and **59** to provide the earlier described advantages and operation of the FIG. **59** embodiment of the invention. A plurality of relatively small extension portions or haptic plates **1304** having hinges **1306** to facilitate posterior and anterior movement of the optic in response to ciliary muscle action. The hinges **1306** are defined by grooves in the haptic plates and/or by grooves **1306***a* in the loops. Hinging action of the plates can alternatively be provided by forming the haptics of a flexible material.

Two pairs of the haptics extend oppositely from the optic, and a loop **1310** extends between each pair of haptics, and is secured to the haptics. An arm **1312** extends from an arcuate transverse portion of each loop **1310** at an acute angle from the transverse portion. Each arm **1312** has an end protuberance defining an opening **1314** for improved fixation and centration.

FIG. **67** illustrates a related embodiment **1350** having an optic **1352**, and loops **1354** extending outwardly between pairs of spaced, radially extending small haptics or extension portions **1356**. As with the embodiment of FIG. **66**, hinging action may be provided by grooves **1357** in the haptics or by grooves **1357***a* in the loops. An arm **1358** extends from each loop at an acute angle thereto, and has a protuberance **1360** defining a sizable opening at its end, as shown. Improved fibrosis securement and centration, are provided, with or without the opening therein, by the protuberance. The protuberances **1314** of FIG. **66** and **1360** of FIG. **67**, preferably with the openings therein, are important features in that they provide substantially improved retention and centration by fibrosis. The arms **1358** and their protuberances **1360**, as well as the loops **1354**, are preferably formed of a relatively non-inert material for improved fibrosis thereabout.

Thus there has been shown and described a novel accommodating intraocular lens which fulfills all the objects and advantages sought therefor. Many changes, modifications, variations and other uses and applications of the subject invention will, however, become apparent to those skilled in the art after considering this specification together with the accompanying drawings and claims. All such changes, modifications, variations and other uses and applications which do not depart from the spirit and scope of the invention are deemed to be covered by the invention which is limited only by the claims which follow.

The inventor claims:

1. An accommodating intraocular lens to be implanted in a human eye within a natural capsular bag in the posterior chamber of the eye attached about its perimeter to the ciliary muscle of the eye and having a certain inner diameter when the ciliary muscle is in its relaxed state, the bag including an elastic posterior capsule which is urged anteriorly by vitreous pressure in the eye and an anterior capsule opening bounded by an anterior capsular remnant that fuses to the posterior capsule by fibrosis during a postoperative fibrosis period in which said bag and remnant shrink, and said remnant being tautly stretched by relaxation of the ciliary muscle and relaxed by contraction of the ciliary muscle after fibrosis is complete, said intraocular lens comprising:

a lens body having normally anterior and posterior sides and including an optic and haptics having inner ends joined to diametrically opposite sides of said optic and opposite outer ends, and said haptics being movable anteriorly and posteriorly relative to said optic and through a certain position wherein said lens has a length approximating said inner diameter of said capsular bag, and wherein

said lens is adapted to be implanted in said bag while said ciliary muscle is in its relaxed state and in an implanted position wherein (a) said haptics are in said certain position relative to said optic and situated between said remnant and said posterior capsule, whereby fibrosis will occur about the haptics, (b) said optic is aligned with said anterior capsule opening, and (c) shrinking of said bag and remnant during fibrosis will exert endwise compression and posterior forces on the lens and haptics, respectively, and

said optic is deflected posteriorly relative to the outer ends of said haptics with resultant anterior deflection of said haptics relative to said optic by endwise compression and posterior forces applied to said lens and haptics, respectively, when said haptics are in said certain position relative to the optic, whereby when said lens is implanted in said bag, relaxation of the ciliary muscle after completion of fibrosis effects posterior deflection of the implanted lens against the posterior capsule of the bag by the taut remnant, and contraction of the ciliary muscle effects anterior accommodation of the implanted lens by the posterior capsule, vitreous pressure, and endwise compression of the lens.

2. An accommodating intraocular lens comprising:

a lens body having normally anterior and posterior sides and including an optic, haptics extending from diametrically opposite sides of said optic and having inner ends adjacent said optic and opposite outer ends, and hinge means pivotally joining said inner haptic ends to said optic for pivotal movement of said haptics about said hinge means anteriorly and posteriorly relative to said optic.

3. An accommodating intraocular lens according to claim **2**, wherein:

said hinge means comprise flexible hinge portions of said lens body.

4. An accommodating intraocular lens according to claim **3**, wherein:

said hinge portions comprise flexible reduced portions of said lens body.

5. An accommodating intraocular lens to be implanted in a human eye within a capsular bag in the eye having a posterior capsule, and an anterior capsular opening bounded by an anterior capsular remnant, said lens comprising:

a lens body having normally anterior and posterior sides and including an optic and haptics having inner ends hingedly joined to diametrically opposite sides of said optic and opposite outer ends, whereby said haptics are movable anteriorly and posteriorly relative to said optic, and

fixation means on said haptics for at least one of the following purposes: (a) positioning the lens in the capsular bag, (b) effecting fixation of the outer haptic ends in the bag by fibrosis.

6. An accommodating intraocular lens comprising:

a lens body having normally anterior and posterior sides and including an optic, and haptics having inner ends joined to diametrically opposite sides of the optic and opposite outer ends, and

grooves at one of said body sides extending across said inner haptic ends transverse to the length of the lens and forming hinges about which said haptics are flexible anteriorly and posteriorly relative to said optic.

7. An accommodating lens according to claim **6**, wherein:

said grooves are located at said anterior side of the body.

8. An intraocular lens to be implanted in a posterior chamber of an eye and supported in the capsular bag of the