Claims

1. A multifocal ophthalmic lens, wherein:

a first surface of the lens is shaped to form a first surface power map;

a second surface of the lens is shaped to form a second surface power map;

the first and second surface power maps together form a lens power map;

the first surface power map, the second surface power map, or the lens power map comprises a spiral, the spiral having a variation across at least a portion of the lens, the spiral having a first periodic component, in a radial direction extending outwards from the centre of the portion, and a second periodic component having a substantially constant period, in an azimuthal direction about the centre of the portion.

~~2. A multifocal ophthalmic lens according to claim 1, wherein the spiral has a first periodic component, in a radial direction extending outwards from the centre of the portion, and a second periodic component, in an azimuthal direction about the centre of the portion.~~

~~3~~2. ~~A~~The multifocal ophthalmic lens according to claim ~~2~~1, wherein:

the first periodic component has a period of greater than 100 microns; and

the second periodic component has a period of greater than 6 degrees.

~~4~~3. ~~A~~The multifocal ophthalmic lens according to ~~any preceding~~ claim 1, wherein the variation of the spiral comprises an offset in power, the offset changing according to a radial distance from the centre of the portion.

~~5~~4. ~~A~~The multifocal ophthalmic lens according to ~~any preceding~~ claim 1, wherein a peak power of one or more arms of the spiral varies according to one or both of: a radial distance from the centre of the portion and an azimuthal position about the centre of the portion.

~~6~~5. ~~A~~The multifocal ophthalmic lens according to ~~any preceding~~ claim 1, wherein:

a peak power of each arm of the spiral does not vary with radial distance from the centre of the portion; and

the peak power of at least one arm of the spiral differs from that of the other arms.

~~7~~6. ~~A~~The multifocal ophthalmic lens according to ~~any preceding~~ claim 1, wherein each of the first surface power map and the second surface power map vary smoothly across the portion.

~~8~~7. ~~A~~The multifocal ophthalmic lens according to ~~any preceding~~ claim 1, wherein:

the portion of the lens comprises a central region and an outer region, the outer region surrounding the central region;

the lens power map within the outer region comprises the spiral; and

the lens power map does not vary periodically within the central region.

~~9~~8. ~~A~~The multifocal ophthalmic lens according to claim ~~8~~7, wherein the central region has a diameter of less than 50% of that of the portion.

~~10~~9. ~~A~~The multifocal ophthalmic lens according to claim~~s 8 or 9~~7, wherein:

the lens comprises a transition region, the transition region surrounding the central region and the outer region surrounding the transition region; and

the lens power map varies such that the transition region provides a smooth transition between the central zone and the outer zone.

~~11~~10. ~~A~~The multifocal ophthalmic lens according to ~~any preceding~~ claim 1, wherein a twist rate of the spiral varies according to a radial distance from the centre of the portion.

~~12~~11. ~~A~~The multifocal ophthalmic lens according to ~~any preceding~~ claim 1, wherein a width of one or more arms of the spiral differs from a corresponding width of the other arms of the spiral.

~~13~~12. ~~A~~The multifocal ophthalmic lens according to claim ~~12~~11, wherein, at a predetermined radial distance from the centre of the portion, the spiral changes its direction of rotation.

~~14~~13. A multifocal ophthalmic lens according to ~~any preceding~~ claim 1, wherein the ophthalmic lens is a contact lens, a spectacle lens, or an intraocular lens.

~~15~~14. A method of manufacturing a multifocal ophthalmic lens, the method comprising:

operating a lathe to shape a first surface of one of: a lens, a mould for a lens, or an insert for manufacturing a mould for a lens to form a first surface power map;

operating a lathe to shape a second surface of the lens, mould, or insert to form a second surface power map;

wherein:

the combination of the first and second surface power maps forms a lens power map;

the first surface power map, the second surface power map, or the lens power map comprises a spiral, the spiral having a variation across at least a portion of the lens, mould or insert, the spiral having a first periodic component, in a radial direction extending outwards from the centre of the portion, and a second periodic component having a substantially constant period, in an azimuthal direction about the centre of the portion.

~~16~~15. A method of improving vision of a person, the method comprising:

providing a multifocal ophthalmic lens according to ~~any of~~ claim~~s~~ 1 ~~to 14~~ to a person in need of improved vision.

~~17~~16. ~~A~~The multifocal ophthalmic lens according to ~~any one of~~ claim~~s~~ 1 ~~to 14~~, where~~in~~ ~~which~~ the ophthalmic lens is a centre distance contact lens, or a centre near contact lens.

~~18~~17. ~~A~~The multifocal ophthalmic lens according to ~~any one of~~ claim~~s~~ ~~8 to 10~~7, wherein the central region has an optical power corresponding to a distance vision correction.

~~19~~18. ~~A~~The multifocal ophthalmic lens according to ~~any one of~~ claim~~s~~ ~~8 to 10~~7, wherein the central region has an optical power corresponding to a near vision correction.