It is claimed:

1. An intraocular lens for the correction of the axial refractive error and the accommodative insufficiency of the post-surgical aphakic eye, made of homogeneous transparent optical material, for placement in the posterior chamber of the human aphakic eye, of continuously and regularly increasing refractive power peripheralward, of a diameter between 4.5 mm and 7 mm and of thickness between 0.65 mm and 1 mm, with at least one surface of said intraocular lens a positive aspheric surface of revolution having an apical umbilical point at which the derivative of curvature vanishes, said surface increasing continuously and regularly in curvature and refractive power from said apical umbilical point to its periphery and where the magnitude and shape of said surface is defined mathematically by means of the following expression:

$$y=(Ax+Bx^2)^{\frac{1}{2}}+Cx^{(p)}+Dx^{(q)}+Ex^{(z)},$$

where $A=2r_{apex}$, $B=(e^2-1)$, e being the eccentricity at the apex of said surface, where C, D, and E are integral or non-integral coefficients of $x^{(p)}$, $x^{(q)}$, and $x^{(z)}$ respectively, and where p, q, and z can be integral or non-integral exponents of x, and where r ranges from 5 mm to 150 mm, where e ranges from 0.0 to 4.0, where at least one of the values of C, D, and E is other than zero, values of C, D, and E ranging from 0.0 to ±9, the values of p, q, and z range from a value of 0.5 to 6.0.

2. An intraocular lens as in claim 1 wherein said one positive aspheric surface of revolution is the front surface of the lens and the back surface is plane.

3. An intraocular lens as in claim 1 wherein said positive aspheric surface of revolution is the back surface of the lens and the front surface is plane.

4. An intraocular lens as in claim 1 wherein said one positive aspheric surface of revolution is the front surface of the lens and the back surface is convex spherical.

5. An intraocular lens as in claim 1 wherein said one positive aspheric surface of revolution is the back surface of the lens and the front surface is convex spherical.

6. An intraocular lens as in claim 1 wherein both front and back surfaces are positive aspheric surfaces of revolution of increasing refractive power peripheralward.

7. An intraocular lens as in claim 1 wherein said one positive aspheric surface of revolution is the front surface of the lens and the back surface is concave.

8. A series of intraocular lenses, each lens in said series coming within the specification of claim 1, said series of lenses subdivided into at least 21 subsets, each of said subsets corresponding to a given apical radius of curvature r of the front surface of the cornea, said apical radius of curvature r ranging from 6.8 mm to 8.8 mm in steps of no more than 0.1 mm, there being at least 25 lenses in each subset sequentially arranged in accordance with values of increasing back vertex power from a lowest value to a highest value of at least 12 diopters greater than said lowest value, the increment of back vertex power separating the lenses in said subset being not greater than 0.50 diopters, each lens of given back vertex power designed to correct the axial refractive error of a given length eye within the specified subset, there being at least 12 lenses for eyes shorter than the average normal length of the eye for said subset value of r, and at least 12 lenses for eyes longer than the average normal length of the eye, there being a total of at least 525 lenses in said series corresponding to at least 525 different combinations of the apical radius of curvature of the anterior surface of the cornea and the axial length of the eye, each lens designed to correct the axial refractive error of the eye in which it is placed and to provide accommodation.

9. A series of intraocular lenses as in claim 8 wherein the front convex surface of the lens increases continuously and regularly in curvature and refractive power from its axis peripheralward and the back surface is plane.

10. A series of intraocular lenses as in claim 8 wherein the front convex surface of the lens increases continuously and regularly in curvature and refractive power from its axis peripheralward and the back surface is convex spherical.

11. A series of intraocular lenses as in claim 8 wherein both the front and the back convex surfaces of the lens increase continuously and regularly in curvature and refractive power from its axis peripheralward.

12. A series of intraocular lenses as in claim 8 wherein the back convex surface of the lens increases continuously and regularly in curvature and refractive power from its axis peripheralward and the front surface is plane.

13. A series of intraocular lenses as in claim 8 wherein the back surface of the lens increases continuously and regularly in curvature and refractive power from its axis peripheralward and the front surface is spherical.

14. A series of intraocular lenses as in claim 8 wherein the front convex surface of the lens increases continuously and regularly in curvature and refractive power from its axis peripheralward and the back surface is concave.

15. A method of selection and obtaining of an appropriate intraocular lens from a given lens series of at least 525 lenses of a given front and back surface design relation, wherein each lens is designed to correct both the axial refractive error and the deficiency of accommodation of an aphakic eye having a given apical radius of curvature r of the front surface of the cornea, and a given length l, of the eye as measured along its geometrical axis from the apex of said corneal surface to the internal limiting membrane of the retina, said method consisting in the utilization of the r and l values in the selection and supply of lenses corresponding to said r and l parameters by the supplier who obtains the appropriate lens from an inventory of at least said 525 lenses, the lens delivered to the doctor being designated by the same r and l values supplied by the doctor and being designed specifically to correct the axial refractive error and the deficiency of accommodation for an eye having said r and l values.

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