SUMMARY

To that end, according to a first aspect, the invention provides an insert assembly for the purpose of an injection mold for manufacturing a first casting mold half of a casting mold for manufacture of an ophthalmic device, wherein the casting mold comprises the first casting mold half and a second casting mold half which in a condition placed onto each other bound a lens cavity, wherein the insert assembly is receivable in an injection mold half of the injection mold and wherein the insert assembly comprises:

- an insert assembly end surface which bounds an injection mold cavity of the injection mold for forming the first casting mold half and which extends substantially perpendicular to an axial centerline of the insert assembly;
- an outer part assembly which has an outer part assembly end surface which forms a part of the insert assembly end surface;
- an inner part which has an optically accurately defined end surface which in a mounted condition is substantially at the outer part assembly end surface and which forms a part of the insert assembly end surface;
- at least one notch in the insert assembly end surface, which forms a bounding structure cavity for forming a bounding structure which is an integral part of the first casting mold half to be formed with the injection mold, such that in a condition of the first and the second casting mold halves placed onto each other, the bounding structure abuts against the second casting mold half and bounds at least one haptics cavity which links up with the lens cavity, wherein the haptics cavity is so configured that in use of the casting mold, after curing of monomeric material deposited in the casting mold, an ophthalmic device in the implementation of an intraocular lens is formed which comprises a lens and integrally formed-on haptics,

wherein the at least one notch is so shaped as to form in the first casting mold half a bounding structure which comprises at least one upwardly projecting ridge, wherein the upwardly projecting ridge in cross section has a triangular shape with a sharp top.

According to a next aspect of the invention, an injection mold is provided, which comprises:

- a first injection mold half in which an insert assembly according to any one of claims 1-8 is received;
- a second injection mold half which is movable relative to the first injection mold half from a closed to an opened position and vice versa,
- a first injection mold cavity which is formed in the closed condition of the injection mold, which is at least partly bounded by the first insert assembly, and which is configured for manufacturing the first casting mold half.

Further, the invention provides a method for manufacturing a casting mold for manufacture of an ophthalmic device, wherein the casting mold comprises a first casting mold half and a second casting mold half which in a condition placed onto each other bound a lens cavity, wherein the method either comprises:

- providing an injection mold according to claim 9 and providing a second injection mold comprising:
    - a second insert assembly provided with an optically accurately defined surface;
    - a second injection mold cavity which is formed in the closed condition of the injection mold, which is at least partly bounded by the optically accurately defined surface of the second insert assembly, and which is configured for manufacturing the second casting mold half;

or wherein the method comprises:

- providing an injection mold according to claim 10;

wherein the method further comprises:

- injection molding of the first casting mold half with an optically accurately defined surface part; and

- injection molding of the second casting mold half with an optically accurately defined surface part;

wherein in a condition of the first and the second casting mold halves placed onto each other, the bounding structure of the first casting mold half abuts against the second casting mold half and bounds at least one haptics cavity which links up with the lens cavity, wherein the haptics cavity is so configured that in use of the casting mold, after curing of monomeric material deposited in the casting mold, an ophthalmic device in the implementation of an intraocular lens is formed which comprises a lens and integrally formed-on haptics.

Further, the invention provides a casting mold for manufacturing an ophthalmic device, provided with:

- a first casting mold half with an optically accurately defined surface part;
- a second casting mold half with an optically accurately defined surface part;

wherein the first casting mold half and the second casting mold half in a condition placed onto each other bound a lens cavity, which lens cavity is at least partly bounded by the optically accurately defined surface parts;
wherein the casting mold is provided with:

- a bounding structure which is an integral part of the first casting mold half, such that in a condition of the first and the second casting mold halves placed onto each other, the bounding structure abuts against the second casting mold half and bounds at least one haptics cavity which links up with the lens cavity, wherein the haptics cavity is so configured that in use of the casting mold, after curing of monomeric material deposited in the casting mold, an ophthalmic device in the implementation of an intraocular lens is formed which comprises a lens and integrally formed-on haptics,
  wherein the bounding structure comprises at least one upwardly projecting ridge which in cross section has a triangular shape with a sharp top.

The invention further provides a method for manufacturing an intraocular lens, wherein the method comprises:

- providing a casting mold according to any one of claims 12-13 with the aid of the method according to claim 11;
- injecting an amount of monomeric material into the first casting mold half;
- placing the second casting mold half on the first casting mold half;
- curing of the monomeric material that is in the casting mold for forming in the casting mold an intraocular lens which comprises a lens and integrally formed-on haptics.

With the aid of the insert assembly according to the invention, an injection mold according to the invention can be provided, with which, using the method according to the invention, a first casting mold half according to the invention can be manufactured. With the same injection mold or with another injection mold, a second casting mold half can be manufactured, whereby through combination of the first and the second casting mold halves a casting mold according to the invention is obtained. Owing to the particular construction of the insert assembly, a casting mold is obtained which is characterized by a bounding structure which is an integral part of the first casting mold half, such that in a condition of the first and the second casting mold halves placed onto each other, the bounding structure abuts against the second casting mold half and bounds at least one haptics cavity which links up with the lens cavity, the haptics cavity being so configured that in use of the casting mold, after curing of monomeric material deposited in the casting

cavity 108 is at least partly bounded by the second insert assembly 80, and is configured for manufacturing the second casting mold half 204.

In an embodiment of the invention, further, a method for manufacturing a casting mold 200 for manufacture of an ophthalmic device is provided. The casting mold 200 comprises a first casting mold half 202 and a second casting mold half 204 which in a condition placed onto each other bound a lens cavity. The method comprises providing either an injection mold 100 provided with only insert assemblies 10 according to the invention and providing a second injection mold which is provided with a second insert assembly 80 provided with an optically accurately defined surface 82 and which in the closed condition of the injection mold forms a second injection mold cavity 108 which is at least partly bounded by the optically accurately defined surface 82 of the second insert assembly, and which is configured for manufacturing the second casting mold half 204. In an alternative embodiment of the method, the method can comprise providing an injection mold according to claim 10, so that with the same injection mold 100 both first casting mold halves 202 and second casting mold halves 204 can be manufactured. Further, the method comprises injection molding of the first casting mold half 202 with an optically accurately defined surface 214 and injection molding of the second casting mold half 204 with an optically accurately defined surface part 216. The injection mold 100 is then preferably so configured that the bounding structure 208, 210 of the first casting mold half 202, in a condition of the first and second casting mold halves 202, 204 placed onto each other, abuts against the second casting mold half 204 and bounds at least one haptics cavity 212 which links up with the lens cavity 206. The thus formed haptics cavity 212 is then so configured that in use of the casting mold 200, after curing of monomeric material deposited in the casting mold 200, an ophthalmic device implemented as an intraocular lens 300 is formed which comprises a lens 302 and integrally formed-on haptics 304.

material in the first casting mold half that is present in the haptics cavity 212 and the lens cavity 206 is effectively separated from the monomeric material that is present outside thereof. This is because the cross-sectionally sharp tops of the upwardly projecting ridges 208, 210 are, upon closure, pressed against the second casting mold half 204, such that at the location of the contact between the sharp top of the upwardly projecting ridge 208, 210 and the second casting mold half 204, the monomeric material is pressed away and there a sharp separation is created between the monomeric material that is in the haptics cavities 212 and the lens cavity 206 and the monomeric material that is present outside thereof. As a result, an intraocular lens 300 is formed without flashes, so that a post-treatment of the intraocular lens 300, for instance for removing flashes, can be omitted.

Further, a method is provided for manufacturing an intraocular lens. The method comprises providing a casting mold 200 according to any one of claims 12-13 with the help of the method according to claim 11. Further, the method comprises:

- injecting an amount of monomeric material into the first casting mold half 202;
- placing the second casting mold half 204 on the first casting mold half 202;
- curing the monomeric material that is in the casting mold 200 for forming in the casting mold 200 an intraocular lens 300 which comprises a lens 302 and integrally formed-on haptics 304.

After carrying out the method, the intraocular lens 300 can undergo a hydration treatment so that it softens and the lens 300 can be packaged in a package in which it is immersed in a fluid. The package could be formed by the first casting mold half 202 which is covered with a foil. However, alternative packages are also possible. It is known to package intraocular lenses in a special holder which is immersed in a fluid that is in a bottle. The holder can

CLAIMS

1. An insert assembly (10) for the purpose of an injection mold (100) for manufacturing a first casting mold half (202) of a casting mold (200) for manufacture of an ophthalmic device, wherein the casting mold (200) comprises the first casting mold half (202) and a second casting mold half (204) which in a condition placed onto each other bound a lens cavity (206), wherein the insert assembly (10) is receivable in an injection mold half (102) of the injection mold (100) and wherein the insert assembly (10) comprises:

- an insert assembly end surface (14, 18, 22, 26), which bounds an injection mold cavity (106) of the injection mold (100) for forming the first casting mold half (202) and which extends substantially perpendicular to an axial centerline (L) of the insert assembly (10);
- an outer part assembly (12, 16, 24) which has an outer part assembly end surface (14, 18, 26) which forms a part of the insert assembly end surface (14, 18, 22, 26);
- an inner part (20) which has an optically accurately defined end surface (22) which in a mounted condition is substantially adjacent the outer part assembly end surface (14, 18, 26) and which forms a part of the insert assembly end surface (14, 18, 22, 26);
- at least one notch (40, 42) in the insert assembly end surface (14, 18, 22, 26) which forms a bounding structure cavity for forming a bounding structure (208, 210) which is an integral part of the first casting mold half (202) to be formed with the injection mold (100), such that, in a condition of the first and the second casting mold halves (202, 204) placed onto each other, the bounding structure (208, 210) abuts against the second casting mold half (204) and bounds at least one haptics cavity (212) which links up with the lens cavity (206), wherein the haptics cavity (212) is so configured that in use of the casting mold (200), after curing of monomeric material deposited in the casting mold

(200), an ophthalmic device in the implementation of an intraocular lens (300) is formed which comprises a lens (302) and integrally formed-on haptics (304),

- wherein the at least one notch (40, 42) is so shaped as to form in the first casting mold half (202) a bounding structure (208, 210) which comprises at least one upwardly projecting ridge (208, 210), wherein the upwardly projecting ridge (208, 210) in cross section has a triangular shape with a sharp top.

2. The insert assembly according to claim 1, wherein the notch (40) forms at least one closed contour that surrounds the optically accurately defined surface (22), wherein the contour is so shaped as to form in the casting mold (200) a bounding structure (208) which comprises an upwardly projecting ridge which extends according to a corresponding closed contour and which, in a condition of the first and the second casting mold halves (202, 204) placed onto each other, abuts against the second casting mold half (204) and bounds the lens cavity (206) and the at least one haptics cavity (212).

3. The insert assembly according to any one of the claims 1-2, wherein the outer part assembly (12, 16, 24) comprises:

- an outer part (12) provided with a central outer part passage (28), wherein the outer part (12) has an end surface (14) which is part of the outer part assembly end surface (14, 18, 26), wherein the outer part
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passage (28) forms an outer part passage opening in the end surface (14) of the outer part, which is bounded by outer part passage edges (30); and

- an intermediate part (16) which in the direction of the axial centerline (L) is slidably and fittingly received in the outer part passage (28), wherein the intermediate part (16) has an intermediate part end surface (18) which is part of the outer part assembly end surface (14, 18, 26), wherein the intermediate part end surface (18) is bounded by intermediate part circumferential edges (48);

wherein the outer part passage edges (30) and/or the intermediate part circumferential edges (48) are chamfered, such that a notch (40) triangular in cross section is obtained when the intermediate part (16) is placed in the outer part (12), which triangular notch (40) forms the at least one upwardly projecting ridge (208) of the first casting mold half (202).

4. The insert assembly according to claim 3, wherein the intermediate part (16) is provided with:

- a central intermediate part passage (46) in which the inner part (20) is axially slidably and fittingly receivable.

5. The insert assembly according to claim 3 or 4, wherein intermediate part (16) is provided with:

- at least one additional intermediate part passage (50), wherein the at least one additional intermediate part passage (50) forms an intermediate part passage opening in the end surface (18) of the intermediate part (16) which is bounded by intermediate part passage edges (52); and

wherein the insert assembly (10) comprises:

- at least one intermediate part sub-element (24), associated with the at least one intermediate part passage (50), which in the direction of the axial centerline is slidably and fittingly receivable in the associated

intermediate part passage (50), wherein the intermediate part sub-element (24) has an end surface (26) which is part of the outer part assembly end surface (14, 18, 22, 26), wherein the end surface (26) of the intermediate part sub-element (24) is bounded by intermediate part sub-element circumferential edges (32);

wherein the intermediate part passage edges (52) and/or the intermediate part sub-element circumferential edges (32) are chamfered, such that a notch (42) triangular in cross section is obtained when the intermediate part sub-element (24) is placed in the intermediate part (16), which triangular notch (42) forms an additional upwardly projecting ridge (210) of the first casting mold half (202) for bounding a portion of the haptics cavity (212).

6. The insert assembly according to claim 4, wherein the central intermediate part passage (46), viewed from the intermediate part end surface (18), over a first length part of the intermediate part passage (46) has a first diameter (D1) and over a second length part that links up with the first length part is provided with a second diameter (D2) which is smaller than the first diameter (D1), wherein at the transition from the first to the second length part a stop surface (54) is formed which extends substantially perpendicular to the axial centerline (L), wherein the inner part (20) at the end opposite the optically accurately defined end surface is provided with a second end surface (58) in which a bore (56) is provided with internal thread, wherein the insert assembly (10) is provided with a bolt (44) which is configured for engagement of the internal thread of the bore (56) and with the aid of which the inner part (20) is detachably mountable in the intermediate part (16), wherein in the mounted condition of the inner part (20) in the intermediate part (16) the second end surface (58) abuts by the bore against the stop surface (54).

7. The insert assembly according to any one of claims 3-6, provided with:

- at least one keyway (34) which is provided in an intermediate part circumferential wall (60) extending in axial direction of the intermediate part (16), wherein the at least one keyway (34) extends substantially perpendicular to the axial centerline (L);
- a stop surface (62) which is arranged in the outer part passage (28), wherein the stop surface (62) is remote from the insert assembly end surface (14, 18, 22, 26); and
- at least one key (36) which is fittingly receivable in the associated at least one keyway (34), wherein in a mounted condition of the intermediate part (16) in the outer part (12), the at least one key (36) is received in the associated at least one keyway (34) and abuts against the stop surface (62) in the outer part passage (28), so that the intermediate part (16) is positioned in axial direction relative to the outer part (12).

8. The insert assembly according to claim 7, wherein the insert assembly (10) also possesses the features of claim 5, wherein each intermediate part sub-element (24) is provided with a keyway (38) which is provided in an intermediate part sub-element circumferential wall (64) which extends parallel to the axial centerline (L), wherein the keyway (38) extends substantially perpendicular to the axial centerline (L), wherein in a mounted condition of the insert assembly (10) the at least one key (36) is received in the keyway (34) of the intermediate part (16) and also in the keyway (38) of the intermediate part sub-element (24) and abuts against the stop surface (62) in the outer part passage (28), so that both the intermediate part (16) and the at least one intermediate part sub-element (24) are positioned in axial direction relative to the outer part (12).

9. An injection mold comprising:

- a first injection mold half (102) in which an insert assembly (10) according to any one of claims 1-8 is received;

- a second injection mold half (104) which is movable relative to the first injection mold half (102) from a closed to an opened position and vice versa,
- a first injection mold cavity (106) which is formed in the closed condition of the injection mold, which is at least partly bounded by the insert assembly end surface (14, 18, 22, 26) of the first insert assembly (10), and which is configured for manufacturing the first casting mold half (202).

10. The injection mold according to claim 9, comprising:

- a second insert assembly (80) provided with an optically accurately defined surface (82);
- a second injection mold cavity (108) which is formed in the closed condition of the injection mold (100), which is at least partly bounded by the second insert assembly (80), and which is configured for manufacturing the second casting mold half (204).

11. A method for manufacturing a casting mold (200) for manufacture of an ophthalmic device, wherein the casting mold (200) comprises a first casting mold half (202) and a second casting mold half (204) which in a condition placed onto each other bound a lens cavity, wherein the method comprises:

- providing an injection mold (100) according to claim 9 and providing a second injection mold comprising:
    - a second insert assembly (80) provided with an optically accurately defined surface (82);
    - a second injection mold cavity (108) which is formed in the closed condition of the injection mold, and which is at least partly bounded by the optically accurately defined surface (82) of the second insert assembly, and which is configured for manufacturing the second casting mold half (204);

or wherein the method comprises:

- providing an injection mold according to claim 10;

wherein the method further comprises:

- injection molding the first casting mold half (202) with an optically accurately defined surface part (214); and
- injection molding the second casting mold half (204) with an optically accurately defined surface part (216);

wherein in a condition of the first and the second casting mold halves (202, 204) placed onto each other, the bounding structure (208, 210) of the first casting mold half (202) abuts against the second casting mold half (204) and bounds at least one haptics cavity (212) which links up with the lens cavity (206), wherein the haptics cavity (212) is so configured that in use of the casting mold (200), after curing of monomeric material deposited in the casting mold (200), an ophthalmic device in the implementation of an intraocular lens (300) is formed which comprises a lens (302) and integrally formed-on haptics (304).

12. A casting mold (200) for manufacturing an ophthalmic device, provided with:

- a first casting mold half (202) with an optically accurately defined surface part (214);
- a second casting mold half (204) with an optically accurately defined surface part (216);

wherein the first casting mold half (202) and the second casting mold half (204) in a condition placed onto each other bound a lens cavity (206), which lens cavity (206) is at least partly bounded by said optically accurately defined surface parts (214, 216);

wherein the casting mold (200) is provided with:

- a bounding structure (208, 210) which is an integral part of the first casting mold half (202), such that in a condition of the first and the second casting mold half (202, 204) placed onto each other, the bounding

structure (208, 210) abuts against the second casting mold half (204) and bounds at least one haptics cavity (212) which links up with the lens cavity (206), wherein the haptics cavity (212) is so configured that in use of the casting mold (200), after curing of monomeric material deposited in the casting mold (200), an ophthalmic device in the implementation of an intraocular lens (300) is formed which comprises a lens (302) and integrally formed-on haptics (304),

- wherein the bounding structure (208, 210) comprises at least one upwardly projecting ridge (208, 210) which in cross section has a triangular shape with a sharp top.

13. The casting mold according to claim 12, wherein the upwardly projecting ridge (208) extends according to a closed contour and, in a condition of the first and the second casting mold halves (202, 204) being placed onto each other, abuts against the second casting mold half (204) and bounds the lens cavity (206) and the at least one haptics cavity (212).

14. A method for manufacturing an intraocular lens, wherein the method comprises:

- providing a casting mold (200) according to any one of claims 12-13 with the aid of the method according to claim 11;
- injecting an amount of monomeric material into the first casting mold half (202);

- placing the second casting mold half (204) on the first casting mold half (202);
- curing the monomeric material that is in the casting mold (200) for forming in the casting mold (200) an intraocular lens (300) which comprises a lens (302) and integrally formed-on haptics (304).