ORIENTED SIMULTANEOUS VISION BIFOCAL CONTACT LENSES OR THE LIKE UTILIZING , INTROAOCULAR SUPPRESSION OF BLUR

BACKGROUND OF THE INVENTION

This invention relates to bifocal contact lenses of the simultaneous vision variety wherein the lenses are constructed such that when placed on the eye the distant and near zones are disposed in opposite arrangement before the two eyes.

Bifocal contact lenses generally speaking can be separated into two distinct types. One type is known as simultaneous vision bifocals and in this type of lens the distance and near vision zones are situated such that both zones are simultaneously represented in the entrance pupil of the eye. Most commonly, this is accomplished by a discrete central circular zone containing the distance or near vision correction surrounded by an annular zone containing the other vision correction. Other common configurations incorporate a continuously changing, aspheric, power.

The second type of lens is known as the alternating vision bifocal. Lenses of this variety are generally constructed such that the lens is oriented to contain the distance vision correction in the upper portion of the optical zone and the near vision correction in the lower portion of the optical zone. Such lenses commonly incorporate mechanical design features that maintain the proper orientation and allow the distance vision zone to occupy the entrance pupil in straight ahead gaze and the near vision zone to occupy the entrance pupil in downgaze for near viewing.

In a simultaneous vision bifocal, the relationship between the distance zone and the near zone is quite critical. In order for the lens to function properly, it must permit approximately equal amounts of light into the eye through both the near zone and the distance zone. This is required so that vision is not biased toward either vision correction. Obviously, because of the great variation in light levels, which accordingly change the diameter of the pupil, a compromise must be settled upon when selecting the size of each zone. This problem is further complicated as the difference in pupil size varies substantially from patient to patient. Examples of these types of lenses may be seen in U.S. Pat. Nos. 4,636,049; 4,418,991; 4,210,391; 4,162,172; and 3,726,587.

The problem of pupil dependency of simultaneous vision bifocal performance is claimed to be diminished by a further embodiment of simultaneous vision bifocals that operates under the principles of diffraction. Examples of these types of lenses may be seen in U.S. Pat. Nos. 4,641,934 and 4,642,112.

In alternating vision bifocals, the lens is constructed so as to move freely upon the cornea. The distance vision zone is normally positioned before the pupil in straight ahead gaze. As the eye is lowered to a reading position the lens, generally because of ballasting and/or inferior edge truncation built into the lens, encounters the lower eyelid and is moved upward on the eye. The near vision zone is thereby transferred before the pupil and the person is able to focus on the near object. It will be appreciated that positioning of the demarcation junction between the distant zone and the near zone is critical and requires a substantial degree of care by the practitioner when fitting the patient. Examples of alternating vision bifocal lenses are shown in U.S. Pat. Nos. 4,728,182; 4,702,513; 4,618,227; 4,614,413; 4,513,775; 4,549,794; 4,324,461; and 4,302,081.

A still further method of providing bifocal vision is one in which the patient is fitted in one eye with a single vision lens corrected for distance vision. The patient's other eye is fitted with a single vision lens corrected for near vision. This technique is commonly known to practitioners as monovision correction. In utilizing this technique, blur is eliminated by the brain's ability to suppress blurred images from one eye when the corresponding images from the other eye are clear. However, when the field of view is restricted to only one eye, such as would be the case when viewing objects located to extreme left or right of the patient, only one focal power is utilized. Accordingly, the patient's head must be shifted in order to provide proper focus. This form of correction is also known to produce difficulty in the maintenance of normal coordination of functions requiring both eyes such as fusing both eyes' images and stereoscopic depth perception.

Within the groups of bifocal lenses described are variations of the themes. For example, in U.S. Pat. No. 4,618,228 entitled "Bifocal Contact Lens of the Bivisual Type", a simultaneous vision bifocal is disclosed. The lens is separated along a vertical line into two different focusing zones. One half of the lens is designed to be positioned nasally on the wearer (closer to the wearer's nose) and contains the reading correction. The other half of the lens is designed to be positioned temporally (away from the wearer's nose) and contains the distance correction. The lens contains ballast to ensure that it maintains its geometric position on the eye. The advantage of this particular lens, according to the inventors, is that the difference in brightness of objects has no effect on their perception through the lens.

SUMMARY OF THE INVENTION

A lens system is disclosed which comprises a pair of contact lenses constructed such that when worn by a patient requiring vision correction for near and distant viewing situations, the near and distant vision corrections for one eye are constructed oppositely in the lens to be worn on the other eye. This lens construction takes advantage of the brain's ability to suppress those images that are blurred so only clear images remain.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is a plan view of a contact lens system constructed according to one embodiment of my invention;

FIG. **2** is a schematic view of a condition wherein a subject is binocularly viewing a pair of objects;

FIG. **3** is a graphical representation of the retinal images formed when viewing the objects of FIG. **2** with monovision correction with the right eye being corrected for distance, vision;

FIG. **4** is a graphical representation of the retinal images formed when viewing the objects of FIG. **2** utilizing the contact lens system constructed according to the principles of the present invention as shown in FIG. **1**; and

FIGS. **5–8** are alternate embodiments of my contact lens system as shown in FIG. **1**.

DETAILED DESCRIPTION OF THE DRAWINGS

FIG. **1** discloses a contact lens system **10** comprising a left lens **12** and a right lens **14** to be worn on the left