another type of fluid having a different index of refraction.

In accordance with another embodiment of the present invention, a posterior chamber intraocular lens **48** is provided utilizing a fluid-expandable sac **50** similar to fluid-expandable sac **40**, with fluid-expandable sac **50** being filled with a liquid crystal material **52**, as shown in FIG. **5**. Posterior chamber intraocular lens **48** is responsive to achieving a desired accommodation by altering the index of refraction of liquid crystal material **52**. This can be accomplished in a number of ways which are hereinafter described. For example, the accommodation of the eye can be monitored by measuring the electrical potential generated by ciliary body **28**. An electrode **54** is located in ciliary body **28**, as shown in FIG. **5**, which provides an input signal, that is proportional to the desired accommodation, to a microprocessor **56**, which can be implanted into sclera **16** of eye **10** as shown in FIG. **5**, or into any other suitable location. A suitable power source is provided for microprocessor **56** and could also be implanted (not shown). Microprocessor **56** may comprise, for example, Model 8080 manufactured and sold by Intel Corporation. Microprocessor processor **56** is programmable in a manner well known to those skilled in the art to provide a corresponding output depending on the relative intensity sensed by electrode **54** which is proportional to the accommodation of the eye. By monitoring the electrical potential generated by ciliary body **28**, the refractive power of the intraocular lens can be controlled. Alternatively, an electrical signal proportional to the location of the eyes can be obtained by implanting electrodes in the rectus medialis (not shown) of eye **10**. Microprocessor **56** is utilized for producing a voltage output for providing a voltage potential across liquid crystal material **52** contained within fluid-expandable sac **50** to provide the index of refraction that is required to obtain the desired accommodation based upon the relative position of the eyes. The voltage output of microprocessor **56** is transmitted through electrical wires **58** and **60**. Electrical wires **58** and **60** connect to electrodes **62** and **64**, respectively for applying a voltage potential across liquid crystal material **52**. Electrodes **62** and **64** can be a thin transparent material forming a coating on the interior of fluid-expandable sac. For example, a thin coating of tin oxide and indium oxide can be used for electrodes **62** and **64**.

In accordance with another embodiment of the present invention, liquid crystal material **52** may comprise a material that darkens on an increase in the voltage potential supplied across such a liquid crystal material. A small photo electric cell (not shown) is mounted in the conjunctiva of the eye for monitoring the ambient light for automatically altering the optical density of the liquid crystal material.

In accordance with another embodiment of the present invention, instead of using a photo electric cell to monitor the ambient light, a small electrode **66** can be placed in the iris of the eye and the size of the pupil or contraction of the iris which occurs under a particular lighting condition can be used to monitor the potential generated so that the intraocular lens would then become darkened when the pupil started to contract with increasing light. It is well known that the pupil contracts under two circumstances, when there is increased light and when one is reading or looking at a close object. During the reading phase the ciliary body also contracts in order to produce normal accommodation and electrode **54** is provided for sensing ciliary muscle in order to alter the refractive index of the liquid crystal for the reading and simultaneous monitor the iris contraction. This allows a determination to be made when both the iris and ciliary muscle contract to therefore prevent the lens from darkening when reading. However, when the eye looks at a bright room it is not reading, or looking at close objects, the pupil would be small but the ciliary body would not contract and therefore there would be an impulse only from the iris so that the lens would then be darkened. By proper choosing the type of liquid crystal material, it would be possible to control both optical density and index of refraction of posterior chamber intraocular lens **48**. For example, by utilizing a liquid crystal material that darkens under an applied voltage between V_o and V_1, and changes its index of refraction under an applied voltage between V_2 and V_3, where the range of V_0 to V_1 is exclusive of the range of V_2 to V_3, both the index of refraction and optical density of posterior chamber intraocular lens **48** can be controlled utilizing electrodes **54** and **66**.

In another embodiment, the fluid-expandable sac may contain a material which, in direct response to increased light, becomes optically denser. With this embodiment, it would not be necessary to incorporate electrodes to monitor microcontractions and relaxation if the material would automatically change its optical density is a direct response to the lighting condition.

While the invention has been described with respect to preferred embodiments, it is to be understood that the invention is capable of numerous modifications, rearrangements and changes that are within the scope of the invention as defined by the appended claims.

I claim:

1. A posterior chamber intraocular lens for an eye comprising:

a fluid-expandable sac constructed of flexible, transparent material for containing fluid and dimensioned for occupying the posterior chamber of the eye when expanded with fluid in place of at least a portion of the natural lens; and

valve means connected to said sac for extending through the sclera of the eye for selectively varying the optical characteristics of the fluid within said sac in order to vary the optical characteristics of the wearer's eye while said sac is in the wearer's eye.

2. The posterior chamber intraocular lens as recited in claim **1** wherein the shape of said sac when expanded with fluid is biconvex.

3. The posterior chamber intraocular lens as recited in claim **1** wherein said fluid-expandable sac is dimensioned to occupy essentially the entire posterior chamber of the eye when expanded with fluid.

4. The posterior chamber lens as recited in claim **1** wherein said fluid-expandable sac is filled with fluid of a predetermined index of refraction for providing a lens having a desired power.

5. The lens as recited in claim **4** wherein said fluid is a gas.

6. The lens as recited in claim **4** wherein said fluid is an aqueous solution.

7. The lens as recited in claim **4** wherein said fluid is an oil.

8. The lens as recited in claim **7** wherein said fluid is silicone oil.

9. The lens as recited in claim **4** wherein said fluid is water.