spirit of the invention, as set forth in the following claims.

What is claimed is:

1. An improved ophthalmic lens with progressively varying focal length having two refractive surfaces, one of which is divided into first, second and third viewing zones intended respectively for distant vision, intermediate vision and near vision, said one surface including a meridional curve passing through the optical center of the lens and traversing said zones, said meridional curve being defined by a sequence of points on said one surface and substantial peripheral portions of the lower half of said one surface and having a substantially constant curvature providing a substantially constant focal length for distant vision, said third viewing zone occupying a lower portion of said one surface providing a substantially constant focal length for near vision, and said second viewing zone lying between said first and third viewing zones providing for intermediate vision, said second viewing zone further having on each side of the meridian substantially symmetrical zones of astigmatism aberrations said one surface of said second viewing zone being generated by portions of a family of circles developed by passing an inclined plane through a multiplicity of spheres of predetermined radius, each of said spheres being tangent to said sequence of points defining said meridional curve.

2. An improved ophthalmic lens as defined in claim 1 in which every point on the surface of the lens generated through said sequence of points defining said meridional curve has the following rectangular coordinates:

$$x=x_M+R_M \sin(\phi+\theta_M)\cos\phi(1-\cos t)$$

$$y=y_M-R_M \sin(\phi+\theta_M)\sin\phi(1-\cos t)$$

$$z=R_M \sin(\phi+\theta_M)\sin t$$

where (x_M,y_M,O,R_M,θ_M) is the quintuplet associated with a corresponding point of said sequence of points and t is a real parameter ranging over the interval $O \leqq t \leqq 2\pi$.

3. An improved ophthalmic lens as defined in claim 2 in which:

(a) the portion of said meridional curve included in said first viewing zone is a circular arc of radius $R_o > O$ defined by the equation:

$$X_M=R_o-(R_o^2-y_M^2)^{\frac{1}{2}}; \text{ and}$$

(b) all points in said first viewing zone have coordinates $(\bar{x},\bar{y},\bar{z})$ satisfying both the inequality

$$(1+\frac{\bar{y}}{R_o\cos\phi\sin\phi})^2+(\frac{\bar{z}}{R_o\cos\phi})^2 \geqq 1$$

and the equation

$$\bar{x}=R_o-(R_o^2-\bar{y}^2-\bar{z}^2)^{\frac{1}{2}}.$$

4. An improved ophthalmic lens as defined in claim 2 in which all points in said third viewing zone have coordinates $(\bar{x},\bar{y},\bar{z})$ satisfying both the inequality

$$(1+\frac{\bar{g}-y_{\bar{M}}}{R\sin(\phi+\theta_{\bar{M}})\sin\phi})^2+(\frac{\bar{z}}{R\sin(\phi+\theta_{\bar{M}})})^2 \leqq 1$$

and the equation

$$\bar{x}=\hat{x}-(R^2-(\bar{y}-\hat{y})^2-\bar{z}^2)^{\frac{1}{2}}$$

where

$$\hat{x}=x_{\bar{M}}+R \sin\theta_{\bar{M}}.\ \hat{y}=+y_{\bar{M}}-R\cos\theta_{\bar{M}}.$$

5. An improved ophthalmic lens as defined in claim 4 in which all points in said second zone have coordinates $(\bar{x},\bar{y},\bar{z})$ satisfying the following equations:

$$\bar{x}=x_M+R_M \sin(\phi+\theta_M)\cos\phi(1-\cos t)$$

$$\bar{y}=y_M-R_M \sin(\phi+\theta_M)\sin\phi(1-\cos t)$$

$$\bar{z}=R_M \sin(\phi+\theta_M)\sin t$$

6. A method of making an improved ophthalmic lens having an x, y and z axis with progressively varying focal length characterized by having two refractive surfaces, one of which is divided into first, second and third viewing zones intended respectively for distant vision, intermediate vision and near vision said one surface including a meridional curve passing through the optical center of the lens and traversing said zones, said meridional curve being defined by a sequence of points on said one surface said first zone occupying the upper half of said one surface and substantial peripheral portions of the lower half of said one surface and having a substantially constant curvature providing a substantially constant focal length for distant vision, said third viewing zone occupying a lower portion of said one surface providing a substantially constant focal length for near vision, and said second viewing zone lying between said first and third viewing zones providing for intermediate vision, said second viewing zone further having on each side of the meridian substantially symmetrical zones of astigmatism aberrations, the improvement consisting of a method of generating said one surface of said second viewing zone by combining together to form said surface a multiplicity of circles developed by passing an inclined plane disposed at a predetermined angle relative to said axis of the lens through a multiplicity of spheres of predetermined radius, each of said spheres passing through said sequence of points defining said meridional curve said radius of said spheres and said angle of said inclined plane being selected so that every point on said surface has the following rectangular coordinates:

$$x=x_M+R_M \sin(\phi+\theta_M)\cos\phi(1-\cos t)$$

$$y=y_M-R_M \sin(\phi+\theta_M)\sin\phi(1-\cos t)$$

$$z=R_M \sin(\phi+\theta_M)\sin t$$

where (x_M,y_M,O,R_M,θ_M) is the quintuplet associated with a corresponding point of said sequence of points and t is a real parameter ranging over the interval $O \leqq t \leqq 2\pi$.

7. A method of making an improved ophthalmic lens as defined in claim 6 in which said one surface of said first viewing zone is generated by combining together to form said surface a multiplicity of circles developed by passing an inclined plane disposed at a predetermined angle relative to said axis of the lens through a multiplicity of spheres of predetermined radius, each of said spheres passing through said sequence of points