US 20070100443A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2007/0100443 A1**

Peyman (43) **Pub. Date: May 3, 2007**

(54) **INTRAOCULAR LENS ADAPTED FOR ACCOMMODATION VIA ELECTRICAL SIGNALS**

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(21) Appl. No.: **11/259,781**

(22) Filed: **Oct. 27, 2005**

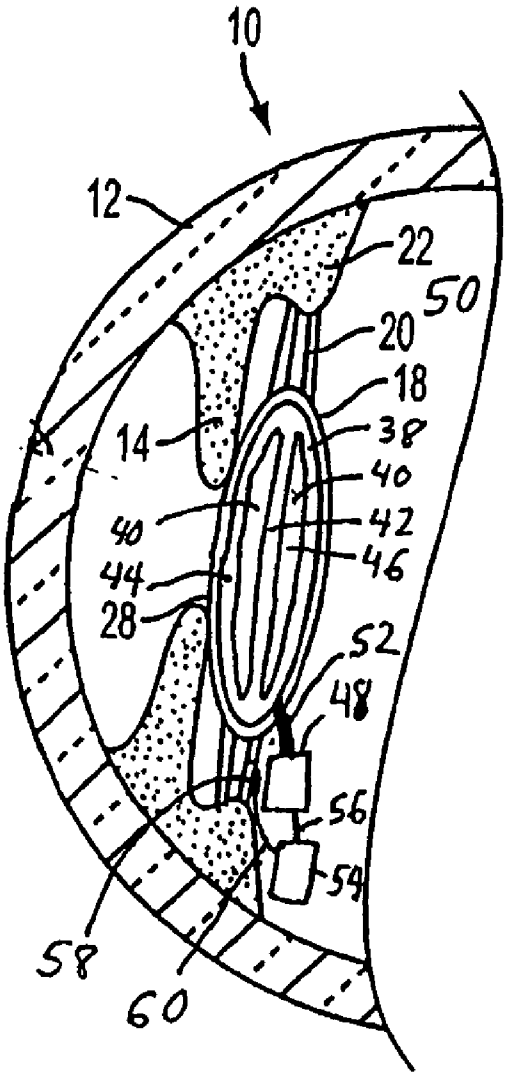
Publication Classification

(51) **Int. Cl.**
A61F 2/16 (2006.01)

(52) **U.S. Cl.** **623/6.13**; 623/6.37

(57) **ABSTRACT**

A lens system is provided. The lens system can include a lens adapted to be part of the optical pathway of an eye and a sensor. The sensor is adapted to sense a condition. The lens system also includes a control unit. The control unit is adapted to receive a signal from the sensor. The signal includes information about the condition. The control unit is operable to alter the shape of the lens based at least partly upon the condition. The lens can be adapted for positioning inside the capsular bag of the eye, in the posterior chamber of the eye, in place of the capsular bag of the eye or in the cornea. The sensor can be a tension sensor. The condition can be the amount of tension at the zonules of the eye. The control system can include a fluidic pressure generator and a fluid flow control device.



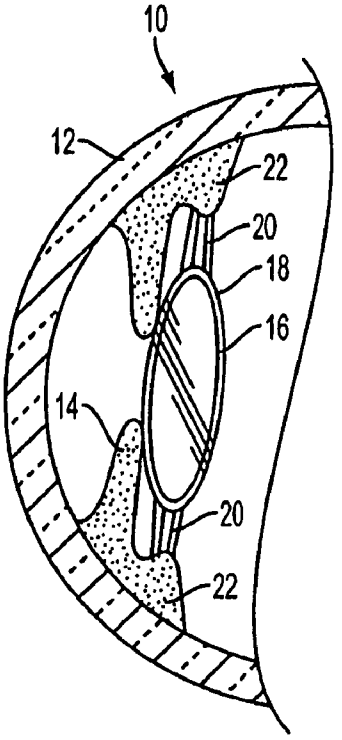


FIG. 1

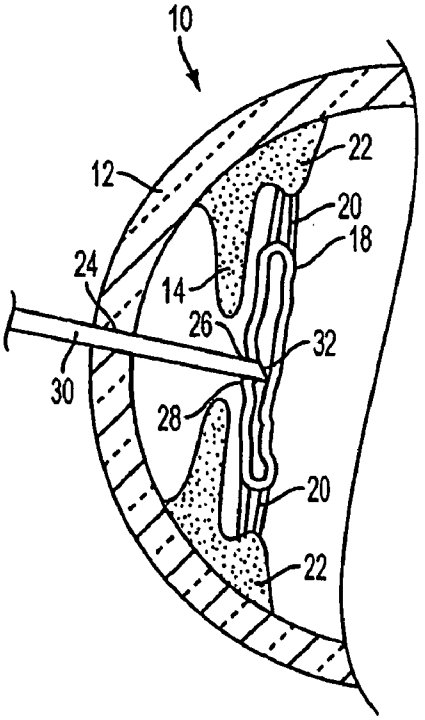


FIG. 2

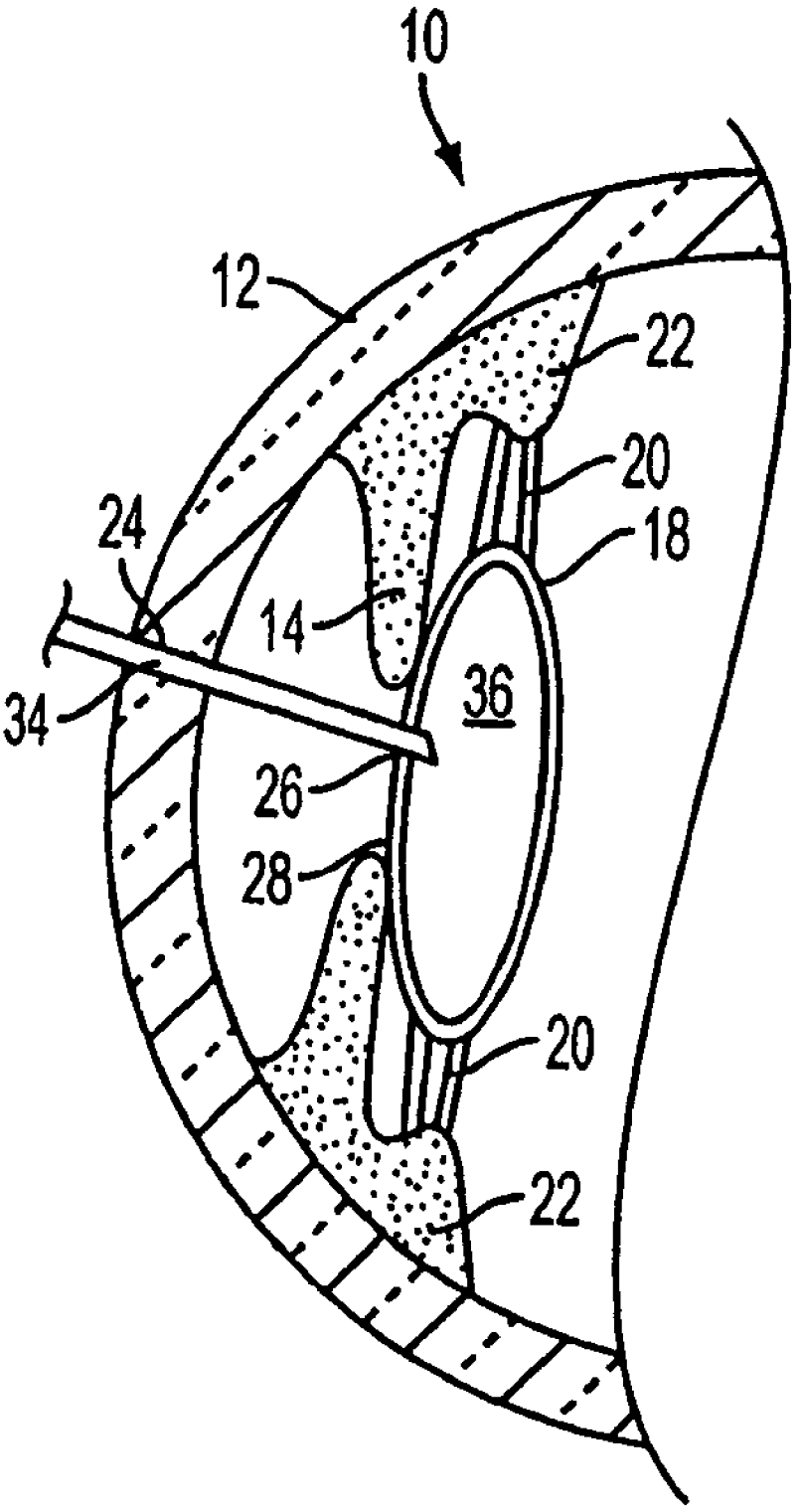


FIG. 3

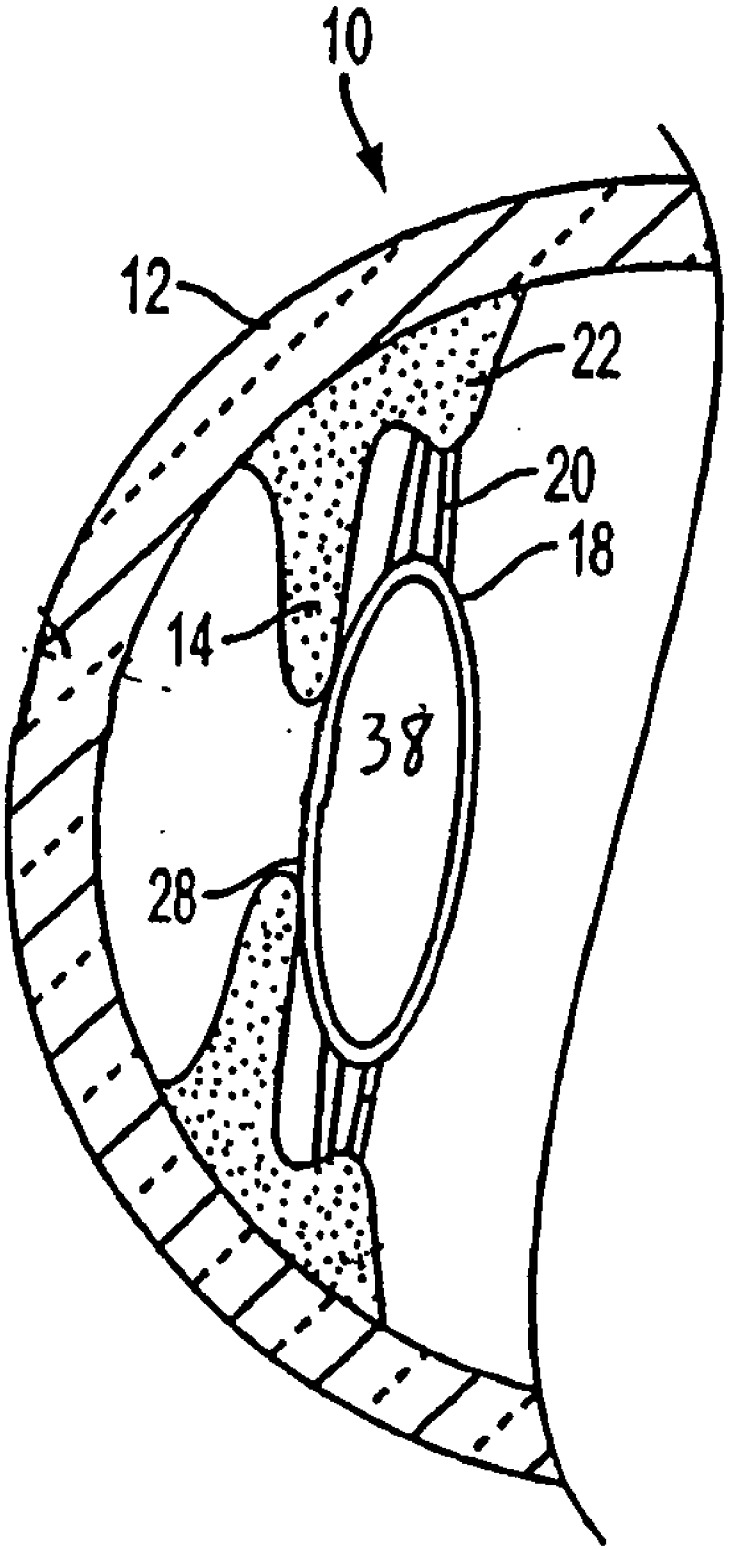


FIG. 4

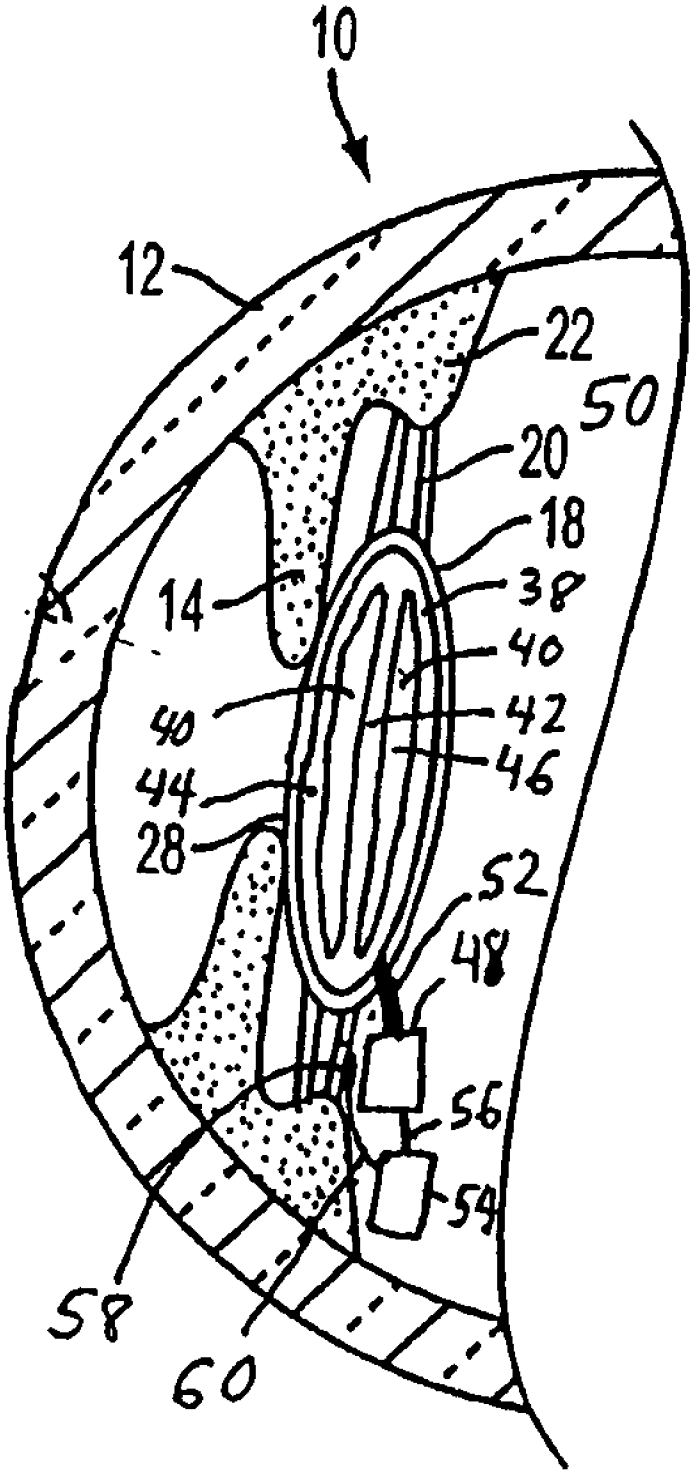


FIG. 5

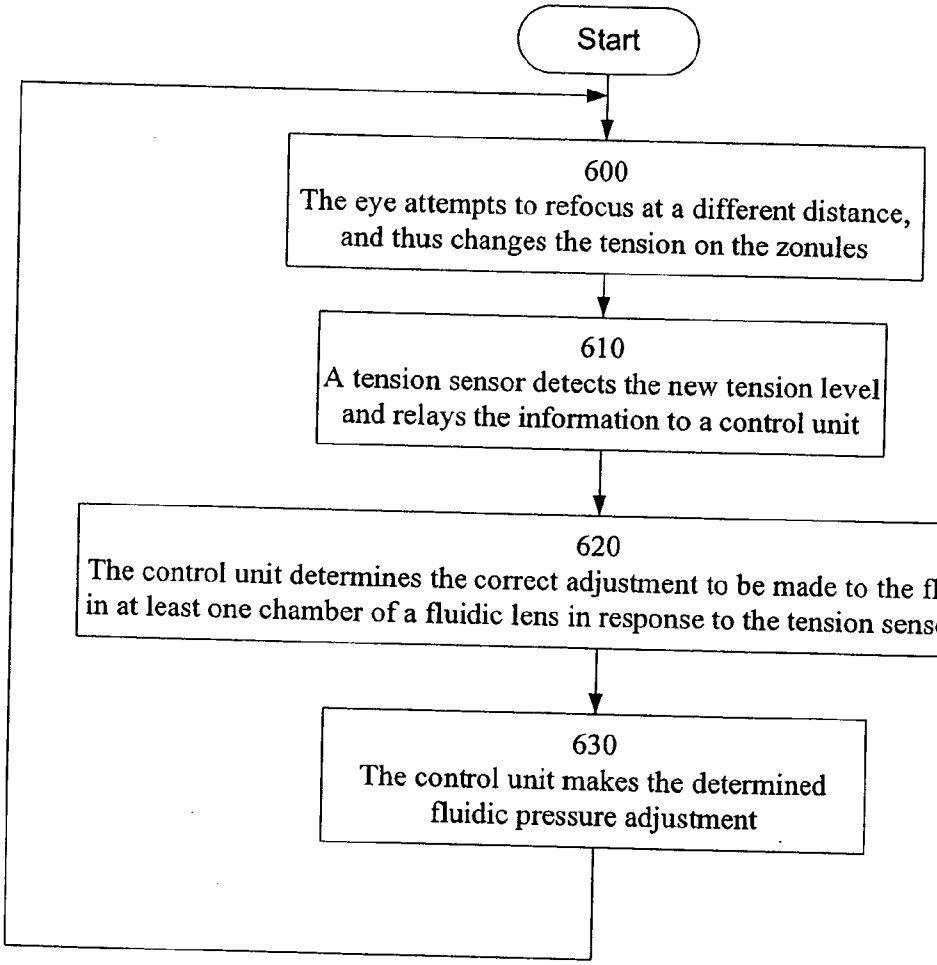

Start
600
The eye attempts to refocus at a different distance, and thus changes the tension on the zonules
610
A tension sensor detects the new tension level and relays the information to a control unit
620
The control unit determines the correct adjustment to be made to the fluidic pressure in at least one chamber of a fluidic lens in response to the tension sensor information
630
The control unit makes the determined fluidic pressure adjustment

Fig. 6

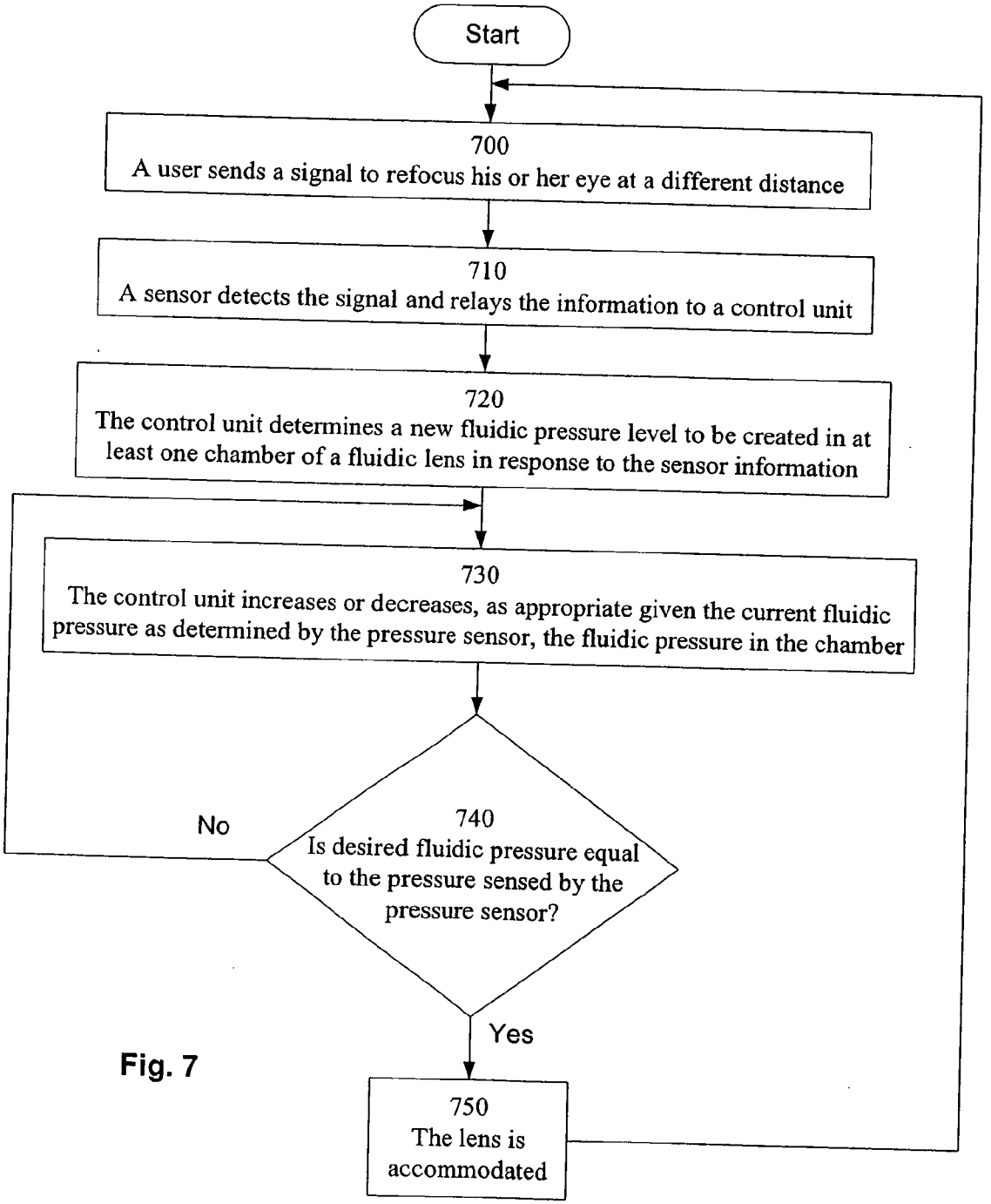

Start
700
A user sends a signal to refocus his or her eye at a different distance
710
A sensor detects the signal and relays the information to a control unit
720
The control unit determines a new fluidic pressure level to be created in at least one chamber of a fluidic lens in response to the sensor information
730
The control unit increases or decreases, as appropriate given the current fluidic pressure as determined by the pressure sensor, the fluidic pressure in the chamber
740
Is desired fluidic pressure equal to the pressure sensed by the pressure sensor?
No
Yes
750
The lens is accommodated

Fig. 7

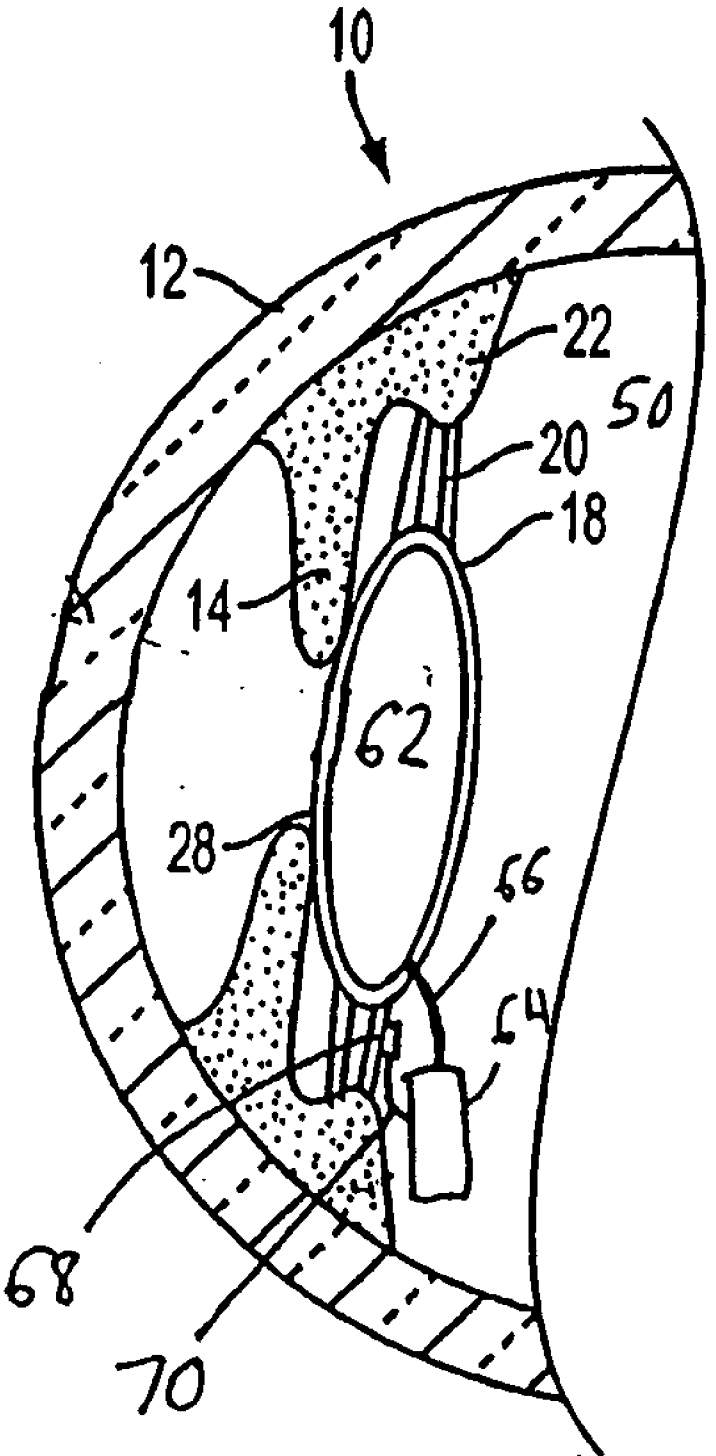


FIG. 8

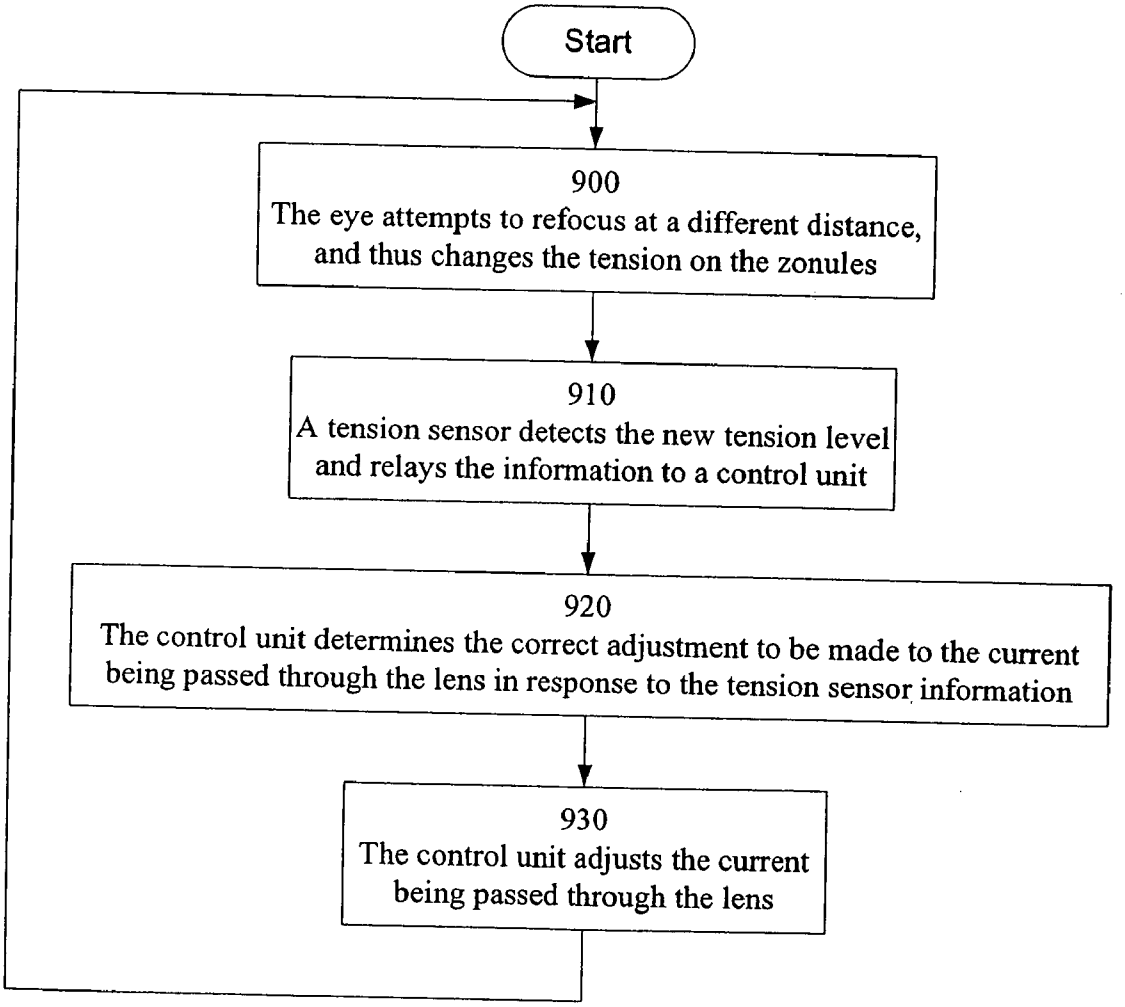

Start
900
The eye attempts to refocus at a different distance, and thus changes the tension on the zonules
910
A tension sensor detects the new tension level and relays the information to a control unit
920
The control unit determines the correct adjustment to be made to the current being passed through the lens in response to the tension sensor information
930
The control unit adjusts the current being passed through the lens

Fig. 9

INTRAOCULAR LENS ADAPTED FOR ACCOMMODATION VIA ELECTRICAL SIGNALS

BACKGROUND

[0001] An eye can have various disorders which affect the crystalline lens of the eye. One of the most common disorders is cataracts, which is a clouding of the crystalline lens. The conventional treatment for cataracts is removal of the crystalline lens and replacement of the lens with an artificial or intraocular lens (IOL).

[0002] Once an IOL is implanted, however, it generally has a fixed refractive power. This presents a problem with respect to both far and near vision. With respect to far vision, the diopter power of the IOL is generally not capable of perfect vision—i.e. 20/20. This problem is due to the fact that the refractive power of the IOL must be chosen prior to implantation and thus can only be approximated. Since the diopter power can only be approximated, most patients will require at least a ±1.00 diopter power correction along the optical path to provide perfect vision. With respect to near vision, an artificial lens results in a loss of accommodation (i.e., the process of focusing the eye between far objects and near objects).

SUMMARY

[0003] In one embodiment, a lens system is provided. The lens system includes a lens adapted to be part of the optical pathway of an eye and a sensor. The sensor is adapted to sense a condition. The lens system also includes a control unit. The control unit is adapted to receive a signal from the sensor. The signal includes information about the condition. The control unit is also operable with the lens to alter the shape of the lens based at least partly upon the condition.

[0004] The lens can be adapted for positioning inside the capsular bag of the eye, in the posterior chamber of the eye, in place of the capsular bag of the eye or in the cornea. The sensor can be a tension sensor. The condition can be the amount of tension at the zonules of the eye. The control system can be operable with the lens to alter the shape of the lens by passing a current through the lens. The control system can include a fluidic pressure generator and a fluid flow control device. The lens can include a chamber adapted to receive a fluid. Further, the control system can be operable with the lens to alter the shape of the lens by changing the fluidic pressure in the chamber. The fluid can be a sodium chromate solution. The chamber can be at least partly enclosed by a flexible membrane. The sensor can be a wireless signal receiver.

[0005] In another embodiment, a lens is provided. The lens includes a flexible membrane and a chamber adapted to receive a fluid. The flexible membrane is adapted to at least partly enclose the chamber. The lens is adapted to be part of the optical pathway of an eye. The chamber is fluidly coupled to a control unit, and the control unit is operable to control the fluidic pressure inside the chamber.

[0006] The fluid can be a sodium chromate solution. The control unit can receive a signal from a sensor, wherein the signal includes information about a condition. The sensor can be a tension sensor. The condition can be the amount of tension at the zonules of the eye. The sensor can be a wireless signal receiver.

[0007] In another embodiment, a control unit is provided. The control unit includes a fluidic pressure generator and an electronic circuit. The control unit is coupled to a lens, and the lens includes a chamber adapted to receive a fluid and a flexible membrane, wherein the flexible membrane is adapted to at least partly enclose the chamber. The lens is adapted to be part of the optical pathway of an eye. The chamber is fluidly coupled to the fluidic pressure generator, and the electronic circuit is operable to control the fluidic pressure generator. The fluidic pressure generator is operable to change the fluidic pressure inside the chamber.

[0008] The fluid can be a sodium chromate solution. The electronic circuit can receive a signal from a sensor, wherein the signal includes information about a condition. The sensor can be a tension sensor. The condition can be the amount of tension at the zonules of the eye.

[0009] Additional features and advantages are described herein, and will be apparent from, the following Detailed Description and the figures.

BRIEF DESCRIPTION OF THE FIGURES

[0010] FIG. **1** is a side elevational view in section taken through the center of an eye showing the cornea, pupil, crystalline lens, and capsular bag.

[0011] FIG. **2** is a side elevational view in section of the eye shown in FIG. **1** showing the capsular bag after removal of the crystalline lens.

[0012] FIG. **3** is a side elevational view in section of the eye shown in FIG. **2** showing the treatment of the interior of the capsular bag with a liquid to prevent capsular opacification.

[0013] FIG. **4** is a side elevational view in section of the eye shown in FIG. **3** showing placement of a replacement lens into the capsular bag.

[0014] FIG. **5** is a side elevational view in section of the eye shown in FIG. **3** in which a replacement lens is positioned in the capsular bag and a fluidic system and remote power unit are positioned in the posterior chamber.

[0015] FIG. **6** is a flow chart of the process of accommodation in accordance with one embodiment of the present invention.

[0016] FIG. **7** is a flow chart of the process of accommodation in which the fluidic system includes a pressure sensor for sensing the pressure in at least one of the chambers in accordance with one embodiment of the present invention.

[0017] FIG. **8** is a side elevational view in section of the eye shown in FIG. **3** in which a replacement lens is positioned in the capsular bag and a power unit is positioned in the posterior chamber.

[0018] FIG. **9** is a flow chart of the process of accommodation in response to electrical signals in accordance with one embodiment of the present invention.

DETAILED DESCRIPTION

[0019] In various embodiments, a lens capable of accommodation in response to electrical signals is provided. The lens can be placed at any suitable location along the optical path of an eye, including but not limited to within the

capsular bag, in place of the capsular bag, within the posterior chamber or on, in or behind the cornea. Further, it should be noted that any suitable section of the capsular bag can be removed, including but not limited to an anterior portion or a posterior portion around the main optical axis of the eye. The lens is preferably coupled to a fluidic pumping system which is also coupled to a control system which preferably includes a power source and a signal generation unit.

[0020] Referring initially to FIG. **1**, a normal eye **10** has a cornea **12**, an iris **14**, and a crystalline lens **16**. The crystalline lens **16** is contained within a capsular bag **18** that is supported by zonules **20**. The zonules **20**, in turn, are connected to the ciliary muscle **22**. According to Helmholz's theory of accommodation, upon contraction of the ciliary muscle **22**, the tension on the zonules **20** is released. The elasticity of the lens causes the curvature of the lens **16** to increase, thereby providing increased refractive power for near vision. Conversely, during dis-accommodation, the ciliary muscle **22** is relaxed, increasing the tension on the zonules **20** and flattening the lens **16** to provide the proper refractive power for far vision.

[0021] If the electrically accommodating lens is to be positioned within the capsular bag and, thus, replace the crystalline lens, a suitable first step is to remove the existing lens. As illustrated in FIG. **2**, the lens is preferably removed using any technique which allows removal of the lens through a relatively small incision, preferably about a 1-2 mm incision. The preferred method is to create a relatively small incision **24** in the cornea **12** and then perform a capsulorhexis to create an opening **26** into the anterior side **28** of the capsular bag **18**. An ultrasonic probe **30** is inserted into the capsular bag **18** through the opening **26**. The probe's vibrating tip **32** emulsifies the lens **16** into tiny fragments that are suctioned out of the capsular bag by an attachment on the probe tip (not shown). Alternatively, the lensectomy may be performed by laser phacoemulsification or irrigation and aspiration.

[0022] Once the crystalline lens **16** has been removed, the capsular bag **18** can be treated to help prevent a phenomenon known as capsular opacification. Capsular opacification is caused by the proliferated growth of the epithelial cells on the lens capsule. This growth can result in the cells covering all or a substantial portion of the front and rear surfaces of the lens capsule, which can cause the lens capsule to become cloudy and thus adversely affect the patient's vision. These cells can be removed by known techniques, such as by scraping away the epithelial cells; however, it is often difficult to remove all of the unwanted cells. Furthermore, after time, the unwanted cells typically grow back, requiring further surgery. To prevent capsular opacification, the capsular bag **18** is preferably treated to eliminate the proliferated growth of epithelial cells, as described below.

[0023] As seen in FIG. **3**, one method of treating the epithelial cells to prevent capsular opacification is to use a cannula **34** to introduce a warm liquid **36** (preferably about <60° C.) into the capsular bag **18**, filling the capsular bag **18**. The liquid contains a suitable chemical that kills the remaining lens cells in the capsular bag and also cleans the interior of the capsular bag. Suitable chemicals, as well as other suitable methods of treatment that prevent capsular opacification are disclosed in U.S. Pat. No. 6,673,067 to Peyman, which is herein incorporated by reference in its entirety.

[0024] As shown in FIG. **4**, a replacement lens **38** is then positioned within the capsular bag **18**. Preferably, the lens **38** can be folded or rolled and inserted through the incision in the capsular bag **18**; however, the lens **38** can be rigid and/or can be inserted through a larger second incision in the capsular bag **18** or the initial incision, possibly after the initial incision is widened, or in any other suitable manner. Preferably the lens **38** varies its focal length in response to changes in fluidic pressure within the lens made in accordance with electrical signals; however the lens **38** can change its index of refraction or alter its focal length in any other suitable manner. Since the capsular bag **18** is still in place, the capsular bag can still assist in accommodation; however, it is not necessary for capsular bag **18** to assist with accommodation. The lens, as shown in FIG. **5**, preferably includes two chambers **40** set on opposite sides of a substrate **42** and covered with a flexible membrane **44**; however, the lens can have one or any other suitable number of chambers. Preferably, the two chambers **40** contain a fluid **46**, and preferably the fluid **46** is a sodium chromate solution; however, if desired, one or more of the chambers can contain something other than a fluid or the chambers can contain different fluids or different sodium chromate solutions. The substrate **42** is preferably glass; however, the substrate **42** can be any suitable material. Preferably, the flexible membrane **44** is a biocompatible material; however, the flexible membrane can be any suitable material.

[0025] Preferably, the fluidic pressure within the chambers **40** can be altered using a fluidic system **48** which includes a miniature fluidic pressure generator (e.g., a pump or any other suitable device), a fluid flow control device (e.g., a valve or any other suitable device), a control circuit and a pressure sensor; however, the fluidic pressure can be altered in any suitable manner. Further, if desired, a fluidic system **48** does not need a pressure sensor. When subjected to electrical signal, the electronic control circuit of the fluidic system **48** controls the valves and pumps to adjust the fluidic pressure in one or more of the chambers **40**. Preferably, the fluidic pressure is adjusted by pumping fluid in or releasing a valve to allow fluid to flow out and back into the system **48**; however, the fluidic pressure can be adjusted by pumping fluid out or in any other suitable manner. As a result, the shape and the focal length of the lens **38** is altered, providing accommodation. Lenses that similarly change focal length in response to fluidic pressure changes made in accordance with electrical signals are described in greater detail in "Integrated Fluidic Adaptive Zoom Lens", *Optics Letters,* Vol. 29, Issue 24, 2855-2857, December 2004, the entire contents of which is hereby incorporated by reference.

[0026] As shown in FIG. **5**, fluidic system **48** is preferably positioned in the posterior chamber **50**; however, the fluidic system **48** can be positioned outside the eye, within the sclera, between the sclera and the choroids or any other suitable location. Further, the fluidic system **48** is preferably positioned such that it is not in the visual pathway. A tube **52** fluidly connects the lens **38** and the fluidic system **48**. Preferably, the tube **52** passes through a small incision in the capsular bag **18** near the connection of the zonules **20** and the capsular bag **18**; however, the tube **52** can pass through the capsular bag in any suitable location.

[0027] Preferably, fluidic system **48** includes a power source which is preferably rechargeable through induction or other suitable means such as generating and storing

electrical energy using eye and/or head movement to provide the energy to drive the generator; however, fluidic system **48** can be connected to a remote power source **54** as shown in FIG. **5** or to any other suitable power source. Preferably, the remote power source **54** is located in the posterior chamber **50**; however, the remote power source **54** can be positioned outside the eye (e.g., under the scalp, within a sinus cavity, under the cheek, in the torso or in any other suitable location), within the sclera, between the sclera and the choroids or any other suitable location. Further, the remote power source **54** is preferably positioned such that it is not in the visual pathway. The remote power source **54** is preferably electrically coupled to the fluidic system **48** by electrically conductive line **56**; however, the remote power source **54** can be coupled to the fluidic system **48** in any suitable manner. Further, the remote power source **54** preferably includes a signal generator which can supply control signals to the fluidic system **48** via electrically conductive line **56**; however, the remote power source **54** can be without a signal generator, if desired, or can supply control signals to the fluidic system **48** in any suitable manner. Similar remote power sources are described in more detail in U.S. Pat. No. 6,947,782 to Schulman et al., which is herein incorporated by reference in its entirety.

[**0028**] Preferably, the remote power source **54** is coupled to a sensor **58** by electrically conductive line **60**; however, the remote power source **54** can be coupled to sensor **58** in any suitable manner. The sensor **58** is preferably a tension sensor positioned on the zonules **20** so that the sensor **58** detects the amount of tension present in the zonules **20**; however, the sensor **58** can be a wireless signal sensor, a neurotransmitter sensor, a chemical sensor, a pressure sensor or any other suitable sensor type and/or can be positioned in or near the ciliary muscle **22**, at or near the nerve controlling the ciliary muscle **22**, in the capsular bag **18** or in any other suitable location. Preferably, the sensor **58** detects the eye's attempt to cause its lens to accommodate; however, the sensor **58** can detect a manual attempt to accommodate the lens **38** (e.g., input through a wireless controller) or any other suitable input. The information detected at the sensor **58** is relayed to the remote power source **54** via line **60**, and the signal generator of the remote power source **54** generates a signal in accordance with the information. The signal is sent to the fluidic system **48**, which adjusts the fluidic pressure in one or more of the chambers **40** accordingly. Thus, the eye's natural attempts to focus will result in accommodation of lens **38**. Response of lens **38** may vary from that of the natural lens; however, the neural systems which control the ciliary muscle **22** (and therefore the tension on the zonules **20**), are provided with feedback from the optic nerve and visual neural pathways. As a result, the neural system can learn and adjust to the characteristics of the lens **38**.

[**0029**] The process of accommodation in accordance with one embodiment is shown in FIG. **6**. At step **600**, the eye attempts to refocus at a different distance, and thus changes the tension on the zonules. At step **610**, a tension sensor detects the new tension level and relays the information to a control unit. The control unit preferably includes a remote power source and a fluidic system; however, the control unit can include any suitable devices. At step **620**, the control unit determines the correct adjustment to be made to the fluidic pressure in at least one chamber of a fluidic lens in response to the tension sensor information. At step **630**, the control unit makes the determined fluidic pressure adjustment and the process repeats at step **600**.

[**0030**] Another process of accommodation in accordance with another embodiment in which the fluidic system includes a pressure sensor for sensing the pressure in at least one of the chambers is shown in FIG. **7**. At step **700**, a user sends a signal to refocus his or her eye at a different distance. Preferably, the signal is sent wirelessly; however, the signal can be sent in any suitable manner. Further, the signal preferably includes information corresponding to the desired different distance; however, the signal can include information indicating only that the desired distance is closer or farther or any other suitable information. At step **710**, a sensor detects the signal and relays the information to a control unit. The control unit preferably includes a remote power source and a fluidic system; however, the control unit can include any suitable devices. At step **720**, the control unit determines a new fluidic pressure level to be created in at least one chamber of a fluidic lens in response to the sensor information. At step **730**, the control unit increases or decreases, as appropriate given the current fluidic pressure as determined by the pressure sensor, the fluidic pressure in the chamber. At step **740** it is determined whether the desired fluidic pressure is equal to the pressure sensed by the pressure sensor. If the desired fluidic pressure is equal to the pressure sensed by the pressure sensor, at step **750**, the lens is accommodated and the process repeats at step **700**. If the desired fluidic pressure is not equal to the pressure sensed by the pressure sensor, the process repeats at step **730**.

[**0031**] FIG. **8** illustrates an alternative accommodating lens **62**. Lens **62** responds to electrical stimulation by changing its focal length. Similar to lens **38**, lens **62** is preferably placed within the capsular bag **18**; however, the lens **62** can be placed in the posterior chamber **50**, in place of the capsular bag **18**, within the cornea **12**, on the surface of the eye or in any other suitable location. Further, it should be noted that any suitable section of the capsular bag can be removed, including but not limited to an anterior portion or a posterior portion around the main optical axis of the eye. If the lens **62** is placed within the capsular bag **18**, the capsular bag can assist with accommodation; however, it is not necessary for the capsular bag **18** to assist with accommodation. Lens **62** may have one or more chambers that are at least partly filled with a fluid or other substance; however, lens **62** is not required to have a chamber.

[**0032**] Preferably, lens **62** is a fluid lens that alters its focal length by changing its shape; however lens **62** can be any suitable type of lens and can change its focal length in any suitable manner. The lens **62** preferably includes two immiscible (i.e., non-mixing) fluids of different refractive index (or other suitable optical property); however, the lens **62** is not required to include two immiscible fluids of different refractive index. Preferably, one of the immiscible fluids is an electrically conducting aqueous solution and the other an electrically non-conducting oil, contained in a short tube with transparent end caps; however, the immiscible fluids can be any suitable fluids and can be contained in any suitable container. The internal surfaces of the tube wall and one of its end caps are preferably coated with a hydrophobic coating that causes the aqueous solution to form itself into a hemispherical mass at the opposite end of the tube, where it acts as a spherically curved lens; however, the hydrophobic coating is not required and, if present, can be arranged

in any suitable manner. Further, the coating can include any suitable material, including hydrophilic substances.

[0033] Preferably, the shape of the lens **62** can be adjusted by applying an electric field across the hydrophobic coating such that it becomes less hydrophobic (a process called "electrowetting" that results from an electrically induced change in surface-tension); however, the shape of the lens **62** can be adjusted by applying an electric field across any suitable portion of the lens **62**. Preferably, as a result of this change in surface-tension, the aqueous solution begins to wet the sidewalls of the tube, altering the radius of curvature of the meniscus between the two fluids and hence the focal length of the lens. Increasing the applied electric field can preferably cause the surface of the initially convex lens to become less convex, substantially flat or concave; however increasing the applied electric field can cause the surface of the lens to change in any suitable manner. Preferably, decreasing the applied electric field has the opposite effect, enabling the lens **62** to transition smoothly from being convergent to divergent, or vice versa, and back again repeatably.

[0034] The lens **62** can measure 3 mm in diameter by 2.2 mm in length; however the lens **62** can have any suitable dimensions. The focal range of the lens **62** can be any suitable range and can extend to infinity. Further, switching over the full focal range can occur in less than 10 ms or any other suitable amount of time. Preferably, lens **62** is controlled by a DC voltage and presents a capacitive load; however, the lens **62** can be controlled by any suitable voltage and operate with any suitable electrical properties.

[0035] Lens **62** is electrically coupled to a power source **64** by electrically conductive line **66**; however, lens **62** can be coupled to power source **64** in any suitable manner. Preferably, power source **64** is rechargeable through induction or other suitable means such as generating and storing electrical energy using eye and/or head movement to provide the energy to drive the generator; however, the power source **64** can be non-rechargeable, if desired. Similar to remote power source **54**, the power source **64** is preferably located in the posterior chamber **50**; however, the power source **64** can be positioned outside the eye (e.g., under the scalp, within a sinus cavity, under the cheek, in the torso or in any other suitable location), within the sclera, between the sclera and the choroids or any other suitable location. Further, the power source **64** is preferably positioned such that it is not in the visual pathway. The power source **64** preferably includes a signal generator which can supply current to the lens **62** via electrically conductive line **66**; however, the power source **64** can be without a signal generator, if desired, or can supply control signals to the lens **62** in any suitable manner.

[0036] Preferably, the power source **64** is coupled to a sensor **68** by electrically conductive line **70**; however, the power source **64** can be coupled to sensor **68** in any suitable manner. The sensor **68** is preferably a tension sensor positioned on the zonules **20** so that the sensor **68** detects the amount of tension present in the zonules **20**; however, the sensor **68** can be a wireless signal sensor, a neurotransmitter sensor, a chemical sensor, a pressure sensor or any other suitable sensor type and/or can be positioned in or near the ciliary muscle **22**, at or near the nerve controlling the ciliary muscle **22**, in the capsular bag **18** or in any other suitable location. Preferably, the sensor **68** detects the eye's attempt to cause its lens to accommodate; however, the sensor **68** can detect a manual attempt to accommodate the lens **62** (e.g., input through a wireless controller) or any other suitable input. The information detected at the sensor **68** is relayed to the power source **64** via line **70**, and the signal generator of the power source **64** generates a signal in accordance with the information. The signal is sent and passed through the lens **62**, which preferably changes shape as a result of the electrical current flowing through it; however, the lens **62** could change its index of refraction in response to the electrical current flowing through it or change its focal length in any other suitable manner. Preferably, line **70** includes two separate electrical pathways that electrically couple to lens **62** at different, preferably substantially opposite, locations so that one of the pathways can serve as a ground wire; however, the lens **62** can be grounded in any other suitable manner to enable current supplied via line **70** to flow through the lens **62**. As a result, similar to lens **38**, the eye's natural attempts to focus will result in accommodation of lens **62**. Response of lens **62** may vary from that of the natural lens; however, as with lens **38**, the neural systems which control the ciliary muscle **22** (and therefore the tension on the zonules **20**), are provided with feedback from the optic nerve and visual neural pathways. As a result, the neural system can learn and adjust to the characteristics of the lens **62**.

[0037] The process of accommodation in response to electrical signals in accordance with one embodiment is shown in FIG. **9**. At step **900**, the eye attempts to refocus at a different distance, and thus changes the tension on the zonules. At step **910**, a tension sensor detects the new tension level and relays the information to a control unit. The control unit preferably includes a power source; however, the control unit can include any suitable devices. At step **920**, the control unit determines the correct adjustment to be made to the current being passed through the lens in response to the tension sensor information. At step **930**, the control unit adjusts the current being passed through the lens and the process repeats at step **900**.

[0038] It should be understood that various changes and modifications to the presently preferred embodiments described herein will be apparent to those skilled in the art. Such changes and modifications can be made without departing from the spirit and scope of the present subject matter and without diminishing its intended advantages. It is therefore intended that such changes and modifications be covered by the appended claims.

1. A lens system comprising:

a lens positioned within an eye; and

a control unit, wherein said control unit is operable with said lens to alter the focal length of said lens based at least partly upon a condition.

2. The lens system of claim 1, wherein said lens is adapted for positioning at a location selected from the group consisting of inside the substantially capsular bag of the eye, inside the capsular bag of the eye in which an anterior portion of the capsular bag around the optical axis of the eye is removed, inside the capsular bag of the eye in which a posterior portion of the capsular bag around the optical axis

of the eye is removed, the posterior chamber of the eye, the anterior chamber of the eye, in place of the capsular bag of the eye, and the cornea.

3. The lens system of claim 1, further comprising:

a sensor, wherein said sensor is adapted to sense the condition and wherein said control unit is adapted to receive a signal from said sensor, wherein the signal includes information about the condition.

4. The lens system of claim 3, wherein said condition is the amount of tension at the zonules of the eye.

5. The lens system of claim 1, wherein said control system is operable with said lens to alter the focal length of said lens by passing a current through said lens.

6. The lens system of claim 1, wherein said control system includes a fluidic pressure generator and a fluid flow control device, wherein said lens includes a chamber adapted to receive a fluid, and wherein said control system is operable with said lens to alter the focal length of said lens by changing the fluidic pressure in the chamber.

7. The lens system of claim 6, wherein the chamber is at least partly enclosed by a flexible membrane.

8. A lens comprising:

a chamber adapted to house a substance,

said lens being adapted to be positioned in an eye, wherein said lens is coupled to a control unit, wherein the control unit is operable to control the focal length of said lens by influencing the substance.

9. The lens of claim 8, wherein influencing the substance includes applying an electrical field across the substance.

10. The lens of claim 8, wherein influencing the substance includes changing the pressure of the substance in the chamber.

11. The lens of claim 8, wherein the control unit receives a signal from a sensor, wherein the signal includes information about a condition.

12. The lens of claim 11, wherein the condition is the amount of tension at the zonules of the eye.

13. A control unit comprising:

an electronic circuit; wherein said control unit is coupled to a lens, said lens including a chamber, which is adapted to house a substance, said lens being adapted to be positioned in an eye, said electronic circuit being operable to control the focal length of the lens.

14. The control unit of claim 13, wherein said electronic circuit being operable to control the focal length of the lens by applying an electric field to the substance.

15. The control unit of claim 13, wherein said electronic circuit receives a signal from a sensor, wherein the signal includes information about a condition.

16. The control unit of claim 15, wherein the condition is the amount of tension at the zonules of the eye.

17. An intraocular lens, comprising:

a lens body; and

a control system adapted to alter the refractive properties of the lens body such that the lens body at least partly assists in accommodation.

18. The intraocular lens of claim 17, wherein the control system is adapted to alter the refractive properties of the lens body by altering the shape of the lens body.

19. The intraocular lens of claim 17, wherein the control system is adapted to alter the shape of the lens body by altering the fluidic pressure in at least one chamber in the lens body.

20. The intraocular lens of claim 17, wherein the control system is adapted to alter the refractive properties of the lens body by altering the refractive index of at least one portion of the lens body.

21. A lens system comprising:

a lens positioned along the optical path of an eye; and

a control unit, wherein said control unit is operable with said lens to alter the focal length of said lens based at least partly upon a condition.

22. The lens of claim 21, wherein said lens is positioned within the eye.

23. The lens of claim 21, wherein the control unit is operable to alter the focal length of said lens in response to a manual input.

24. The lens of claim 21, wherein the control unit is operable to automatically alter the focal length of said lens.

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