OPTICAL LENS FOR THE HUMAN EYE

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to an optical lens for a phakic, aphakic and pseudophakic eye and more specifically relates to an optical lens which is adapted to be inserted into the eye or used in conjunction with an intraocular lens to restore the loss of near and far accommodation of the eye. Also, the teachings of this invention can be used in a contact lens located on the surface of an eye.

2. Description of the Prior Art

Intraocular lenses adapted to be implanted into an eye are well known in the art. Typical of such intraocular lenses are the lenses described in U.S. Pat. No. 4,159,546 to Shearing; U.S. Pat. No. 4,249,271 to Polar; and U.S. Pat. No. 4,244,060 to Hoffer. Another known intraocular lens which is adapted to be implanted in either the anterior chamber or posterior chamber of an eye is a Universal Intraocular Lens invented by Dennis D. Shepard, M.D., F.A.C.S. In one embodiment of the Universal Intraocular Lens of Dr. Shepard, the lens element is formed into a plano-convex lens and has four resilient support members which deflect and move within the plane of the lens body relative to the pupil in a proper optical relationship.

It is also known to insert a lens directly into the cornea of the eye, by means of a cornea inlay, in a phakic, aphakic and pseudophakic eye.

It is also known in the art to use a tinting material in contact lenses for the purpose of appearance only, which has no optical effect. Contact lenses are known which utilize different refractive indexes to form a bifocal lens element. However, the position of the iris is an important part of the bifocal operation

SUMMARY OF THE INVENTION

The present invention relates to a new and novel optical lens for an eye which is adapted to be implanted directly into the eye and which can be implanted into either the anterior or posterior chamber of an eye. Also, the optical lens can be utilized in cooperation with an artificial intraocular lens. In the alternative, the lens body can be fabricated to be placed either on the surface of the cornea or used in a cornea inlay. The optical lens device functions to restore the loss of near and far accommodation of the eye. In the preferred embodiment, the optical lens for an eye includes a lens body which has a top surface and a bottom surface. The lens body is formed in the center area to have a predetermined area which is adapted to selectively intercept and pass light through the lens body. The light passes through the lens body in a manner to obtain an optical effect for substitution of the loss of the accommodation of the eye. In addition, the optical lens can be formed with a resilient support means which is operatively coupled to the lens body and adapted to engage tissue in the chamber of an eye to position the lens body in a proper optical relationship to the pupil.

None of the known prior art intraocular lenses are adapted to provide an optical effect for substitution of the loss of the accommodation of the eye.

One advantage of the present invention is that the optical effect of substitution for loss of the accommodation of the eye can be accomplished by increasing the normal depth of focus of the eye by means of the effect of an intraocular stenopaeic hole.

A further advantage of the present invention is that the optical lens can obtain the optical effect by providing different refractive powers to the different parts of the lens body.

Another advantage of the present invention is that an optical lens can be formed in a similar manner to that of an intraocular lens, the surface of the lens can be fabricated to have a differential refractive power, and the central area of the lens can be formed of an opaque material which defines an intraocular stenopaeic hole of a selected diameter.

A yet further advantage of the optical lens of the present invention is that, in the case of distance vision, the pupil is partially subjected to ambient illumination so as to permit the light rays to enter the peripheral part of the intraocular lens body as well as through the stenopaeic hole, and such a lens permits an eye to adapt to darkness.

A still further advantage of the present invention is that the central area of the lens body can be fabricated from any suitable opaque material, such as silver, plastic, or laminated thin layers of material. Also, it is envisioned that the material could be completely encapsulated within the intraocular lens body in order to achieve the optical effect. Also, the opaque material can be placed on either the top surface or the bottom surface of a lens body.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and other advantages of this invention will be apparent from the following description of the preferred embodiment of the invention when considered with the illustrations and accompanying drawings which include the following figures:

FIG. **1** is a perspective view of an optical lens, having "J" loop strands, which utilizes the present invention;

FIG. **2** is a front view of a different embodiment of an optical lens utilizing the present invention;

FIG. **3** is a top plan view of an optical lens of the present invention;

FIG. **4** is a right side plan view of an optical lens of the embodiment of FIG. **2**;

FIG. **5** is a cross section taken along section lines **5—5** of FIG. **2**;

FIG. **6** is an illustration of an implantation of the optical lens of FIG. **2** in the anterior chamber of an eye;

FIG. **7** is a diagrammatic representation of the implantation of an optical lens of the present invention implanted in the posterior chamber of an eye and located between the iris and the ciliary processes;

FIG. **8** is a partial end plan view portion in cross section showing the location of the optical lens and the resilient support means between the iris and the ciliary processes;

FIG. **9** is a pictorial representation showing the optical lens of the present invention implanted in the lens capsular bag between the ciliary processes and the end of the hyaloid membrane and/or posterior lens capsule;

FIG. **10** is a partial end plan view in cross section showing the relationship between the resilient support means of the optical device located among the ciliary processes, the lens capsular bag, and the end of the hyaloid membrane and/or posterior lens capsule;

FIG. **11** is a pictorial representation showing a different embodiment of the optical lens in a cornea inlay;