CLAIMS

1. An apparatus for manufacturing mold halves for use in the manufacture of contact lenses, the apparatus comprising:

an injection-molding apparatus including a plate, a removable collet in the plate; and

a collet-exchange robot comprising at least one collet extraction head;

CHARACTERISED IN THAT:

a tool half is mounted in the removable collet;

the apparatus includes a collet store for storing at least one removable collet configured to be inserted into the plate;

the collet-exchange robot is configured to grip the removable collet from the plate, move the removable collet to the collet store, insert the removable collet into the collet store, grip a replacement collet from the collet store, move the replacement collet to the plate, and insert the replacement collet into the plate;

wherein the injection-molding apparatus comprises a clamp configured to hold the removable collet in the plate and the removable collet includes a frustoconical rear portion and a circumferential groove upon which the clamp acts; and wherein the collet store comprises a housing for receiving a plurality of removable collets, and a turntable on which the housing is mounted, the turntable being rotatable from a first position wherein a removable collet can be manually loaded into the housing, to a second position wherein the removable collet can be removed from the collet store by the collet-exchange robot.

2. The apparatus as claimed in claim 1, wherein the collet extraction head is rotatably mounted on the collet-exchange robot.

3. The apparatus as claimed in claim 1 or claim 2, wherein the collet extraction head comprises a gripping portion.

4. A method of manufacturing a contact lens, comprising:

- using a robot to remove a first collet from a plate in an injection-molding apparatus;
- using the robot to transport a replacement collet to the plate and insert the replacement collet into the plate; and
- forming a contact lens mold half in a second injection-molding cavity;

CHARACTERISED BY

- using the robot to transport the first collet to a collet store and insert the first collet into the collet store; and
- using the robot to remove the replacement collet from the collet store, the replacement collet comprising a second tool half defining at least a portion of the second injection-molding cavity for molding a contact lens mold half;

AND IN THAT

- the first collet comprising a first tool half mounted therein, the first tool half defining at least a portion of a first injection-molding cavity for molding a contact lens mold half;
- the first collet includes a frustoconical rear portion and a circumferential groove and is held in place in the plate with a clamp acting upon the circumferential groove, and the method further comprises releasing the clamp from holding the first collet prior to removing the first collet from the plate; and
- the collet store comprises a housing for receiving a plurality of removable collets, and a turntable on which the housing is mounted, the turntable being rotatable from a first position wherein a removable collet can be manually loaded into the housing, to a second position wherein the removable collet can be removed from the collet store by the collet-exchange robot.

5. The method of claim 4, wherein using the robot to remove the first collet, using the robot to transport the first collet and insert the first collet into the collet store, using the robot to remove the replacement collet, and using the replacement robot to transport the replacement collet and insert the replacement collet into the plate, comprises moving a collet extraction head of the robot in three dimensions.

6. The method of claim 4 or 5, wherein using the robot to remove the first collet from the plate comprises moving a collet extraction head of the robot to a position in front of the first collet; moving the collet extraction head forward, toward the first collet; gripping the first collet with the extraction head; and moving the collet extraction head backward, to extract the first collet from the plate.

7. The method of claim 6, wherein gripping the first collet with the collet extraction head comprises gripping the first collet at a circumferential groove formed in the first collet.

8. The method of any of claims 4 to 7, wherein coolant is removed from coolant passages associated with the first collet, prior to the removal of the first collet from the plate, and resupplied to said coolant passages after insertion of the replacement collet into the plate.

9. The method of any of claims 4 to 8, wherein using the robot to transport the first collet and insert the first collet into the collet store comprises: moving the collet extraction head so that the collet extraction head is in a position in front of an empty aperture in the collet store; moving the collet extraction head forward, toward the empty aperture; and releasing the first collet into the empty aperture.

10. The method of any of claims 4 to 9, wherein using the robot to transport the replacement collet and insert the replacement collet into the plate comprises: moving the collet extraction head to a position in front of the replacement collet; gripping the replacement collet with the collet extraction head; moving the collet extraction head to a position in front of the plate from which the first collet was removed; and inserting the replacement collet into the plate.

11. The method of claim 10, wherein gripping the replacement collet with the collet extraction head comprises gripping the replacement collet at a circumferential groove formed in the replacement collet.

12. The method of any of claims 4 to 11, further comprising clamping the replacement collet into the plate.

13. The method of any of claims 4 to 12, further comprising moving the robot to a resting location after using the robot to insert the replacement collet into the plate.

14. The method of any of claims 4 to 13, wherein forming a contact lens mold in the second injection-molding cavity comprises: providing a complementary contact lens mold half; combining the contact lens mold half and the complementary contact lens mold half to form a mold assembly having a lens-shaped cavity there between; curing a polymerizable composition in the lens-shaped cavity to form a polymeric lens body; demolding and delensing the polymeric lens body from both the contact lens mold half and the complementary contact lens mold half, to form a released polymeric lens body; optionally washing, extracting, hydrating, or any combination thereof, the released polymeric lens body; placing the released polymeric lens body in a contact lens package; sealing the filled contact lens package; and sterilizing the sealed contact lens package to form a finished contact lens package containing a finished contact lens.