In any given orientation of the subject continuous contact lens, the refractive power over the entire optical zone is uniform. As a result, the entire optical zone is utilized to collect and focus onto the retina light rays from any given object distance. Concentric bifocal contact lenses have an optical zone composed of two different front surfaces, each of which covers, on the average, only one-half the pupillary area. Thus, image quality is relatively poor while the number of powers provided is limited to two. Aspheric multi-focal contact lenses, while providing a virtually continuous spectrum of refractive power, do so at a cost severely restricting for any given object distance the area of the optical zone involved in collecting and focusing light rays onto the retina. By comparison with the subject continuous contact lens, they suffer from severe impairment of image quality.

Since the chamber in the subject continuous contact lens is filled entirely with liquid substances, the lens is not subject to condensation and consequent fogging of internal surfaces with temperature change as are prior art contact lenses having a closed chamber filled in part by gas. In addition, the subject continuous contact lens has better light transmissibility and less internal reflection and is less deformable than the aforementioned prior art contact lenses.

We claim:

1. A lens system for variable refraction having an optical zone for refracting light rays, said system comprising a solid housing that is transparent at least throughout said optical zone; a single closed chamber within said housing having a portion spanning the full extent of said optical zone and a portion outside of said optical zone; a plurality of immiscible liquids completely filling said chamber, at least two of said liquids being transparent, said transparent liquids having different refractive indices and forming between themselves an interface that is disposed substantially perpendicular to the optical axis of said system at all times, said contained liquids having preselected densities so that tilt of the system relative to the earth results in interdisplacement of said contained liquids within said chamber and a change in the contour of said interface in said optical zone so as to produce a change in the refractive power of said system over a continuous range, the sole impetus for said interdisplacement being gravitational force.

2. A lens system incorporated into a pair of spectacles for correction of impaired accommodation comprising a lens, a frame enclosing said lens at its periphery, an earpiece contiguous with said frame, a single complex closed chamber having a portion in said lens defining an optical zone and a portion in said earpiece, interconnecting means between said lens portion and said earpiece portion, and three immiscible liquids completely filling said chamber, two of said immiscible liquids being transparent, said transparent liquids having the same density but different refractive indices and polar properties and forming between themselves an interface that is disposed substantially perpendicular to the optical axis of said system at all times, the third of said immiscible liquids being confined to said earpiece, said immiscible liquids having preselected densities so that tilt of the system relative to the earth results in interdisplacement of said contained liquids within said chamber and a change in the contour of said interface in said optical zone so as to produce a change in the refractive power of said system over a continuous range, the sole impetus for said interdisplacement being gravitational force.

3. A spectacle lens system as defined in claim 2 in which the portion of said chamber in said earpiece takes the form of a curved cylinder having its concave aspect disposed substantially upward so that the portion of said cylinder nearest the earth changes continuously as said spectacles are tilted through a generally useful range.

4. A spectacle lens system as defined in claim 3 in which said curved cylinder has a uniform radius of curvature.

5. A spectacle lens system as defined in claim 3 in which said third immiscible liquid forms a single unbroken column within said curved cylinder, said column being freely movable within said cylinder and occupying a fixed volume greater than one-half the volume of said cylinder so that a central sector of said cylinder is always occupied by said column, and further including means for confining said third immiscible liquid within said cylinder.

6. A spectacle lens system as defined in claim 5 in which said third immiscible liquid is mercury.

7. A spectacle lens system as defined in claim 5 in which the portion of said chamber in said lens has front and back surfaces that are spherical in contour, said surfaces defining the extent of said optical zone and intersecting at their margins a surface having the shape of a narrow circular band, said band being incomplete where the optical zone portion of said chamber is continuous with the remainder of said chamber.

8. A spectacle lens system as defined in claim 7 in which said front surface is concave posteriorly and said back surface is convex posteriorly, both surfaces having the same radius of curvature.

9. A spectacle lens system as defined in claim 7 in which said interconnecting means comprise two discreet channels confined to said earpiece and said frame and connecting respective ends of said curved cylinder to said optical zone portion of said chamber, one of said channels opening in close proximity to said front surface, the other opening in close proximity to said back surface.

10. A spectacle lens system as defined in claim 9 in which said front surface and the forward half of said circular band have a strong surface attraction for one of said transparent liquids, and said back surface and the rear half of said circular band have a strong surface attraction for the other of said transparent liquids, said liquids, therefore, covering their respective surfaces in said optical zone, said interface, therefore, being disposed substantially perpendicular to said optical axis.

11. A spectacle lens system as defined in claim 10 in which said connecting channels and the two halves of said curved cylinder exert similar surface attractions for said transparent liquids as the surfaces in said optical zone with which they are respectively associated.

12. A spectacle lens system as defined in claim 10 in which said transparent liquids are separated in said curved cylinder by said column of said third immiscible liquid so that a change in orientation of said spectacles within a generally useful range results in displacement of one of said transparent liquids from said cylinder into said optical zone and displacement of the other of said transparent liquids from said optical zone into said cylinder, said displacement resulting in a change in the relative amounts of said transparent liquids occupying said optical zone and manifesting as a change in the contour of said interface.