

form of a dovetail relationship of the collar sides. In lieu of a locking mechanism, a straight split in the collar is sufficient according to one embodiment of the invention. It further is within the scope of the present invention to provide positioning holes 48 in collar 26 in which tools can be inserted for handling and manipulating lens 20.

The present invention further defines a specially configured instrument, for handling and/or compressing the lens, as best shown in FIG. 5, generally at 50. Referring thereto instrument 50 is shown to have a forcep type of construction with first and second arms 52, 54 joined at one end 56 and their opposite ends 58, 60 being provided, respectively, with oppositely disposed box-shaped channels 62, 64 configured for holding collar 24 between them. When the collar is positioned between channels 62, 64, arms 52, 54 can be compressed together to compress the lens into its narrowed shape, as shown in FIG. 4, and then inserted as illustrated by the arrow in FIG. 6 into an insertion tool 66 and positioned therein as shown in FIG. 7 to be positioned entirely within insertion tool 66 or with its tip extending out from it. In lieu of the pin attachment at end 56 the arms 52 and 54 can be welded together as in conventional forceps.

Insertion tool 66 comprises a rectangular shaped tubular member 68 having oppositely facing channels 70, 72 in which collar 24 is inserted. A slider member 74 of the tool slides in the channels and is configured with a low profile, as best shown in FIG. 8, to preferably pass entirely underneath haptic loop 26 and directly engage collar 24 for accurate control of the ejection of lens 20 from the tool into the eye. Although depicted in the drawings as being tubular, the preferred configuration of slider member 74 is flat; it is a flat sheet with proximal thumb loop or ring 80 attached to it to fit under haptic 26 and push against collar 24 to thereby move the lens. Insertion tool 66 includes a pair of oppositely placed finger rings 76, 78 on the sides of tubular member 68 and a third finger ring 80 attached to the end of slider member 74 for controlling its sliding movement as best shown by the hand illustrated with phantom lines in FIG. 6. These rings are similar to the rings on certain hypodermic syringes provided to ease manipulations of them.

Tubular member 68 is a rectangular tube approximately 3.0 mm wide and 0.5 mm high with a central portion of one flat surface 82 (the top) missing. The internal rectangle defined by tubular member 68 may have its sharp corners rounded. Lens 20 held in the surgeon's finger, or in the compressing instrument 50, is lubricated with VISCOAT or other visco-elastic substance and inserted into the distal (or proximal) end of the tube. (Alternatively the lens can be inserted in an uncompressed state into a modified insertion tool and the tool compresses it, as well as controllably inserts it, as by pushing it through and out a narrowing channel.) The surgeon slides lens 20 to the desired point, either completely within tubular member 68 or with the forward haptic part of the lens extended. The central portion of the top of the tubular member is omitted so that the surgeon can then use an instrument to position lens 20 in the tubular member from above. The upper opening also allows the surgeon to lubricate the lens from above, to position it within the tube, and to lift the haptic of the lens so that the slider member can pass under it.

By ejecting the compressed intraocular lens 20 slowly and controllably into the eye as is possible with inser-

tion tool 66, the lens resumes its natural shape without "springing open" within the eye and possibly causing injury. Tool 66 can place the lens in the same position as the manual technique employed with current lenses. The lens is manipulated into its remedial position in either the anterior or posterior chambers of the eye. Fluid 30 then is added or withdrawn from bag 28 through needle 34 inserted into the periphery 32 of the bag. Lens 20 is thus quickly, safely and easily inserted through a small incision into the eye and its refractive power adjusted during the implantation surgery and/or at a later time as needed.

From the foregoing detailed description, it will be evident that there are a number of changes, adaptations, and modifications of the present invention which come within the province of those skilled the art. However, it is intended that all such variations not departing from the spirit of the invention be considered as within the scope thereof as limited solely by the claims appended hereto.

What is claimed is:

1. A small incision intraocular lens comprising:
  - a deformable soft optic,
  - a collar positioned generally about said soft optic and compressible about an axis thereof to fit through a small incision into the eye and then expandable when in the eye,
  - an attaching means for attaching said collar to said soft optic,
  - a haptic means attached to said collar for remedially positioning said soft optic in the eye after having been inserted therein,
  - said collar being broken so that a first collar side can slide relative to a second collar side when said collar is compressed, and
  - said collar including a locking means for locking said first and second collar sides together when said collar is in its expanded state.
2. The intraocular lens of claim 1 wherein said haptic means comprises at least two spaced haptics extending out from said collar.
3. The intraocular lens of claim 3 wherein said haptics comprise at least two J-shaped loops.
4. The intraocular lens of claim 2 wherein said haptics comprise at least two flexible, resilient loops attached at their proximal ends to said collar.
5. The intraocular lens of claim 1 wherein said collar is rigid, generally circular and positioned about the periphery of said soft optic.
6. The intraocular lens of claim 1 wherein said collar includes two collar ends which overlap when said collar is compressed and are in generally abutting relation when said collar is in a relaxed state.
7. The intraocular lens of claim 1 wherein said attaching means attaches the inner surface of said collar directly to the outer surface of said soft optic.
8. The intraocular lens of claim 1 wherein said attaching means comprises a welding means.
9. The intraocular lens of claim 1 wherein said attaching means comprises a plurality of attachments spaced about said collar.
10. The intraocular lens of claim 9 wherein said attachments comprise spot welds.
11. The intraocular lens of claim 1 wherein said soft optic has a biconvex configuration.
12. The intraocular lens of claim 1 wherein said soft optic has a thickened perimeter.