CLAIMS

What is claimed is:

1. A breast pump, comprising a main pump module, a breast shield, a liquid separation device, and a breast pump assembly, wherein the main pump module is configured to generate negative pressure, and the breast shield is provided with a breast receptacle;

the breast pump assembly comprises:

a container body and a container lid, wherein the container body and the container lid enclose a milk storage chamber;

a negative pressure part, wherein the negative pressure part is connected to the container lid, the negative pressure part is provided with a negative pressure chamber; and

a nipple tunnel cap element, wherein the nipple tunnel cap element is connected to the container lid, the nipple tunnel cap element is provided with a nipple tunnel, the nipple tunnel communicates with the negative pressure chamber, and the nipple tunnel is at least configured to guide milk from a breast;

the liquid separation device is at least partially accommodated within the negative pressure chamber;

the nipple tunnel communicates with the breast receptacle; and

both the nipple tunnel cap element and the negative pressure part extend to an interior of the milk storage chamber; the negative pressure part is further provided with a first through hole and a second through hole; the first through hole is configured to communicate the negative pressure chamber with the nipple tunnel; and the second through hole is configured to communicate the negative pressure chamber with the milk storage chamber;

wherein the negative pressure part, the nipple tunnel cap element, and the container lid are integrally formed.

2. The breast pump according to claim 1, wherein the container lid is provided with a first perforation and a second perforation;

the negative pressure part is connected to the first perforation;

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the nipple tunnel cap element is connected to the second perforation; and the second perforation communicates with the nipple tunnel, and is configured to allow the milk to pass through and flow to the nipple tunnel.

3. The breast pump according to claim 2, wherein the first perforation and the second perforation meet at least one of following conditions:

1) when the breast pump is placed against the breast, the first perforation is located below the second perforation;

2) a central axis of the first perforation is coaxial with a central axis of the negative pressure chamber, and a central axis of the second perforation is coaxial with a central axis of the nipple tunnel;

3) the central axis of the first perforation is parallel to the central axis of the second perforation; and

4) the first perforation is closely adjacent to the second perforation.

4. The breast pump according to claim 3, wherein when the breast pump is placed against the breast, the first perforation is located directly below the second perforation, and the negative pressure chamber communicates with the milk storage chamber.

5. The breast pump according to claim 1, wherein the nipple tunnel cap element and the negative pressure part share a first side wall, and two opposite sides of the first side wall face the negative pressure chamber and the nipple tunnel, respectively.

6. The breast pump according to claim 5, wherein the first through hole penetrates the first side wall and communicates the negative pressure chamber with the nipple tunnel.

7. The breast pump according to claim 6, wherein the negative pressure part further comprises a second side wall that is arranged opposite to the first side wall, and the second through hole penetrates the second side wall and communicates with the negative pressure chamber.

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8. The breast pump according to claim 7, wherein the first through hole and the second through hole meet at least one of following conditions:

1) when the breast pump is placed against the breast, the second through hole is located below the first through hole;

2) when the breast pump is placed against the breast, the first through hole is located at a lowest position of the nipple tunnel cap element;

3) when the breast pump is placed against the breast, the second through hole is located at a lowest position of the negative pressure part;

4) when the breast pump is placed against the breast, the second through hole is aligned with the first through hole along a vertical direction;

5) the negative pressure part further comprises a first bottom wall; the first side wall, the second side wall, and the first bottom wall enclose the negative pressure chamber; and the second through hole is formed in an end of the second side wall close to the first bottom wall;

6) when the breast pump is placed against the breast, the first through hole is located at a bottom of the nipple tunnel cap element; and

7) when the breast pump is placed against the breast, the second through hole is located at a bottom of the negative pressure part.

9. The breast pump according to claim 8, wherein the first bottom wall is in smooth transition with both the first side wall and the second side wall.

10. The breast pump according to any one of claims 1-9, wherein the breast pump assembly further meets at least one of following conditions:

1) the container body is provided with a first mounting groove; and the container lid is accommodated in the first mounting groove, so as to enclose the milk storage chamber with the container body; and

2) the nipple tunnel cap element and the negative pressure part are arranged side by side；

3）wherein when the breast pump is placed against the breast, the negative pressure chamber is located below the nipple tunnel.

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11. The breast pump according to any one of claims 1-9, wherein the container lid is provided with a first perforation; and the negative pressure part is connected to the first perforation and is located on a side of the container lid toward the milk storage chamber;

the liquid separation device comprises a liquid separation device body and a ring connected to the liquid separation device body; and

a circumferential direction of the main pump module around a negative pressure suction port and/or a circumferential direction of the container lid around the first perforation is provided with a second mounting groove; the ring is disposed in the second mounting groove; and the liquid separation device body is accommodated in the negative pressure chamber.

12. The breast pump according to claim 11, wherein when the breast pump is placed against the breast, the negative pressure chamber is located below the nipple tunnel; and

the liquid separation device has a contracted state and an expanded state; and when the liquid separation device is in the expanded state, at least a portion of the liquid separation device corresponding to the first through hole is spaced apart from a wall of the negative pressure chamber.

13. The breast pump according to any one of claims 1-9, wherein the nipple tunnel cap element is at least partially made of a transparent material; and at least a portion of the container body that is located above the nipple tunnel cap element is made of an optically transparent material, such that a user is able to directly view an internal situation of the nipple tunnel through the container body and the nipple tunnel cap element.

14. The breast pump according to any one of claims 1-9, wherein a one-way valve is provided at the second through hole, so as to prevent backflow of the milk to the negative pressure chamber from the milk storage chamber.

15. A breast pump assembly, applied to a breast pump and comprising:

a container body and a container lid, wherein the container body and the container lid enclose a milk storage chamber;

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a negative pressure part, wherein the negative pressure part is connected to the container lid, and the negative pressure part is provided with a negative pressure chamber; and

a nipple tunnel cap element, wherein the nipple tunnel cap element is connected to the container lid, the nipple tunnel cap element is provided with a nipple tunnel, the nipple tunnel communicates with the negative pressure chamber, and the nipple tunnel is at least configured to guide milk from a breast;

wherein, the negative pressure chamber is at least configured to accommodate at least a portion of a liquid separation device of a main pump module of the breast pump; and the liquid separation device is configured to transfer negative pressure generated by the main pump module to the negative pressure chamber; and

both the nipple tunnel cap element and the negative pressure part extend to an interior of the milk storage chamber; the negative pressure part is further provided with a first through hole and a second through hole; the first through hole is configured to communicate the negative pressure chamber with the nipple tunnel; and the second through hole is configured to communicate the negative pressure chamber with the milk storage chamber.

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