CLAIMS

1. An ophthalmic lens device with a variable optic insert having an optical zone and a non-optical zone comprising:

a variable optic insert comprising at least a portion within the optical zone and comprising an insert front curve piece and an insert back curve piece, wherein a back surface of the front curve piece and a front surface of the back curve piece have differing radii of surface curvature at least in the portion within the optical zone ;

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 the layer is comprised of droplets of liquid crystal material.

2. The ophthalmic lens device of Claim 1 wherein the droplets of liquid crystal material have an average diameter less than approximately 1 micron in size.

3. The ophthalmic lens device of Claim 2 wherein within the layer comprised of droplets of liquid crystal material the region comprising the droplets is a subset of the layer comprising liquid crystal material and has a shaped profile capable of causing an optical effect supplementary to the effect of the different radii of insert surfaces.

4. The ophthalmic lens device of Claim 2 wherein within the layer comprised of droplets of liquid crystal material the density of the droplets is spatially varied such that the variation is capable of causing an optical effect supplementary to the effect of the different radii of insert surfaces.

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

6. The ophthalmic lens device of Claim 5 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.

7. The ophthalmic lens device of Claim 6 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.

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

9. The ophthalmic lens device of Claim 8 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.

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

11. An ophthalmic lens device with a variable optic insert having an optical zone and a non-optical zone comprising:
a variable optic insert comprising at least a portion within the optical zone, and comprising an insert front curve piece, an intermediate curve piece and an insert back curve piece, wherein a back surface of the front curve piece and a front surface of the intermediate curve piece have differing radii of curvature at least in the portion within the optical zone;
an energy source embedded in the insert in at least a region comprising the non-optical zone; and

the variable optic insert comprising at least a first layer containing liquid crystal material, wherein the first layer containing liquid crystal material is comprised of droplets of liquid crystal material.

12. The ophthalmic lens device of Claim 11 wherein the droplets of liquid crystal material have an average diameter less than 1 micron in size.

13. The ophthalmic lens device of Claim 12 wherein within the layer comprised of droplets of liquid crystal material the region comprising the droplets is a subset of the layer comprising liquid crystal material and has a shaped profile capable of causing an optical effect supplementary to the effect of the different radii of insert surfaces.

14. The ophthalmic lens device of Claim 12 wherein within the layer comprised of droplets of liquid crystal material the density of the droplets is spatially varied such that the variation is capable of causing an optical effect supplementary to the effect of the different radii of insert surfaces.

15. The ophthalmic lens device of Claim 12 wherein the lens is a contact lens.

16. The ophthalmic lens device of Claim 15 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 intermediate curve piece.

17. The ophthalmic lens device of Claim 16 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.

18. The ophthalmic lens device of Claim 17 wherein the variable optic insert alters a focal characteristic of the lens.

19. The ophthalmic lens device of Claim 18 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.

20. The ophthalmic lens device of claim 19 wherein the electrical circuit comprises a processor.

CLAIMS

1. An ophthalmic lens device with a variable optic insert having an optical zone and a non-optical zone comprising:

a variable optic insert comprising at least a portion within the optical zone and comprising an insert front curve piece and an insert back curve piece, wherein a back surface of the front curve piece and a front surface of the back curve piece have differing radii of surface curvature at least in the portion within the optical zone;

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 the layer is comprised of droplets of liquid crystal material;

wherein the droplets of liquid crystal material have an average diameter less than approximately 1 micron in size.

2. The ophthalmic lens device of Claim 1 wherein within the layer comprised of droplets of liquid crystal material the region comprising the droplets is a subset of the layer comprising liquid crystal material and has a shaped profile capable of causing an optical effect supplementary to the effect of the different radii of insert surfaces.

3. The ophthalmic lens device of Claim 1 wherein within the layer comprised of droplets of liquid crystal material the density of the droplets is spatially varied such that the variation is capable of causing an optical effect supplementary to the effect of the different radii of insert surfaces.

4. The ophthalmic lens device of Claim 1 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 back surface of the front curve piece; and

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

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 having an optical zone and a non-optical zone comprising:
a variable optic insert comprising at least a portion within the optical zone, and comprising an insert front curve piece, an intermediate curve piece and an insert back curve piece, wherein a back surface of the front curve piece and a front surface of the intermediate curve piece have differing radii of curvature at least in the portion within the optical zone;
an energy source embedded in the insert in at least a region comprising the non-optical zone; and
the variable optic insert comprising at least a first layer containing liquid crystal material, wherein the first layer containing liquid crystal material is comprised of droplets of liquid crystal material and wherein the droplets of liquid crystal material have an average diameter less than 1 micron in size.

11. The ophthalmic lens device of Claim 10 wherein within the layer comprised of droplets of liquid crystal material the region comprising the droplets is a subset of the layer comprising liquid crystal material and has a shaped profile capable of causing an optical effect supplementary to the effect of the different radii of insert surfaces.

12. The ophthalmic lens device of Claim 10 wherein within the layer comprised of droplets of liquid crystal material the density of the droplets is spatially varied such that the variation is capable of causing an optical effect supplementary to the effect of the different radii of insert surfaces.

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

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.