PATENT CLAIMS

1. Breast shield unit of a breast pump for expressing human breastmilk, the breast shield unit comprising a breast shield (1) to be placed onto a mother's breast, a breastmilk collection container (5) for receiving expressed breastmilk, an adapter (2) for connecting the breast shield (1) to the breastmilk collection container (5) and a valve head (4), with a breastmilk channel extending from the breast shield (1) into the breastmilk collection container (5) through the adapter (2) and the valve head (4), and the valve head (4) comprising a valve (40), said valve closing and opening the breastmilk channel during the pumping action, wherein a fill level sensor (6) for measuring a fill level of the breastmilk collection container (5) is arranged in the valve head (4), and wherein the fill level sensor (6) is a distance sensor for measuring a distance from a surface of the expressed breastmilk situated in the breastmilk collection container (5), and wherein the breast shield unit further comprises a position sensor (7) which detects the position of the breastmilk collection container (5) in three-dimensional space and hence the oblique position thereof in three-dimensional space.

2. Breast shield unit according to Claim 1, wherein the fill level sensor (6) is a time-of-flight sensor.

3. Breast shield unit according to any one of Claims 1 and 2, wherein at least one further sensor (7, 8) is arranged in the valve head (4).

4. Breast shield unit according to Claim 3, wherein one of the at least one further sensors is a flow sensor (8) which measures the flow through the valve (40).

5. Breast shield unit according to Claim 4, wherein the flow sensor (8) is an optical sensor which detects a deflection of a valve flap (40) of the valve.

6. Breast shield unit according to any one of Claims 3 to 5, wherein one of the at least one further sensors is the position sensor (7).

7. Breast shield unit according to any one of Claims 1 to 6, wherein the position sensor (7) is an acceleration sensor.

8. Breast shield unit according to any one of Claims 1 to 7, wherein the fill level sensor (6) and the position sensor (7) are arranged with fixed positions in relation to one another in the valve head (4).

9. Breast shield unit according to any one of Claims 1 to 8, wherein an electronics unit (9) for processing signals from the fill level sensor (6) is arranged in the valve head (4).

10. Breast shield unit according to Claim 9 and at least one of Claims 4 to 8, wherein the electronics unit (9) is embodied to process signals of the at least one further sensor (7, 8).

11. Breast shield unit according to any one of Claims 9 and 10, wherein the electronics unit (9) is embodied to interchange data (91, 92, 93, 94, 95, 96, 97) with at least one of the following units: a breast pump (30), a “smart device” (SD), such as a smartphone, which is updated from an information technology point of view, an external data processing unit such as a computer (OD), cloud (C), Internet, Internet access unit (I).

12. Breast shield unit according to any one of Claims 1 to 11, wherein the valve head (4) is embodied without wires to the outside and, in terms of electronic connectors, without a connector.

13. Breast shield unit according to any one of Claims 1 to 12, wherein the valve head (4) is an integral component of the adapter (2).

14. Breast shield unit according to any one of Claims 1 to 13, wherein the valve head (4) is detachably connectable to the adapter (2) and/or the breastmilk collection container (5).

15. Valve head of a breast shield unit according to any one of Claims 1 to 14, wherein the valve head (4) has a valve (40) which closes and opens the breastmilk channel during the pumping action and wherein a fill level sensor (6) for measuring a fill level of the breastmilk collection container (5) is arranged in the valve head.