WHAT IS CLAIMED IS:

1. An ophthalmic lens device 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 liquid crystal molecules within the layer containing liquid crystal material are aligned in a hybrid pattern wherein an alignment pattern of liquid crystal molecules proximate to the curved front surface differs from an alignment pattern of liquid crystal molecules proximate to the curved back surface.

2. The ophthalmic lens device of Claim 1, wherein one of either the alignment pattern of liquid crystal molecules proximate to the curved front surface or the alignment pattern of liquid crystal molecules proximate to the curved back surface orients the liquid crystal molecules in a homeotropic orientation.

3. The ophthalmic lens device of Claim 2, wherein an optical effect of the layer comprised of hybrid aligned liquid crystal material is supplemented by an effect of different radii of the curved front surface and curved back surface.

4. The ophthalmic lens device of Claim 2, wherein the lens is a contact lens.

5. The ophthalmic lens device of Claim 4 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.

6. The ophthalmic lens device of Claim 5 wherein the layer of liquid crystal material varies its index of refraction affecting a ray of light traversing the layer of liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material.

7. The ophthalmic lens device of Claim 6 wherein the variable optic insert alters a focal characteristic of the lens.

8. The ophthalmic lens device of Claim 7 further comprising an electrical circuit, wherein the electrical circuit controls the flow of electrical energy from the energy source to the first and second electrode layers.

9. The ophthalmic lens device of claim 8 wherein the electrical circuit comprises a processor.

10. An ophthalmic lens device 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;

a layer containing liquid crystal material positioned within at least one of the first chamber and the second chamber, wherein liquid crystal molecules within the layer containing liquid crystal material are aligned in a hybrid pattern wherein an alignment pattern of liquid crystal molecules proximate to the curved front surface differs from an alignment pattern of liquid crystal molecules proximate to the curved back surface; and

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

11. The ophthalmic lens device of Claim 10, wherein one of either the alignment pattern of liquid crystal molecules proximate to the curved front surface or the alignment pattern of liquid crystal molecules proximate to the curved back surface orients the liquid crystal molecules in a homeotropic orientation.

12. The ophthalmic lens device of Claim 11, wherein an optical effect of the layer comprised of hybrid aligned liquid crystal material is supplemented by an effect of different radii of the curved front surface and curved back surface.

13. The ophthalmic lens device of Claim 10 wherein the lens is a contact lens.

14. The ophthalmic lens device of Claim 13, 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.

15. The ophthalmic lens device of Claim 14, wherein the layer of liquid crystal material varies its index of refraction affecting a ray of light traversing the layer of liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material.

16. The ophthalmic lens device of Claim 15, wherein the variable optic insert alters a focal characteristic of the lens.

17. The ophthalmic lens device of Claim 16, further comprising an electrical circuit, wherein the electrical circuit controls the flow of electrical energy from the energy source to the first and second electrode layers.

18. The ophthalmic lens device of Claim 17 wherein the electrical circuit comprises a processor.

19. A contact lens device with a variable optic insert positioned within at least a portion of an optical zone of the contact 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 form at least a first chamber;

a first layer of electrode material proximate to the curved first front surface;

a second layer of electrode material proximate to the curved first back surface;

a first layer containing liquid crystal material positioned within the first chamber, wherein liquid crystal molecules within the first layer containing liquid crystal material are aligned in a hybrid pattern wherein an alignment pattern of liquid crystal molecules proximate to the curved first front surface differs from an alignment pattern of liquid crystal molecules proximate to the curved first back surface, and wherein the first layer of liquid crystal material varies its index of refraction affecting a ray of light traversing the first layer of liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material ;

a curved second front surface and a curved second back surface wherein the second front surface and the second back surface are configured to form at least a second chamber;

a third layer of electrode material proximate to the curved second front surface;

a fourth layer of electrode material proximate to the curved second back surface;

a second layer containing liquid crystal material positioned within the second chamber, wherein liquid crystal molecules within the second layer containing liquid crystal material are aligned in a hybrid pattern wherein an alignment pattern of liquid crystal molecules proximate to the curved second front surface differs from an alignment pattern of liquid crystal molecules proximate to the curved second back surface, and wherein the second layer of liquid crystal material varies its index of refraction affecting a ray of light traversing the first layer of liquid crystal material when an electric potential is applied across the third layer of electrode material and the forth layer of electrode material;

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

an electrical circuit comprising a processor, wherein the electrical circuit controls the flow of electrical energy from the energy source to one or more of the first, second, third or fourth electrode layers; and

wherein the variable optic insert alters a focal characteristic of the ophthalmic lens.

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

a layer containing liquid crystal material positioned within the variable optic insert, wherein liquid crystal molecules within the layer containing liquid crystal material are aligned in a hybrid pattern , and wherein at least a first surface of the layer is curved.

21. An ophthalmic lens device 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 the non-optical zone; and

a layer containing liquid crystal material, wherein liquid crystal molecules within the layer containing liquid crystal material are aligned in a hybrid pattern wherein an alignment pattern of liquid crystal molecules proximate to the front curve piece differs from an alignment pattern of liquid crystal molecules proximate to the back curve piece.

22. The ophthalmic lens device of Claim 21, wherein one of the alignment

patterns of liquid crystal molecules proximate to the front curve piece or the alignment pattern of liquid crystal molecules proximate to the back curve piece orients the liquid crystal molecules in a homeotropic orientation.

23. The ophthalmic lens device of Claim 22, wherein an optical effect of the layer comprised of hybrid aligned liquid crystal material is supplemented by an effect of different radii of insert surfaces.

24. The ophthalmic lens device of Claim 21, wherein the first curvature is different from the second curvature.

25. The ophthalmic lens device of Claim 21, wherein the lens is a contact lens.

26. The ophthalmic lens device of Claim 25, 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.

27. The ophthalmic lens device of Claim 26, wherein the layer of liquid crystal material varies its index of refraction affecting a ray of light traversing the layer of liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material.

28. The ophthalmic lens device of Claim 27, wherein the variable optic insert alters a focal characteristic of the lens.

29. The ophthalmic lens device of Claim 28, further additionally comprising an electrical circuit, wherein the electrical circuit controls the flow of electrical energy from the energy source to the first and second electrode layers.

30. The ophthalmic lens device of Claim 29, wherein the electrical circuit comprises a processor.

31. An ophthalmic lens device 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 the non-optical zone; and

the variable optic insert comprising a layer containing liquid crystal material, wherein liquid crystal molecules within the layer containing liquid crystal material are aligned in a hybrid pattern wherein an alignment pattern of liquid crystal molecules proximate to the front curve piece differs from an alignment pattern of liquid crystal molecules proximate to the back curve piece.

32. The ophthalmic lens device of Claim 31, wherein one of the alignment patterns of liquid crystal molecules proximate to the front curve piece or the alignment pattern of liquid crystal molecules proximate to the back curve piece orients the liquid crystal molecules in a homeotropic orientation.

33. The ophthalmic lens device of Claim 32, wherein an optical effect of the layer comprised of hybrid aligned liquid crystal material is supplemented by an effect of different radii of insert surfaces.

34. The ophthalmic lens device of Claim 31, wherein the lens is a contact lens.

35. The ophthalmic lens device of Claim 34, 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.

36. The ophthalmic lens device of Claim 34, 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.

37. The ophthalmic lens device of Claim 36, wherein the layer of liquid crystal material varies its index of refraction affecting a ray of light traversing the layer of liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material.

38. The ophthalmic lens device of Claim 37, wherein the variable optic insert alters a focal characteristic of the lens.

39. The ophthalmic lens device of Claim 38, further comprising an electrical circuit, wherein the electrical circuit controls the flow of electrical energy from the energy source to the first and second electrode layers.

40. The ophthalmic lens device of Claim 39 wherein the electrical circuit comprises a processor.

CLAIMS

1. An ophthalmic lens device 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 liquid crystal molecules within the layer containing liquid crystal material are aligned in a hybrid pattern wherein an alignment pattern of liquid crystal molecules proximate to the curved front surface differs from an alignment pattern of liquid crystal molecules proximate to the curved back surface.

2. The device according to Claim 1, wherein one of either the alignment pattern of liquid crystal molecules proximate to the curved front surface or the alignment pattern of liquid crystal molecules proximate to the curved back surface orients the liquid crystal molecules in a homeotropic orientation.

3. The device according to Claim 2, wherein an optical effect of the layer comprised of hybrid aligned liquid crystal material is supplemented by an effect of different radii of the curved front surface and curved back surface.

4. The device according to Claim 2, wherein the lens is a contact lens.

5. The device according to Claim 4, 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.

6. The device according to Claim 5, wherein the layer of liquid crystal material varies its index of refraction affecting a ray of light traversing the layer of liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material.

7. The device according to Claim 6, wherein the variable optic insert alters a focal characteristic of the lens.

8. The device according to Claim 7, further comprising an electrical circuit, wherein the electrical circuit controls the flow of electrical energy from the energy source to the first and second electrode layers.

9. The device according to claim 8, wherein the electrical circuit comprises a processor.

10. An ophthalmic lens device 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;

a layer containing liquid crystal material positioned within at least one of the first chamber and the second chamber, wherein liquid crystal molecules within the layer containing liquid crystal material are aligned in a hybrid pattern wherein an alignment pattern of liquid crystal molecules proximate to the curved front surface differs from an alignment pattern of liquid crystal molecules proximate to the curved back surface; and

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

11. The device according to Claim 10, wherein one of either the alignment pattern of liquid crystal molecules proximate to the curved front surface or the alignment pattern of liquid crystal molecules proximate to the curved back surface orients the liquid crystal molecules in a homeotropic orientation.

12. The device according to Claim 11, wherein an optical effect of the layer comprised of hybrid aligned liquid crystal material is supplemented by an effect of different radii of the curved front surface and curved back surface.

13. The device according to Claim 10, wherein the lens is a contact lens.

14. The device according to Claim 13, 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.

15. The device according to Claim 14, wherein the layer of liquid crystal material varies its index of refraction affecting a ray of light traversing the layer of liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material.

16. The device according to Claim 15, wherein the variable optic insert alters a focal characteristic of the lens.

17. The device according to Claim 16, further comprising an electrical circuit, wherein the electrical circuit controls the flow of electrical energy from the energy source to the first and second electrode layers.

18. The device according to Claim 17, wherein the electrical circuit comprises a processor.

19. A contact lens device with a variable optic insert positioned within at least a portion of

an optical zone of the contact 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 form at least a first chamber;

a first layer of electrode material proximate to the curved first front surface;

a second layer of electrode material proximate to the curved first back surface;

a first layer containing liquid crystal material positioned within the first chamber, wherein liquid crystal molecules within the first layer containing liquid crystal material are aligned in a hybrid pattern wherein an alignment pattern of liquid crystal molecules proximate to the curved first front surface differs from an alignment pattern of liquid crystal molecules proximate to the curved first back surface, and wherein the first layer of liquid crystal material varies its index of refraction affecting a ray of light traversing the first layer of liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material;

a curved second front surface and a curved second back surface wherein the second front surface and the second back surface are configured to form at least a second chamber;

a third layer of electrode material proximate to the curved second front surface;

a fourth layer of electrode material proximate to the curved second back surface;

a second layer containing liquid crystal material positioned within the second chamber, wherein liquid crystal molecules within the second layer containing liquid crystal material are aligned in a hybrid pattern wherein an alignment pattern of liquid crystal molecules proximate to the curved second front surface differs from an alignment pattern of liquid crystal molecules proximate to the curved second back surface, and wherein the second layer of liquid crystal material varies its index of refraction affecting a ray of light traversing the first layer of liquid crystal material when an electric potential is applied across the third layer of electrode material and the forth layer of electrode material;

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

an electrical circuit comprising a processor, wherein the electrical circuit controls the flow of electrical energy from the energy source to one or more of the first, second, third or fourth electrode layers; and

wherein the variable optic insert alters a focal characteristic of the ophthalmic lens.

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

a layer containing liquid crystal material positioned within the variable optic insert, wherein liquid crystal molecules within the layer containing liquid crystal material are aligned in a hybrid pattern , and wherein at least a first surface of the layer is curved.

21. An ophthalmic lens device 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 the non-optical zone; and

a layer containing liquid crystal material, wherein liquid crystal molecules within the layer containing liquid crystal material are aligned in a hybrid pattern wherein an alignment pattern of liquid crystal molecules proximate to the front curve piece differs from an alignment pattern of liquid crystal molecules proximate to the back curve piece.

22. The device according to Claim 21, wherein one of the alignment patterns of liquid crystal molecules proximate to the front curve piece or the alignment pattern of liquid crystal molecules proximate to the back curve piece orients the liquid crystal molecules in a homeotropic orientation.

23. The device according to Claim 22, wherein an optical effect of the layer comprised of hybrid aligned liquid crystal material is supplemented by an effect of different radii of insert surfaces.

24. The device according to Claim 21, wherein the first curvature is different from the second curvature.

25. The device according to Claim 21, wherein the lens is a contact lens.

26. The device according to Claim 25, 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.

27. The device according to Claim 26, wherein the layer of liquid crystal material varies its index of refraction affecting a ray of light traversing the layer of liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material.

28. The device according to Claim 27, wherein the variable optic insert alters a focal characteristic of the lens.

29. The device according to Claim 28, further additionally comprising an electrical circuit, wherein the electrical circuit controls the flow of electrical energy from the energy source to the first and second electrode layers.

30. The device according to Claim 29, wherein the electrical circuit comprises a processor.

31. An ophthalmic lens device 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 the non-optical zone; and

the variable optic insert comprising a layer containing liquid crystal material, wherein liquid crystal molecules within the layer containing liquid crystal material are aligned in a hybrid pattern wherein an alignment pattern of liquid crystal molecules proximate to the front curve piece differs from an alignment pattern of liquid crystal molecules proximate to the back curve piece.

32. The device according to Claim 31, wherein one of the alignment patterns of liquid crystal molecules proximate to the front curve piece or the alignment pattern of liquid crystal molecules proximate to the back curve piece orients the liquid crystal molecules in a homeotropic orientation.

33. The device according to Claim 32, wherein an optical effect of the layer comprised of hybrid aligned liquid crystal material is supplemented by an effect of different radii of insert surfaces.

34. The device according to Claim 31, wherein the lens is a contact lens.

35. The device according to Claim 34, 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.

36. The device according to Claim 34, 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.

37. The device according to Claim 36, wherein the layer of liquid crystal material varies its index of refraction affecting a ray of light traversing the layer of liquid crystal material when an electric potential is applied across the first layer of electrode material and the second layer of electrode material.

38. The device according to Claim 37, wherein the variable optic insert alters a focal characteristic of the lens.

39. The device according to Claim 38, further comprising an electrical circuit, wherein the electrical circuit controls the flow of electrical energy from the energy source to the first and second electrode layers.

40. The device according to Claim 39, wherein the electrical circuit comprises a processor.