may be
readily manually removed by being slid upwardly and out
of the cavity along the inclined ramp surface of the
cavity.

5 Although the foregoing blister package
construction for the containment of contact lenses
clearly provides a significant advance over prior
structures requiring glass bottles and removable stopper
arrangements for housing the contact lenses, the present
10 invention further improves upon the uses and versatility
of blister package construction in that the cavity is
essentially of a semi-spherical configuration
dimensioned so as to be adapted to closely support the
contact lens therein immersed in an aqueous solution for
15 ease of removal and also to facilitate an inspection
process. Moreover, the foregoing construction primarily
considers the utilization of such blister packages for
the dispensing of individual contact lenses, with such
blister packages being ordinarily separate or single
20 packagings, which may then be housed in larger
quantities in a further container, such as a rigid
cardboard or paperboard carton of usual construction
employed for the retail sales of the lenses.

 Accordingly, it is an important aspect to be
25 able to furnish a user of such disposable hydrophilic
contact lenses with a specific supply of contact lenses,
the latter of which are normally worn for only a single
day; in essence, for ordinarily 8 to 18 hours within a
24-hour period and thereafter discarded. Hereby, the
30 packaging of a supply of contact lenses should enable
the user to store and provide indication for

-5-

1 replenishing the supply of contact lenses at regular
intervals; for example, at periods of 30 days, although
pursuant to the invention, it is also possible to
contemplate providing packages containing supplies of
5 the contact lenses for shorter or considerably lengthier
periods of days. Consequently, the present invention
contemplates the provision of packaging arrangements for
specified quantities of such hydrophilic contact lenses,
wherein these packaging arrangements are boxed enabling
10 a rapid and precise determination as to the quantity of
hydrophilic contact lenses contained therein, and with
the blister packages being shaped to enable large
quantities to be stored in carton-like packaging
arrangements of a compact nature which is completely
15 protective of the hydrophilic lenses, while avoiding
them being unwieldy in sizes and external dimensions.

SUMMARY OF THE INVENTION

In essence, the inventive concept pertains to
20 packaging arrangements in which a plurality of blister
packages each having a preferably, although not
necessarily, semi-circular cavity containing
respectively one hydrophilic contact lens in a sterile
aqueous solution. A specified quantity of such blister
25 packages has molded plastic base members thereof each
containing a contact lens positioned in a contiguous
array, and with the array or possibly each base member
individually being covered by a single flexible cover
sheet constituted of a laminated foil or plastic film
30 incorporating a silicon oxide barrier material, or other
suitable covering material structure to provide a sealed

-6-

1 environment for each of the contact lenses contained in
the cavity formed in each base member. Weakening lines
are formed in the flexible cover sheet intermediate
adjoiningly located base members to enable detachment
5 from the array of individual blister packages containing
one of the hydrophilic contact lenses as may be required
by a user.

In particular, a plurality of such arrays of
continuous packaging arrangements for contact lenses,
10 which arrays may be in an interconnected planar form,
are adapted to be arranged superimposed in a generally
rectangular container or carton. Each successively
superimposed array is inverted and rotationally reversed
relative to a preceding underlying array so as to enable
15 the respective arrays to be interleaved and compactly
nestingly support each other. The cavities containing
the contact lenses of a superimposed array are arranged
inverted relative to the cavities of an array of blister
packages located therebeneath or thereabove, such that
20 the mutually inverted cavities will be positioned
adjacent to cavities of a superimposed array in an
interleaved compact arrangement at minimum spacial
requirements. Consequently, a plurality of planar
arrays of blister packages which are each respectively
25 interconnected by a single flexible cover sheet for each
array are adapted for compact positioning in a
superimposed contacting relationship within a
substantially rigid rectangular container or carton,
with such arrays containing a specific quantity of
30 disposable hydrophilic contact lenses to furnish a user
with a desired supply; for instance, thirty (30)

- 7 -

hydrophilic contact lenses in six superimposed arrays of five blister packages each; in essence, a thirty-day
5 supply of contact lenses, although other and even considerably larger quantities may be readily considered; for instance, such as a three-month supply of about 96 lenses.

Each of the blister package base members,
10 which may be of injection molded or thermoformed plastic material, in order to reduce or miniaturize the size thereof, has an outstanding substantially rigid planar flange encompassing a respective lens-receiving cavity molded therein, the latter of which is offset towards
15 one end of the flange. The planar flange as disclosed herein, pursuant to a preferred embodiment, has a generally wedge-shaped configuration; in effect, two converging side walls, the opposite ends of which extend into semi-circular or convexly curved end walls, and
20 also may possess a bent tab at one end or other deviating shapes. However, numerous other shapes readily lend themselves to the invention, and the blister packages may have diverse configurations as disclosed; for instance, in copending U.S. Patent
25 Application Serial No. 08/414,514 (Attorney's Docket No. VTN-171, 9014Z-III), commonly assigned to the assignee of this application and the disclosure of which is incorporated herein by reference. The lens-receiving cavity is formed towards the larger end of each planar
30 flange, as described hereinbelow. The presence of the flange is adapted to provide a support for a superimposed or alternatively therebeneath located array of blister packages, thereby formulating rigid and

-8-

1 compact packaging arrangements within the carton, in
which the cavities containing the hydrophilic contact
lenses of superimposed arrays are substantially
protected against potentially damaging external
5 influences, such as shocks or impacts which may be
imparted to the filled carton during handling thereof.
The unique wedge-like or teardrop shape of the flange,
which considerably reduces the size of the base member
of the blister package, not only miniaturizes the
10 overall dimensions of a packaging array in comparison
with base members possessing rectangular flanges,
thereby facilitating the packaging of larger quantities
of blister packages in comparatively smaller secondary
packagings, such as cartons, but also result in
15 considerable savings in the materials for producing such
blister packages. This, of course, renders the
manufacture thereof much more economical, considering
the large quantities of such articles being produced.

Each molded plastic base member of a blister
20 package may be constituted from a suitable injection
molded or thermoformed thermoplastic sheet material,
such as a polyolefin, for instance polypropylene;
whereas the flexible cover sheet may be constituted of a
laminate of a thermoplastic film and aluminum foil or a
25 barrier material comprising silicon oxide, suitably
imprinted and which is adapted to be heat-sealed to the
flange extending about the cavity of the package
containing the hydrophilic contact lens. The flexible
cover sheet may be of a construction and imprinted in a
30 novel manner as is disclosed, for example, in copending
U.S. Patent Application Serial No. 08/106,386; filed on

1 August 13, 1993; entitled "Method of Double-Sided
Printing of a Laminate and Product Obtained Thereby",
commonly assigned to the assignee of the present
application and the disclosure of which is incorporated
5 herein by reference.

Accordingly, it is an object of the present
invention to provide a packaging arrangement for
hydrophilic contact lenses, wherein a plurality of
lenses are located in essentially reduced-size base
10 members of blister packages which are interconnected by
a common flexible cover sheet to form an array of such
packages which are adapted to be compactly packaged in
carton structures.

A more specific object of the invention is to
15 provide a packaging arrangement for a plurality of
hydrophilic contact lenses in which a plurality of
wedge-like or teardrop-shaped blister packages each
having a semi-spherical cavity containing one of the
contact lenses in a sterile aqueous solution are
20 interconnected in an array by a single flexible cover
sheet containing weakening lines intermediate the base
members of the blister packages enabling separation of
individual of the blister packages from the array to
facilitate dispensing the contact lens from the
25 separated blister package.

Another object of the present invention is to
provide an arrangement for the storage of a plurality of
superimposed and inverted interleaved arrays of blister
packages compactly positioned within a substantially
30 rigid carton structure possessing minimal external
dimensions.

-10-

1 Yet another object of the present invention is
to provide a uniquely configured flanged base member
structure for blister packages of the type described for
the storage of hydrophilic contact lenses in a sterile
5 aqueous environment, wherein pluralities of arrays of
essentially miniaturized blister packages are arranged
in specified mutually inverted superimposed and
interleaved or nested orientations for compact
containment within a carton or box-like structure which
10 are adapted to house large supplies of contact lenses
for extended periods of use by a consumer.

BRIEF DESCRIPTION OF THE DRAWINGS

Reference may now be had to the following
15 detailed description of preferred embodiments of a
packaging arrangement for contact lenses constructed
pursuant to the invention, and taken in conjunction with
the accompanying drawings; in which:

Fig. 1 illustrates, in an exploded perspective
20 view, a plurality of superimposed arrays of packaging
arrangements or blister packages pursuant to the
invention for a specific quantity of contact lenses
adapted to be stored in a suitable carton-like
container;

25 Figs. 1a and 1b, respectively, illustrate
different embodiments of blister packages pursuant to
the invention;

Fig. 2 illustrates a sectional view taken
along line 2-2 in Fig. 1;

30 Fig. 3 illustrates a perspective view of a
single array of a plurality of detachably interconnected

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-11-

1 teardrop-shaped blister packages each containing
respectively one contact lens immersed in a sterile
aqueous solution;

Fig. 4 illustrates a top plan view of the
5 array of blister packages of Fig. 3;

Fig. 5 illustrates a bottom view of the array
of blister packages of Fig. 3;

Fig. 6 illustrates a top and side perspective
view of a base member for a teardrop-shaped blister
10 package;

Fig. 7 illustrates a bottom and side
perspective view of the base member of Fig. 5;

Fig. 8 illustrates a top plan view of the base
member of the blister package;

15 Fig. 9 illustrates a sectional view taken
along line 9-9 in Fig. 8;

Fig. 10 illustrates a top and side perspective
view of a base member of a blister package pursuant to a
second embodiment;

20 Fig. 11 illustrates a bottom and side
perspective view of the base member of the blister
package of Fig. 10;

Fig. 12 illustrates a top plan view of the
base member of Fig. 10;

25 Fig. 13 illustrates a sectional view taken
along line 13-13 in Fig. 12.

Fig. 14 illustrates a top plan view of an
array of blister packages pursuant to the invention;

30 Fig. 15 illustrates diagrammatically a
plurality of superimposed and inverted interleaved

1 layers of arrays of blister packages as arranged within
a carton structure;

Fig. 16 illustrates a sectional view taken
along line 16-16 in Fig. 15;

5 Figs. 17, 18 and 19 correspond essentially to
those shown in respectively Figs. 14 through 16,
however, showing in this instance pluralities of arrays
and superimposed layers of arrays of blister packages;

Figs. 20, 21 and 22 are generally similar to
10 those of respectively Figs. 17 through 19; however,
illustrating pluralities of planar arrays of blister
packages, with three rows of arrays being provided in
respectively each plane;

Figs. 23, 24, and 25 illustrate another
15 arrangement of larger quantities of pluralities of
arrays of blister packages similar to those illustrated
in respectively Figs. 14 through 22 of the drawings;

Figs. 26 through 29 illustrate another
embodiment of a base member in a representation similar
20 to Figs. 6 through 9 of the drawings;

Fig. 30 is a top plan view of an array of
blister packages utilizing the base members of Figs. 26
to 29; and

Figs. 31 through 34 illustrate a fourth
25 embodiment of a base member in a representation similar
to Figs. 6 to 9 of the drawings.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

Referring now more specifically to the
30 drawings, and in particular to Figs. 1 and 2, there is
diagrammatically illustrated a rectangular carton 10,

- 13 -

shown in a partially opened condition, wherein the carton 10 includes a lower or inner portion 12 having a storage space for the receipt of arrays of blister packages, including a top opening and incorporating side and end walls extending upwardly from a flat bottom wall, as known in the carton art, and which is adapted to be enclosed by a sleeve-like outer carton portion 14. The rectangular carton 10 is preferably constituted of paperboard as is well known in the carton manufacturing technology and is dimensioned so as to be able to receive a specified quantity of planar arrays of packaging arrangements for the sealed containment of contact lenses, especially disposable hydrophilic contact lenses (not shown), as described in more specific detail hereinbelow; although other materials, such as pressed cardboard, plastic and even more rigid durable materials, can be contemplated.

Furthermore, although shown as a so-called "matchbox" carton, the latter may be a carton having an openable lid or cover portion; for example, as disclosed in copending U.S. Patent Application Serial No. 08/146,754 (Attorney's Docket No. VTN-90, 9014), the disclosure of which is incorporated herein by reference.

As is illustrated, the carton 10, as is known in the art may be provided with a decorative glossy or semi-glossy exterior surface, which may be imparted with suitable single or multi-colored imprinting and/or embossing representative of the product contained therein identifying legends and logos pertaining to the company manufacturing and/or marketing of the product, instructions pertaining to the use of the product

- 14 -

packaged in the carton, and other suitable legends including product batch numbers and manufacturing dates
5 and other decorative indicia and the like.

As is shown in the exploded perspective view of Fig. 1 and also in the sectional view shown in Fig. 2 of the drawings, a plurality of arrays 20 of interconnected blister packages is located in the lower
10 carton portion 12. Each blister package 22 of an array 20, as represented in further detail hereinbelow, includes a base member consisting of a planar essentially wedge or teardrop-shaped flange having semi-circularly outwardly curved end portions, and wherein
15 off-set towards the wider end of the planar flange, there is formed a cavity of an essentially semi-spherical configuration. However, as disclosed in copending U.S. Patent Application Serial No. 08/414,514 (Attorney's Docket No. VTN-171, 9014Z-III), other flange
20 configurations are to be considered herein, and the above-mentioned shape is to be deemed as being only exemplary in nature. Generally the cavity is configured in conformance with the curvilinear shape of a contact lens (not shown), adapted to be stored therein a sealed
25 condition while immersed in a suitable sterile aqueous solution.

Referring to Fig. 1a of the drawings, the blister packages 22 are essentially constituted of a plurality of lens-receiving cavities, and are injection
30 molded or thermoformed as an integral unit, in this instance of an essentially rectangular construction. In this case, five cavities for receiving each a contact lens are molded in a manner similar to the array of

-15-

1 Fig. 1, and are adapted to be sealingly covered by
flexible cover sheet 24, which includes suitable
weakening lines or perforations to enable access to
individual of the cavities for removal of the contact
5 lens therefrom. Proximate the perimeter of the base
member 22 incorporating the respective plurality of
cavities, there is provided, as an optional aspect, a
molded rib structure 23 at the bottom surface to add
additional rigidity to the integrally formed base member
10 containing the plurality of cavities.

With respect to the embodiment of Fig. 1b of
the drawings, which is somewhat similar to that of Fig.
1a, in this instance four cavities, in two rows each for
a total of eight lens-receiving cavities, are molded
15 into the base member 22 which is of unitary molded or
thermoformed construction, and which may also have an
encompassing stiffening rib 23 molded in the lower
surface thereof to provide additional rigidity and
strength thereto. The entire integral base member
20 containing the plurality of lens-receiving cavities may
be sealingly covered by a flexible cover sheet 24 which,
in this instance, has weakening lines or perforations 26
adapted to be removed in sections to provide selective
access to individual of the cavities for removing the
25 contact lens therefrom. Each of the weakening lines 26
at the intersections thereof may be provided with
suitable areas 27 of non-sealing property to enable the
user to grippedly engage that portion of the flexible
cover sheet and detach that segment from the remaining
30 cover sheet so as not to adversely influence the

-16-

1 integrity of the contact lenses sealingly contained in
the remaining cavities.

However, other lens-receiving cavity
configurations also readily lend themselves to the
5 invention, such as hemispherical, oval, rectangular or
the like.

A plurality of the blister packages 22
arranged in reverse oriented order and in coplanar
relationship, as shown in Figs. 3 to 5, may be sealingly
10 covered by a flexible cover sheet 24, the latter of
which is provided with a series of weakening lines 26,
such as perforations, discontinuous slits or the like,
so as to extend between each of the adjacently located
base members of each blister package. This will enable
15 a suitable detachment, from the array 20, of individual
blister packages 22, each containing a single contact
lens. The flexible cover sheet 24 is adhesively
fastened to suitable regions of the surface of the
flanges of each base member of a blister package facing-
20 the cover sheet, such as by heat sealing, ultrasonic
sealing, adhesives or other acceptable methods so as to
at least encompass in a sealing manner each cavity
containing a respective contact lens immersed in a
sterile aqueous solution and to provide a sealing
25 containment for each contact lens in its respective
cavity. Other sealing locations may be provided in
suitable areas or points as desired between the facing
surfaces of the flexible cover sheet and that of the
flange of each base member so as to provide adequate
30 regions of adherence therewith, while permitting various
edge portions between the flexible cover sheet and

-17-

1 flange components to remain unattached in order to
facilitate a finger-gripping engagement and enable
separating the severed cover sheet portion from its
associated base member, thereby providing for access to
5 the contact lens which is contained in the applicable
cavity thereof.

The flexible cover sheet is preferably
constituted of a laminated foil, barrier film layered to
other plastic, metalized or further layers, or other
10 suitable material structure; for example, comprising a
polypropylene film, possibly a PET film, on at least one
external surface thereof adapted to contact the facing
surface of the flange of each respective base member of
a blister package 22, so as to enable adhesive or heat
15 sealing therewith, as mentioned thereof. The laminated
foil constituting the flexible cover sheet may be of a
multi-layered construction having suitable double-sided
imprinting provided thereon; for example, as disclosed
in copending U.S. Patent Application Serial No.
20 08/106,386, which is commonly assigned to the assignee
of the present application.

As disclosed herein, as shown in Figs. 1 and 2
of the drawings, the inventive packaging arrangement is
adapted to provide for a packaged supply of large
25 quantities of disposable hydrophilic contact lenses,
each of which is intended to be used for only a
specified period of hours within a single day, and then
discarded; in effect, requiring the carton to be able to
store contact lenses each in a sterile sealed condition
30 in each one of the cavities of the respective blister
packages so as to be individually dispensable.

-18-

1 Different sizes of carton constructions, each
containing various specified quantities of arrays of
blister packages with each having respectively a contact
lens immersed in a sterile aqueous solution, may be
5 provided in accordance with specific requirements of
consumers. Thus, there may be provided different
numbers of arrays of contact lenses varying in quantity
and positioning within any specific carton so as to
provide supplies of lenses for a consumer for various
10 lengths of time extending over periods of days, weeks or
even months, as elucidated hereinbelow in more specific
detail.

As represented in the present instance, by way
of example and having specific reference to Fig. 2,
15 there are shown six arrays 20 each of five blister
packages 22 interconnected by a single cover sheet 24,
which are respectively superimposed interleaved inverted
positions, so as to provide for a supply of 30 contact
lenses, boxed in the carton 10.

20 As illustrated in Figs. 3 to 5, the generally
teardrop-shaped flanges of each base portion of a
respective blister package 22 are arranged in relatively
reversed alternating positions, having specific
reference to Fig. 5, so that the cavities therein are
25 each offset relative to each other; in effect, adjacent
to narrower end of a contiguous base member, and to
thereby permit the tapered or converging side walls of
each base member to be positioned closely adjacent to an
adjoining side wall of a contiguous blister package base
30 member while oriented in an opposite direction, so as to
impart a minimum overall dimension to the array 20.

-19-

1 The surfaces of the planar flanges in which
the cavities are formed are then sealingly covered, as
mentioned hereinbefore, by means of the single sheet of
the flexible cover 24, and in which a plurality of
5 weakening lines 26 are formed so as to extend generally
coextensive along the lines of contact between the
individual base members of the blister packages and to
thereby produce a generally zig-zag pattern of weakening
lines constituting generally triangularly-shaped cover
10 sheet segments 28 upon being separated from each other
with the exception of the opposite end segments 30, 32
which may have excess material in order to form the
overall rectilinearly shaped arrays 22 in the carton 10;
or possibly other potentially more appealing designs
15 which could readily be custom die cut.

 As illustrated in Fig. 2 of the drawings,
vertically stacked arrays of blister packages 22 are
inverted relative to each other and positioned so as to
provide interleaving and nesting of the various base
20 members of superimposed arrays, and which will provide
for maximum savings in space; or in effect, -
miniaturization of the size of the arrays, and an
inherently intense rigidity in positioning these
plurality of arrays 20 within the carton 10.

25 Referring more specifically to the embodiment
of a base member 40 as typically illustrated, for
producing each array, and as shown in Figs. 6 to 9 of
the drawings, a planar flange 42 possesses a
configuration having converging side walls 44, 46
30 extending along opposite sides of a longitudinal
centerline, wherein the walls 44, 46 may be either

-20-

1 straight or slightly outwardly curved. At a wider space
portion between the walls, these extend into a generally
hemispherical convex end 48, and also a convexly rounded
end 50 at the narrower end portion thereof. Formed in
5 the flange surface and offset towards the wider end 48
of the planar flange 42 and essentially having a center
point coinciding with the center of curvature of the
wider end portion 48 is a curvilinear depression forming
a cavity 52, as shown specifically in Fig. 9 of the
10 drawings, adapted to receive a similarly-shaped contact
lens (not shown) immersed in a sterile saline solution.
Moreover, the bottom surface of flange 42 may be
provided with a rib or depression 43 extended along or
proximate the periphery thereof so as to impart added
15 strength and stiffness to the base member 40.

A plurality of such these base members 40 for
the blister packages 22 are then arranged in an
alternatively reverse arrangement adjacent each other,
as shown in Fig. 14, so that the converging side walls
20 of contiguous base members are essentially in contact at
least at one point, and with the cavities 52 being
staggered relative to each other as shown in the
embodiment of Figs. 14 to 16 of the drawings. These
flanges are then sealingly covered by the flexible cover
25 member 24, as described hereinabove and shown in Figs. 3
to 5.

With respect to the modified embodiment of
Figs. 10 to 13 of the drawings, in which the reference
numerals are the same in identifying components similar
30 to those in Figs. 6 to 9, the base member 40 is
substantially similar to that shown in the embodiment of

-21-

1 Figs. 6 to 9 with the exception that the flange portion
42 is somewhat shorter in the mid-section having the
converging side walls 44, 46, and thus providing a
somewhat squatter structure with a larger radius of
5 curvature at the narrow end thereof. For the remainder,
including the formation of the cavity 52 for the
containment of a contact lens and the semi-circular
configuration at the wider end surrounding such cavity,
the embodiment of Figs. 10 to 13 is essentially
10 identical with that shown in Figs. 6 to 9.

As illustrated, the overall dimensions of the
flexible cover sheet or member 24 which is sealingly
attached to each specific array of blister package base
members has external peripheral dimensions which are
15 generally in conformance with the internal dimensions of
the lower carton part 12 which is adapted to receive the
plurality of superimposed and interleaved, nested arrays
22 of blister packages so as to inhibit any axial
shifting and potential damage to the plurality of arrays
20 of blister packages contained therein.

As mentioned previously, the small size and
resultingly compact nature of the base members 40 for
the blister packages 22 enable the arrays 20 to be
considerably smaller in overall size, such as width and
25 length, than with basically rectangular blister
packages. Consequently, it is possible to have
relatively small-sized cartons contain larger supplies
of blister packages and contact lenses than heretofore.
Such cartons may easily store up to a 3-month supply of
30 contact lenses without appearing excessively large and
ungainly to a potential buyer and consumer.

-22-

1 For instance, as shown in Figs. 15 and 16,
there may be provided a plurality of planar arrays 20 of
blister packages 22 as in Fig. 16, and also Figs. 3 to
5, which are inverted and superimposed into nested
5 positions as shown in Fig. 16, in that embodiment four
layers of arrays 20, with each layer having an array of
eight blister packages 22, for a total of 32 blister
packages, each array interconnected by a single flexible
cover member 24, and boxed in a compact elongate carton
10 10 similar to that shown in Fig. 1 of the drawings.

When it is desired to package larger
quantities of arrays of blister packages 22 containing
contact lenses, for example, as shown in Figs. 17 to 19,
a pair of parallel adjacently located coplanar arrays 20
15 are each adapted to be interleaved with a similar
therebeneath inverted array, and with further subsequent
layers of arrays as shown in Fig. 19 of the drawings so
as to be positioned in a compact relationship within a
rectangular carton 10 of the type shown in Fig. 1 of the
20 drawings. This arrangement may house 64 to 96 blister
packages, depending upon the number of layers or arrays
20.

With respect to the embodiments of Figs. 20 to
22, this discloses a slightly different array
25 arrangement in which the superimposed inverted arrays
are provided in three rows for each layer; whereas with
regard to Figs. 23 to 25, this illustrates simply two
layers of inverted arrays 20 in a larger-sized but
flatter rectangular carton construction.

30 Referring to the modified embodiment of a base
member 40 as illustrated in Figs. 26 through 29 of the

-23-

1 drawings, in which the reference numerals are the same
in identifying components similar to those of Figs. 6
through 9, in this instance the primary distinction
relative to the embodiment of Figs. 6 to 9 resides in
5 that the flange portion rather than being provided with
converging sidewalls 44, 46 has the sidewalls narrowed
and extending substantially in parallel. This generally
defines the shape of a so-called "duckbill," terminating
in a rounded end portion 50 opposite to the wider end 48
10 in which the cavity 52 is located. If desired, the base
member 40 of this embodiment of Figs. 26 through 29 may
also be provided with a stiffening rib structure 43 as
illustrated in the embodiment of Figs. 6 through 9.

The foregoing base member 40, in conjunction
15 with other base members of similar configuration and a
flexible cover sheet 24, as illustrated in Fig. 1 of the
drawings may be assembled in specified arrays; for
example, as shown in Figs. 14 through 25 of the
drawings. In this instance, the arrays, which are
20 generally planar in shape, may be of a plurality of rows
and also include reversed and inverted superimposed
arrays to provide the required quantity of blister
packages each containing a contact lens in a secondary
packaging.

25 Similarly, with respect to the embodiment of
the base member illustrated in Figures 31 through 34 of
the drawings, in which elements identical or similar to
those in the embodiment of Figs. 6 through 9 are
identified by the same reference numerals, in that
30 instance, the leading edge or end 50 of the parallel
sidewalls 44 and 46 may be curved downwardly from the

1 planar upper surface so as to provide an improved
strength or rigid configuration upon being assembled in
arrays and packaged in secondary packagings. Again, as
in the previous embodiments, suitable numbers of base
5 members 40 in this embodiment, covered by a sealing
flexible cover sheets 24 may be packaged in various
secondary packagings or containments depending upon the
number of blister packages which are to be provided with
any specific package for use by a consumer, as described
10 with regard to the proceeding embodiments.

The foregoing arrangements of blister package
arrays enable the provisions of numerous variations and
numbers within respective differently sized carton
structures and may be customized in accordance with
15 retail orders received by the manufacturer from
ophthalmologists, optometrists, or even from consumers
in accordance with their specifications and the types of
prescriptions of contact lenses contained in the various
arrays of blister packages.

20 From the foregoing, there is obtained an
extremely versatile secondary or composite packaging
arrangement for a wide variety of purposes suitable to
the specific needs of different consumers and conditions
of use.

25 While there has been shown and described what
are considered to be preferred embodiments of the
invention, it will, of course, be understood that
various modifications and changes in form or detail
could readily be made without departing from the spirit
30 of the invention. It is, therefore, intended that the
invention be not limited to the exact form and detail

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1 herein shown and described, nor to anything less than
the whole of the invention herein disclosed as
hereinafter claimed.

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What is claimed is:

1. A packaging arrangement for the sealed containment of at least one hydrophilic contact lens in a sterile aqueous solution; comprising:

a) a plurality of injection molded or thermoformed plastic base members each having a cavity for containing contact lenses immersed in a solution, each base member including a flange extending outwardly about the periphery of the cavity, the flange having opposite side walls extending between wider and narrower flange ends, the cavity consisting of a generally curvilinear concave indentation in the base member proximate the wider end of the planar flange and having a shape in substantial conformance with the shape of a contact lens adapted to be contained therein; and

b) a flexible cover sheet superimposed over the plurality of base members and dimensioned to be detachably sealed to a seal area on the surface of each flange, the cover sheet scalingly extending about each cavity and having unsealed edge portions providing gripping means engageable for enabling separating the cover sheet from each flange so as to expose each cavity and to facilitate external access to the contact lens in each cavity;

wherein the plurality of base members are contiguously arranged and interconnected in an array such that the wider end of respectively one flange is alternately positioned adjacent a narrower end of a contiguously located adjacent flange of an adjointly located base member, the base members being interconnected by the flexible cover sheet for the containment of a specified number of contact lenses arranged in respectively each cavity of each base member.

2. A packaging arrangement as claimed in Claim 1, wherein the side walls of each flange define a narrowing flange configuration for each base member.

3. A packaging arrangement as claimed in Claim 1, wherein said side walls are each of a linear configuration extending intermediate the opposite distal ends of each flange.

4. A packaging arrangement as claimed in Claim 3, wherein said sidewalls of each flange converge towards a narrower flange end in a generally wedge-like shape from a wider end.

5. A packaging arrangement as claimed in Claim 3, wherein said sidewalls of each flange narrow from the periphery of each cavity and extend in parallel relationship towards said narrower flange end.

6. A packaging arrangement as claimed in Claim 1, wherein each flange is planar and is downwardly curved at the narrower end thereof.

7. A packaging arrangement as claimed in Claim 1, wherein the contiguously located side walls of adjacent each flange are in edge contact with each other.

8. A packaging arrangement as claimed in Claim 1, wherein the flexible cover sheet extends over the plurality of base members and is sealingly connected to each flange about at least the cavity of respectively each base member.

9. A packaging arrangement as claimed in Claim 8, wherein said flexible cover sheet connects said plurality of base members in a coplanar array.

10. A packaging arrangement as claimed in Claim 8, wherein weakening lines are formed in said flexible cover sheet intermediate each of said base members to enable separating said plurality of base members into individual packaging arrangements each having a single said base member.

11. A packaging arrangement as claimed in Claim 10, wherein said weakening lines in said flexible cover sheet comprise perforations extending at least partially through said cover sheet.

12. A packaging arrangement as claimed in Claim 10, wherein said

weakening lines extend along the junctures between contiguous side walls of adjacent of said flanges so as to facilitate separating said base members along lines coextensive with the side walls of said adjacent flanges.

13. A packaging arrangement as claimed in Claim 1, wherein the plurality of base members are separable into individual blister packages each containing a single contact lens.

14. A packaging arrangement as claimed in Claim 1, wherein the array of base members comprise linearly arranged base members, said flexible cover sheet having a substantially rectangular configuration.

15. A packaging arrangement as claimed in Claim 1, further comprising a rigid carton to contain a plurality of the defined array.

16. A packaging arrangement as claimed in Claim 15, wherein plural of the defined array are arranged in said carton in superimposed mutually inverted nested relationships.

17. A packaging arrangement as claimed in Claim 16, wherein each cavity of each said molded plastic base member is offset towards the wider end of said flange, said superimposed arrays being inverted with respect to the orientation of each other said array to enable the compact nested positioning thereof within said carton.

18. A packaging arrangement as claimed in Claim 17, wherein said carton has a generally rectangular configuration.

19. A packaging arrangement as claimed in Claim 17, wherein said carton is constituted of one of paperboard, pressed cardboard, and plastic.

20. A packaging arrangement as claimed in Claim 19, wherein indicia and content-identifying legends are imprinted on at least one of the exterior surfaces of said carton.

21. A packaging arrangement as claimed in Claim 15, wherein said containment is enclosed by a plastic shrinkwrap film.

22. A packaging arrangement as claimed in Claim 1, wherein a seal is formed between the cover sheet and the surface of each flange sealingly encompassing the peripheral edge of each cavity.

23. A packaging arrangement as claimed in Claim 22, wherein said seal comprises a heat seal.

24. A packaging arrangement as claimed in Claim 1, wherein the plastic base members are made from a thermoformable plastic material.

25. A packaging arrangement as claimed in Claim 1, wherein the flexible cover sheet is a multi-layered laminate having an outer layer consisting of a plastic film contacting the surface of the flange of the plastic base member.

26. A packaging arrangement as claimed in Claim 25, wherein said plastic film is heat sealed to said flange surface of the molded plastic base member for sealing the cavity.

27. A packaging arrangement as claimed in Claim 25, wherein said flexible cover sheet comprises a composite foil and plastic film laminate.

28. A packaging arrangement as claimed in Claim 26, wherein said flexible cover sheet comprises a barrier layer material intermediate the outer plastic film layer.

29. A packaging arrangement as claimed in Claim 1, wherein each base member and the flexible cover conjointly form a moisture and vapor-imperviously sealed containment for a contact lens in said cavity.

30. A packaging arrangement for the sealed containment of at least two hydrophilic contact lenses in a sterile aqueous solution; comprising:

a) a plurality of molded plastic base members contiguously arranged and interconnected in an array, each of said base members having a cavity for containing a contact lens immersed in said solution, said cavity consisting of a generally concave indentation in said base member, the lower portion of which has a shape in substantial conformance with the shape of the contact lens adapted to be contained therein,

b) a circular flange extending outwardly about a first portion of the periphery of said cavity,

c) an extending planar flange connected to said circular flange to form an elongate and tapered gripping member,

d) a depending wall portion extending downwardly from said gripping member,

e) a flexible cover sheet superimposed over said plurality of base members and dimensioned to be detachably sealed to said circular and extending planar flanges, said flange and said tapered gripping member having a generally planar surface facing said superimposed cover sheet in contacting relationship,

f) said flange having said depending wall portion at one end of said tapered gripping member and extending in a direction away from said superimposed cover sheet,

g) said flexible cover sheet sealingly extending about each said cavity and having an unsealed tapered edge portion to provide a gripping tab separately engageable by a user in cooperation with a gripping of said tapered gripping member for enabling the separation of said cover sheet from said flange so as to expose said cavity and facilitating external access to the contact lens.

31. A packaging arrangement as claimed in Claim 30, wherein said side walls of said flange define a narrowing flange configuration.

32. A packaging arrangement as claimed in Claim 30, wherein said sidewalls of said flange converge towards the narrower flange end in a generally wedge-like shape from said wider end.

33. A packaging arrangement as claimed in Claim 30, wherein said sidewalls of said flange narrow from the periphery of said cavity and extend in parallel relationship towards said narrower flange end.

34. A packaging arrangement as claimed in Claim 30, wherein said flange is planar and is downwardly curved at the narrower end thereof.

35. A packaging arrangement as claimed in Claim 30, wherein the contiguously located side walls of adjacent of said flanges are in edge contact with each other.

36. A packaging arrangement as claimed in Claim 30, wherein said plurality of base members are separable into individual blister packages each containing a single contact lens.

37. A packaging arrangement as claimed in Claim 30, wherein weakening lines are formed in said flexible cover sheet intermediate each of said base members to enable separating said plurality of base members into individual packaging arrangements each having a single said base member.

38. A packaging arrangement as claimed in Claim 37, wherein said weakening lines in said flexible cover sheet comprise perforations extending at least partially through said cover sheet.

39. A packaging arrangement as claimed in Claim 37, wherein said weakening lines extend along the junctures between contiguous side walls of adjacent of said flanges so as to facilitate separating said base members along lines coextensive with the side walls of said adjacent flanges.

40. A packaging arrangement as claimed in Claim 30, wherein a plurality of said packaging arrays are arranged in said containment in superimposed mutually inverted nested relationships.

41. A packaging arrangement as claimed in Claim 40, wherein each cavity of each said molded plastic base member is offset towards the wider end of said flange, said superimposed arrays being inverted with respect to the orientation of each other said array to enable the compact nested positioning thereof within said carton.

42. A packaging arrangement as claimed in Claim 30, wherein a seal is formed between said cover sheet and the surface of said flange sealingly encompassing the peripheral edge of said cavity.

43. A packaging arrangement as claimed in Claim 30, wherein said molded plastic base member is constituted of a thermoformable plastic material.

44. A packaging arrangement as claimed in Claim 30, wherein said flexible cover sheet is a multi-layered laminate having an outer layer of said laminate consisting of a plastic film contacting the surface of the flange of said molded plastic base member.

45. A packaging arrangement as claimed in Claim 44, wherein said plastic film is heat sealed to said flange surface of the molded plastic base member for sealing the cavity containing the contact lens.

46. A packaging arrangement as claimed in Claim 30, wherein said injection molded or thermoformed plastic base member and said flexible cover conjointly form a moisture and vapor-imperviously sealed containment for said contact lens in said cavity.