CLAIMS

1. A contact lens with a variable optic insert positioned within at least a portion of an optical zone of the ophthalmic lens device, wherein the variable optic insert comprises:
a curved front surface and a curved back surface, wherein the front surface and the back surface are configured to bound at least a portion of one chamber;
an energy source embedded in the variable optic insert in at least a region comprising a non-optical zone; and
a layer containing liquid crystal material positioned within the at least one chamber,
wherein the layer includes regions of liquid crystal material aligned in a pattern wherein an index of refraction across at least a first portion of the variable optic insert varies with a radial dependence;
wherein the index of refraction across at least the first portion of the optic insert has a parabolic dependence on a radial dimension.

2. The contact lens of Claim 1, wherein an optical effect of the layer containing liquid crystal material is supplemented by an effect of different radii of insert surfaces.

3. The contact lens of Claim 1, further comprising:
a first layer of electrode material proximate to the curved back surface; and
a second layer of electrode material proximate to the curved front surface.

4. The contact lens of Claim 3, wherein at least a portion of the layer containing liquid crystal material varies its index of refraction affecting a ray of light traversing the layer containing liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material and wherein the variable optic insert alters a focal characteristic of the lens.

5. The contact lens of Claim 4, further comprising an electrical circuit, wherein the electrical circuit controls a flow of electrical energy from the energy source to the first and

second electrode layers wherein the electrical circuit comprises a processor.

6. A contact lens with a variable optic insert positioned within at least a portion of an optical zone of the ophthalmic lens device, wherein the variable optic insert comprises:
a curved first front surface and a curved first back surface wherein the first front surface and the first back surface are configured to bound at least a portion of a first chamber;
a curved second front surface and a curved second back surface wherein the second front surface and the second back surface are configured to bound at least a portion of a second chamber;
at least one layer containing liquid crystal material positioned within the at least one chamber, wherein the at least one layer includes regions of liquid crystal material aligned in a pattern wherein an index of refraction across at least a first portion of the variable optic insert varies with a radial dependence; and
an energy source embedded in the insert in at least a region comprising a non-optical zone;
wherein the index of refraction across at least the first portion of the optic insert has a parabolic dependence on a radial dimension.

7. The contact lens of Claim 6, wherein an optical effect of the layer containing liquid crystal material is supplemented by an effect of different curvature of insert surfaces.

8. The contact lens of Claim 6, further comprising:
a first layer of electrode material proximate to the first curved back surface; and
a second layer of electrode material proximate to the curved first front surface.

9. The contact lens of Claim 8, wherein the layer containing liquid crystal material varies its index of refraction affecting a ray of light traversing the layer contain-ing liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material and wherein the variable optic insert alters a focal characteristic of the lens.

10. The contact lens of Claim 9, further comprising an electrical circuit, wherein the electrical circuit controls a flow of electrical energy from the energy source to the first and second electrode layers wherein the electrical circuit comprises a processor.

11. A contact lens with a variable optic insert positioned within at least a portion of an optical zone of the ophthalmic lens device, wherein the variable optic insert comprises:
an insert front curve piece and an insert back curve piece, wherein a back surface of the front curve piece has a first curvature and a front surface of the back curve piece has a second curvature;
an energy source embedded in the insert in at least a region comprising a non-optical zone; and
a layer containing liquid crystal material, wherein the layer includes regions of liquid crystal material aligned in a pattern wherein an index of refraction across at least a first portion of the variable optic insert varies with a radial dependence;
wherein the index of refraction across at least the first portion of the optic insert has a parabolic dependence on a radial dimension.

12. The contact lens of Claim 11, wherein an optical effect of the layer containing liquid crystal material is supplemented by an effect of different curvature of insert surfaces.

13. The contact lens of Claim 11, wherein the first curvature is different from the second curvature.

14. The contact lens of Claim 11, further comprising:
a first layer of electrode material proximate to the back surface of the front curve piece; and
a second layer of electrode material proximate to the front surface of the back curve piece.

15. The contact lens of Claim 14, wherein the layer containing liquid crystal material varies its index of refraction affecting a ray of light traversing the layer containing liquid

crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material and wherein the variable optic insert alters a focal characteristic of the lens.

16. The contact lens of Claim 15, further comprising an electrical circuit, wherein the electrical circuit controls a flow of electrical energy from the energy source to the first and second electrode layers wherein the electrical circuit comprises a processor.

17. A contact lens with a variable optic insert positioned within at least a portion of an optical zone of the ophthalmic lens device, wherein the variable optic insert comprises:
an insert front curve piece, at least a first intermediate curve piece and an insert back curve piece, wherein a back surface of the front curve piece has a first curvature and a front surface of the first intermediate curve piece has a second curvature;
an energy source embedded in the insert in at least a region comprising a non-optical zone; and
the variable optic insert comprising a layer containing liquid crystal material, wherein the layer includes regions of liquid crystal material aligned in a pattern wherein an index of refraction across at least a first portion of the variable optic insert varies with a radial dependence;
wherein the index of refraction across at least the first portion of the optic insert has a parabolic dependence on a radial dimension.

18. The contact lens of Claim 17, wherein the first curvature is different from the second curvature.

19. The contact lens of Claim 17, further comprising:
a first layer of electrode material proximate to the front curve piece; and
a second layer of electrode material proximate to one or more of the intermediate curve piece and the back curve piece.

20. The contact lens of Claim 17, further comprising:
a first layer of electrode material proximate to the front curve piece; and
a second layer of electrode material proximate to the intermediate curve piece.

21. The contact lens of Claim 20, wherein the layer containing liquid crystal material varies its index of refraction affecting a ray of light traversing the layer containing liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material and wherein the variable optic insert alters a focal characteristic of the lens.

22. The contact lens of Claim 21, further comprising an electrical circuit, wherein the electrical circuit controls a flow of electrical energy from the energy source to the first and second electrode layers wherein the electrical circuit comprises a processor.

CLAIMS

1. A contact lens with a variable optic insert positioned within at least a portion of an optical zone of the ophthalmic lens device, wherein the variable optic insert comprises:
a curved front surface and a curved back surface, wherein the front surface and the back surface are configured to bound at least a portion of one chamber;
an energy source embedded in the variable optic insert in at least a region comprising a non-optical zone; and
a layer containing liquid crystal material positioned within the at least one chamber, extending fully between the curved front surface and a curved back surface wherein the layer includes regions of liquid crystal material aligned in a pattern wherein an index of refraction across at least a first portion of the variable optic insert varies with a radial dependence;
wherein the index of refraction across at least the first portion of the optic insert has a parabolic dependence on a radial dimension and wherein an optical effect of the layer containing liquid crystal material is supplemented by an effect of different radii of insert surfaces.

2. The contact lens of Claim 1, further comprising:
a first layer of electrode material proximate to the curved back surface; and
a second layer of electrode material proximate to the curved front surface.

3. The contact lens of Claim 2, wherein at least a portion of the layer containing liquid crystal material varies its index of refraction affecting a ray of light traversing the layer containing liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material and wherein the variable optic insert alters a focal characteristic of the lens.

4. The contact lens of Claim 3, further comprising an electrical circuit, wherein the electrical circuit controls a flow of electrical energy from the energy source to the first and

second electrode layers wherein the electrical circuit comprises a processor.

5. A contact lens with a variable optic insert positioned within at least a portion of an optical zone of the ophthalmic lens device, wherein the variable optic insert comprises:
a curved first front surface and a curved first back surface wherein the first front surface and the first back surface are configured to bound at least a portion of a first chamber;
a curved second front surface and a curved second back surface wherein the second front surface and the second back surface are configured to bound at least a portion of a second chamber;
at least one layer containing liquid crystal material positioned within the at least one chamber, extending fully between a curved front surface and its corresponding curved back surface wherein the at least one layer includes regions of liquid crystal material aligned in a pattern wherein an index of refraction across at least a first portion of the variable optic insert varies with a radial dependence; and
an energy source embedded in the insert in at least a region comprising a non-optical zone; wherein the index of refraction across at least the first portion of the optic insert has a parabolic dependence on a radial dimension and wherein an optical effect of the layer containing liquid crystal material is supplemented by an effect of different radii of insert surfaces.

6. The contact lens of Claim 5, wherein an optical effect of the layer containing liquid crystal material is supplemented by an effect of different curvature of insert surfaces.

7. The contact lens of Claim 5, further comprising:
a first layer of electrode material proximate to the first curved back surface; and
a second layer of electrode material proximate to the curved first front surface.

8. The contact lens of Claim 7, wherein the layer containing liquid crystal material varies its index of refraction affecting a ray of light traversing the layer contain-ing liquid crystal material when an electric potential is applied across the first layer of electrode material

and the second layer of electrode material and wherein the variable optic insert alters a focal characteristic of the lens.

9. The contact lens of Claim 8, further comprising an electrical circuit, wherein the electrical circuit controls a flow of electrical energy from the energy source to the first and second electrode layers wherein the electrical circuit comprises a processor.

10. A contact lens with a variable optic insert positioned within at least a portion of an optical zone of the ophthalmic lens device, wherein the variable optic insert comprises:
an insert front curve piece and an insert back curve piece, wherein a back surface of the front curve piece has a first curvature and a front surface of the back curve piece has a second curvature;
an energy source embedded in the insert in at least a region comprising a non-optical zone; and
a layer containing liquid crystal material, extending fully between the curved front surface and a curved back surface wherein the layer includes regions of liquid crystal material aligned in a pattern wherein an index of refraction across at least a first portion of the variable optic insert varies with a radial dependence;
wherein the index of refraction across at least the first portion of the optic insert has a parabolic dependence on a radial dimension and wherein an optical effect of the layer containing liquid crystal material is supplemented by an effect of different radii of insert surfaces.

11. The contact lens of Claim 10, wherein an optical effect of the layer containing liquid crystal material is supplemented by an effect of different curvature of insert surfaces.

12. The contact lens of Claim 10, wherein the first curvature is different from the second curvature.

13. The contact lens of Claim 10, further comprising:

a first layer of electrode material proximate to the back surface of the front curve piece; and

a second layer of electrode material proximate to the front surface of the back curve piece.

14. The contact lens of Claim 13, wherein the layer containing liquid crystal material varies its index of refraction affecting a ray of light traversing the layer containing liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material and wherein the variable optic insert alters a focal characteristic of the lens.

15. The contact lens of Claim 14, further comprising an electrical circuit, wherein the electrical circuit controls a flow of electrical energy from the energy source to the first and second electrode layers wherein the electrical circuit comprises a processor.

16. A contact lens with a variable optic insert positioned within at least a portion of an optical zone of the ophthalmic lens device, wherein the variable optic insert comprises:

an insert front curve piece, at least a first intermediate curve piece and an insert back curve piece, wherein a back surface of the front curve piece has a first curvature and a front surface of the first intermediate curve piece has a second curvature;

an energy source embedded in the insert in at least a region comprising a non-optical zone; and

the variable optic insert comprising a layer containing liquid crystal material, extending fully between the curved front surface and a curved back surface wherein the layer includes regions of liquid crystal material aligned in a pattern wherein an index of refraction across at least a first portion of the variable optic insert varies with a radial dependence;

wherein the index of refraction across at least the first portion of the optic insert has a parabolic dependence on a radial dimension and wherein an optical effect of the layer containing liquid crystal material is supplemented by an effect of different radii of insert surfaces.

17. The contact lens of Claim 16, wherein the first curvature is different from the second curvature.

18. The contact lens of Claim 16, further comprising:
a first layer of electrode material proximate to the front curve piece; and
a second layer of electrode material proximate to one or more of the intermediate curve piece and the back curve piece.

19. The contact lens of Claim 16, further comprising:
a first layer of electrode material proximate to the front curve piece; and
a second layer of electrode material proximate to the intermediate curve piece.

20. The contact lens of Claim 19, wherein the layer containing liquid crystal material varies its index of refraction affecting a ray of light traversing the layer containing liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material and wherein the variable optic insert alters a focal characteristic of the lens.

21. The contact lens of Claim 20, further comprising an electrical circuit, wherein the electrical circuit controls a flow of electrical energy from the energy source to the first and second electrode layers wherein the electrical circuit comprises a processor.