Claims

1. Suction head (20) for a dredging vessel (1), adapted for movement in a direction of movement P, the suction head (20) comprising a box shaped construction (21), at its bottom side provided with a suction opening (22) and having a connection for a suction conduit (3) of the dredging vessel (1), further having a rear wall (23) and a front wall (29, 26e), each extending substantially transverse to the direction of movement P, and side walls (25a, 25b), extending substantially parallel to the direction of movement P, as well as an upper wall (24) provided at the side turned away from the bottom, whereby the front wall (29, 26e) includes a fixed front wall part (29) and whereby the rear wall, the side walls and the fixed front wall part form a rigid unity and the rear wall (23) at its bottom side is provided with cutting tools (30) for penetrating ~~in~~ the bottom, their being spaces formed between the ~~which~~ cutting tools ~~spaces are formed through~~ which enable ~~spaces~~ a bottom material/water mixture to be ~~is~~ sucked in, and whereby the front wall (29, 26e) further comprises ~~a fixed wall part (29) and~~ a movable wall part (26e) that moves together with the bottom profile and closes off the suction opening at the upstream side of the cutting tools substantially at all times.

2. Suction head according to claim 1, the suction head comprising a close off body (26) that is hingedly connected to the box shaped construction, the movable wall part comprising a wall part (26e) of the close off body (26).

3. Suction head according to claim 2, whereby the wall part of the close off body comprises a rear wall of the close off body, the rear wall being hingedly connected to the side walls of the box shaped construction by means of side walls connected to the rear wall, such that the rear wall may be rotated up and down.

4. Suction head according to claim 3, whereby the rear wall of the close off body comprises an upstanding rear wall overlapping partly with the fixed wall part of the front wall of the box shaped construction.

5. Suction head according to any one of the preceding claims, whereby the wall part that moves together with the bottom profile extends transverse to the direction of movement of the suction head over substantially the complete width thereof.

6. Suction head according to any one of the preceding claims, whereby the wall part that moves together with the bottom profile comprises a number of substantially linked up and mutually independently movable sections transverse to the direction of movement of the suction head.

7. Suction head according to any one of the preceding claims, whereby the cutting tools at least at their free end are rotation symmetric.

8. Suction head according to claim 7, whereby the cutting tools are connected with the rear wall such that they can rotate substantially free around their axis of rotation symmetry.

9. Suction head according to claim 7 of 8, whereby the cutting tools are cone shaped.

10. Suction head according to any one of the preceding claims, whereby the cutting tools form at least one array, that extends or extend along a straight line (11, 12) substantially transverse to the direction of movement.

11. Suction head according to claim 10, whereby the number of cutting tools in an array is at least 15.

12. Suction head according to claim 10 of 11, whereby the number of arrays is at least 2.

13. Suction head according to any one of the preceding claims, whereby the suction head (1) comprises at least one array of jet pipes for injecting water under pressure.

14. Suction head according to claim 13, whereby the rear wall of the box shaped construction comprises at least one array of jet pipes.

15. Suction head according to claim 13 of 14, whereby the jet pipes are provided between the cutting tools.

16. Dredging device, comprising a dredging vessel adapted for movement in a direction of movement, a suction head according to any of one of claims 1-15, connected to the dredging vessel, a dredge pump with a suction connection provided on the dredging vessel, a suction conduit connecting the suction head to the suction connection of the dredge pump, and support means provided between the dredging vessel and the suction head for supporting the suction conduit, the support means being adapted for controlling the depth of the suction head.

17. Method for dredging bottom material under water with a dredging vessel, equipped with a suction head according to any one of claims 1 - 15, or with a dredging device according to claim 16, whereby the suction head is trailed over a bottom to be dredged in a direction of movement and such that substantially only the cutting tools make contact with the bottom, and whereby the movable wall part of the front wall of the suction head moves together with the bottom profile.

18. Method according to claim 17 wherein the suction head is trailed over a ~~the~~ bottom ~~to be dredged under water has~~having an UCS (‘Unconfined Compressive Strength’) of at least 20 MPa.

Claims

1. Suction head (20) for a dredging vessel (1), adapted for movement in a direction of movement P, the suction head (20) comprising a box shaped construction (21), at its bottom side provided with a suction opening (22) and having a connection for a suction conduit (3) of the dredging vessel (1), further having a rear wall (23) and a front wall (29, 26e), each extending substantially transverse to the direction of movement P, and side walls (25a, 25b), extending substantially parallel to the direction of movement P, as well as an upper wall (24) provided at the side turned away from the bottom, whereby the front wall (29, 26e) includes a fixed front wall part (29) and whereby the rear wall, the side walls and the fixed front wall part form a rigid unity and the rear wall (23) at its bottom side is provided with cutting tools (30) for penetrating the bottom, their being spaces formed between the cutting tools which enable a bottom material/water mixture to be sucked in, and whereby the front wall (29, 26e) further comprises a movable wall part (26e) that moves together with the bottom profile and closes off the suction opening at the upstream side of the cutting tools substantially at all times.

2. Suction head according to claim 1, the suction head comprising a close off body (26) that is hingedly connected to the box shaped construction, the movable wall part comprising a wall part (26e) of the close off body (26).

3. Suction head according to claim 2, whereby the wall part of the close off body comprises a rear wall of the close off body, the rear wall being hingedly connected to the side walls of the box shaped construction by means of side walls connected to the rear wall, such that the rear wall may be rotated up and down.

4. Suction head according to claim 3, whereby the rear wall of the close off body comprises an upstanding rear wall overlapping partly with the fixed wall part of the front wall of the box shaped construction.

5. Suction head according to any one of the preceding claims, whereby the wall part that moves together with the bottom profile extends transverse to the direction of movement of the suction head over substantially the complete width thereof.

6. Suction head according to any one of the preceding claims, whereby the wall part that moves together with the bottom profile comprises a number of substantially linked up and mutually independently movable sections transverse to the direction of movement of the suction head.

7. Suction head according to any one of the preceding claims, whereby the cutting tools at least at their free end are rotation symmetric.

8. Suction head according to claim 7, whereby the cutting tools are connected with the rear wall such that they can rotate substantially free around their axis of rotation symmetry.

9. Suction head according to claim 7 of 8, whereby the cutting tools are cone shaped.

10. Suction head according to any one of the preceding claims, whereby the cutting tools form at least one array, that extends or extend along a straight line (11, 12) substantially transverse to the direction of movement.

11. Suction head according to claim 10, whereby the number of cutting tools in an array is at least 15.

12. Suction head according to claim 10 of 11, whereby the number of arrays is at least 2.

13. Suction head according to any one of the preceding claims, whereby the suction head (1) comprises at least one array of jet pipes for injecting water under pressure.

14. Suction head according to claim 13, whereby the rear wall of the box shaped construction comprises at least one array of jet pipes.

15. Suction head according to claim 13 of 14, whereby the jet pipes are provided between the cutting tools.

16. Dredging device, comprising a dredging vessel adapted for movement in a direction of movement, a suction head according to any of one of claims 1-15, connected to the dredging vessel, a dredge pump with a suction connection provided on the dredging vessel, a suction conduit connecting the suction head to the suction connection of the dredge pump, and support means provided between the dredging vessel and the suction head for supporting the suction conduit, the support means being adapted for controlling the depth of the suction head.

17. Method for dredging bottom material under water with a dredging vessel, equipped with a suction head according to any one of claims 1 - 15, or with a dredging device according to claim 16, whereby the suction head is trailed over a bottom to be dredged in a direction of movement and such that substantially only the cutting tools make contact with the bottom, and whereby the movable wall part of the front wall of the suction head moves together with the bottom profile.

18. Method according to claim 17 wherein the suction head is trailed over a bottom having an UCS (‘Unconfined Compressive Strength’) of at least 20 MPa.