

INTRAOCCULAR LENS AND METHOD OF POSITIONING THE SAME IN AN EYE

This invention relates to intraocular lenses for the human eye, and, more particularly, to intraocular lenses of the type which can be positioned in the anterior chamber, the posterior chamber, or partially in the anterior chamber and partially in the posterior chamber of the eye. The invention also relates to methods of positioning such lenses in an eye.

One type of intraocular lens is described and claimed in my U.S. Pat. No. 4,174,543 issued Nov. 20, 1979. Such a lens is inserted into the eye through a corneal incision that may be also used to remove the natural lens. To minimize the possibility of injury to the eye, it is important that the incision be made as small as possible. To this end, another type of lens is described and claimed in my co-pending application Ser. No. 393,057 filed June 28, 1982, entitled Intraocular Lens And Method of Inserting An Intraocular Lens Into An Eye. In my co-pending application a deformable lens is described and claimed which allows the surgeon to make an incision in the eye which is smaller than the diameter of the lens body or optic of the lens.

It is an object of the present invention, therefore, to provide a new and improved intraocular lens which avoids one or more of the limitations of prior such lenses.

It is another object of the invention to provide a new and improved intraocular lens which can be inserted into the eye through an opening which is smaller than the diameter of the lens body or optic.

It is another object of the invention to provide a new and improved method of positioning an intraocular lens in an eye, which avoids one or more of the limitations of prior such methods.

It is another object of the invention to provide a new and improved method of positioning an intraocular lens in an eye utilizing a smaller opening in the eye than the diameter of the lens body for insertion of the lens into the eye.

In accordance with the invention, an intraocular lens comprises a lens body having a plurality of portions which are separable outside an eye. The lens also includes a plurality of position-fixation members extending from the lens body for fixating the position of the lens body portions within the eye. A plurality of lens portions comprise the lens body portions and the position-fixation members. The plurality of lens portions are individually insertable through an opening in the eye and are connectable within the eye to form the lens.

Also in accordance with the invention, a method of positioning in an eye an intraocular lens having a plurality of lens portions which are separable outside the eye, the lens portions including lens body portions and position-fixation members, the lens portions being connectable, comprises inserting a first lens body portion and at least one position-fixation member through an opening in the eye. The method also includes inserting a second lens body portion through the opening in the eye to position the lens body portions and the position-fixation members in the eye.

For a better understanding of the present invention, together with other and further objects thereof, reference is made to the following description, taken in connection with the accompanying drawings, and its scope will be pointed out in the appended claims.

Referring now to the drawings:

FIG. 1 is a simplified schematic sectional view of an eyeball implanted with an intraocular lens embodying a preferred form of the present invention;

FIG. 2 is a plan view of the intraocular lens represented in FIG. 1;

FIG. 3 is a plan view of one portion of the lens of FIGS. 1 and 2;

FIG. 4 is a plan view of another portion of the lens of FIGS. 1 and 2;

FIG. 5 is a plan view of a lens body or optic which may be utilized in lieu of the lens body or optic of the lens of FIGS. 1 and 2;

FIG. 6 is a plan view of a lens portion of another embodiment of a lens constructed in accordance with the invention;

FIG. 7 is a plan view of another lens portion cooperative with the lens portion of FIG. 6 to form another embodiment of a lens constructed in accordance with the invention;

FIG. 8 is a plan view of a lens constructed in accordance with the invention having the portions represented in FIGS. 6 and 7;

FIG. 9 is a plan view of a lens portion of another embodiment of a lens constructed in accordance with the invention;

FIG. 10 is plan view of another lens portion cooperative with the lens portions of FIG. 9 to form another embodiment of a lens constructed in accordance with the invention; and

FIG. 11 is a plan view of a lens constructed in accordance with the invention having the portions represented in FIGS. 9 and 10.

FIG. 12 is a plan view of a pair of lens portions shown in spaced apart condition prior to assembly thereof into a lens constructed in accordance with the invention.

Referring now more particularly to FIGS. 1 and 2 of the drawings, reference numeral 10 generally designates an eyeball as shown in simplified schematic cross-section in FIG. 1. Portions of the eyeball structure which are not believed to be essential to an understanding of the invention have been omitted for the sake of clarity.

The eyeball 10 includes a cornea 12, a diaphragm of iris 14 having a central opening or pupil 16, a membrane 18, vitreous humor 20 and a retina 22. The natural lens, which normally occupies part of the region between the membrane 18 and the iris 14, has been omitted since the invention deals with artificial substitutes for a natural lens. An aqueous zone, between the cornea 12 and the membrane 18, is subdivided by the iris 14 into an anterior chamber 24 and a posterior chamber 26. A scleral spur 28 in the anterior chamber 24 is spaced from the iris 14 thereby defining a groove 30.

An intraocular artificial lens for the eyeball 10 is generally indicated by reference numeral 32 in FIG. 1 and will first be described generally with reference to FIGS. 1 and 2. The lens 32 can be formed of any suitable material which is compatible with the environment of the eyeball, such as a non-toxic plastic, for example, polymethylmethacrylate.

The lens 32 includes a medial light-focusing lens body 34 or optic having, for example, a convex anterior surface 36 and a generally flat posterior surface 38. A pair of oppositely disposed symmetrical position-fixation members 40 and 42 include respective stem portions 44 and 45 that extend from the periphery of the lens body 34.