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 the layer includes regions of liquid crystal material aligned in a pattern across at least a first portion of the variable optic insert that varies in a repeating a cycloidal pattern.

2. The device as claimed in Claim 1, wherein locations of orientations in liquid crystal orientation aligning with a radial axis across at least a first portion of the optic insert has a parabolic dependence on a radial dimension.

3. The device as claimed in Claim 1, wherein the layer containing liquid crystal material and varying with the cycloidal pattern assumes a curved shape.

4. The device as claimed in Claim 3, wherein the lens includes a polarizing component.

5. The device as claimed in Claim 3, additionally 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 as claimed in Claim 5, 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.

7. The device as claimed in Claim 6, wherein the variable optic insert alters a focal characteristic of the lens.

8. The device as claimed in Claim 7, 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.

9. 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 the at least one chamber, wherein the layer includes regions of liquid crystal material aligned in a pattern across at least a first portion of the variable optic insert that varies with a repeating cycloidal pattern; and
an energy source embedded in the insert in at least a region comprising a non-optical zone.

10. The device as claimed in Claim 9, wherein locations of orientations in liquid crystal orientation aligning with a radial axis across at least a first portion of the optic insert has a parabolic dependence on a radial dimension.

11. The device as claimed in Claim 10, wherein the layer containing liquid crystal material that varies with the cycloidal pattern assumes a curved shape.

12. The device as claimed in Claim 11, wherein the lens includes a polarizing component.

13. The device as claimed in Claim 11, 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.

14. The device as claimed in 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.

15. The device as claimed in Claim 14, wherein the variable optic insert alters a focal characteristic of the lens.

16. The device as claimed in 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.

17. 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 front curve piece and a 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 the layer includes regions of liquid crystal material aligned in a pattern across at least a first portion of the variable optic insert that varies with a repeating cycloidal pattern.

18. The device as claimed in Claim 17, wherein locations of orientations in liquid crystal orientation aligning with a radial axis across at least a first portion of the optic insert has a parabolic dependence on a radial dimension.

19. The device as claimed in Claim 18, wherein the layer containing liquid crystal material

that varies with the cycloidal pattern assumes a curved shape.

20. The device as claimed in ~~of~~ Claim 19, wherein the first curvature is approximately the same as the second curvature.

21. The device as claimed in ~~of~~ Claim 20, wherein the lens includes a polarizing component.

22. The device as claimed in Claim 21, 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.

23. The device as claimed in Claim 22, 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.

24. The device as claimed in Claim 23, wherein the variable optic insert alters a focal characteristic of the lens.

25. The device as claimed in Claim 24, 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.

26. 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 front curve piece, at least a first intermediate curve piece and a 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 across at least a first portion of the variable optic insert that varies with a repeating cycloidal pattern.

27. The device as claimed in Claim 26, wherein locations of orientations in liquid crystal orientation aligning with a radial axis across at least a first portion of the optic insert has a parabolic dependence on a radial dimension.

28. The device as claimed in Claim 27, wherein the first curvature is approximately the same as the second curvature.

29. The device as claimed in Claim 28, wherein the lens includes a polarizing component.

30. The device as claimed in Claim 29, 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.

31. The device as claimed in Claim 29, 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.

32. The device as claimed in Claim 31, 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.

33. The device as claimed in Claim 32, wherein the variable optic insert alters a focal characteristic of the lens.

34. The device as claimed in Claim 33, 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.

35. The device as claimed in Claim 8, 16, 25 or Claim 34, 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 the layer includes regions of liquid crystal material aligned in a pattern across at least a first portion of the variable optic insert that varies along a radial axis in a repeating a cycloidal pattern and

wherein locations of orientations in liquid crystal orientation aligning with a radial axis across at least a first portion of the optic insert has a parabolic dependence on a radial dimension.

2. The device as claimed in Claim 1, wherein the layer containing liquid crystal material and varying with the cycloidal pattern assumes a curved shape.

3. The device as claimed in Claim 2, wherein the lens includes a polarizing component.

4. The device as claimed in Claim 2, additionally 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.

5. 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 the at least one chamber, wherein the layer includes regions of liquid crystal material aligned in a pattern across at least a first portion of the variable optic insert that varies along a radial axis with a repeating cycloidal pattern; and

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

wherein locations of orientations in liquid crystal orientation aligning with a radial axis across at least a first portion of the optic insert has a parabolic dependence on a radial dimension.

6. The device as claimed in Claim 9, wherein the layer containing liquid crystal material that varies with the cycloidal pattern assumes a curved shape.

7. The device as claimed in Claim 6, wherein the lens includes a polarizing component.

8. The device as claimed in 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. 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 front curve piece and a 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 the layer includes regions of liquid crystal

material aligned in a pattern across at least a first portion of the variable optic insert that varies along a radial axis with a repeating cycloidal pattern;

wherein locations of orientations in liquid crystal orientation aligning with a radial axis across at least a first portion of the optic insert has a parabolic dependence on a radial dimension.

10. The device as claimed in Claim 9, wherein the layer containing liquid crystal material that varies with the cycloidal pattern assumes a curved shape.

11. The device as claimed in Claim 10, wherein the first curvature is approximately the same as the second curvature.

12. The device as claimed in Claim 11, wherein the lens includes a polarizing component.

13. The device as claimed in Claim 12, 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. 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 front curve piece, at least a first intermediate curve piece and a 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 across at least a first

portion of the variable optic insert that varies along a radial axis with a repeating cycloidal pattern;

wherein locations of orientations in liquid crystal orientation aligning with a radial axis across at least a first portion of the optic insert has a parabolic dependence on a radial dimension.

15. The device as claimed in Claim 13, wherein the first curvature is approximately the same as the second curvature.

16. The device as claimed in Claim 14, wherein the lens includes a polarizing component.

17. The device as claimed in Claim 15, 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.

18. The device as claimed in Claim 15, 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.

19. The device as claimed in Claim 4, 8, 13, or 17, 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.

20. The device as claimed in Claim 18, wherein the variable optic insert alters a focal characteristic of the lens.

21. The device as claimed in Claim 19, 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.

22. The device as claimed in Claim 20, wherein the electrical circuit comprises a processor.