CLAIMS

1. A suctioning device for suctioning a water volume from a bottom of large artificial water bodies, with surfaces larger than 10,000 m^2, without centralized filtration systems, where the suctioning device is capable of cleaning at a surface rate of 325,000 ft^2 per 24 hours (30,000 m^2 per 24 hours) or more, the device comprising:

a flexible sheet configured to provide a structural frame;

a plurality of first brushes depending from the sheet;

a plurality of middle brushes configured to redirect the bottom water flow into the first brushes;

a plurality of lateral brushes configured to contain the bottom water flow within the suctioning device and avoid the re-suspension of the bottom water flow in the vicinity of the suctioning device;

a plurality of suction points configured to concentrate suction capacity to increase suction power in the suction points;

a plurality of safety wheels configured to provide secondary support and avoid damage to the suctioning device when the first brushes, the middle brushes, and/or the lateral brushes are worn out and cannot provide a proper support or suction height of the suctioning device;

a plurality of collectors configured to gather the suctioned bottom water flow and concentrate the suctioned bottom water flow into one or more external suction lines;

a plurality of internal suction lines configured to conduit the suctioned bottom water flow from the plurality of suction points to the plurality of collecting means; and

a coupling device connecting the internal suction lines and the collectors, wherein a rate of the bottom water flow entering the suctioning device is the same or higher than a rate of water flow suctioned by an external pumping system.

2. The suctioning device according to claim 1, wherein the first brushes are shaped to have an apex.

3. The suctioning device according to claim 2, wherein the suction points are located at the apexes of the first brushes and at apexes of the lateral brushes.

4. The suctioning device according to claim 1, wherein the first brushes are V-shaped brushes.

5. The suctioning device according to claim 1, wherein the bottom water flow entering

the suction device comprises flocs produced by flocculants or coagulants.

6. The suctioning device according to claim 1, wherein the rate ($\dot{Q}_{SC}$) of the bottom water flow entering the suctioning device is the same or higher than the rate ($\dot{Q}_{SC}$) of the water flow suctioned by the external pumping system according to the following equation:

$$\dot{Q}_{SC}\left[\frac{m^3}{s}\right] \geq \dot{Q}_{PS}\left[\frac{m^3}{s}\right]$$

7. The suctioning device according to claim 6, wherein the rate ($\dot{Q}_{SC}$) of the bottom water flow entering the suctioning device is defined as:

$$\dot{Q}_{SC} = \vec{V}_{SC} \times L_{SC} \times H_{SC}\ \left[\frac{m^3}{s}\right],$$

wherein $\vec{V}_{SC}$ is an advancing speed of the suctioning device, L_{SC} is a length of the suctioning device that faces in a moving direction, and H_{SC} is a height of the suctioning device that faces in the moving direction.

8. The suctioning device according to claim 1, wherein the first brushes, the middle brushes, and the lateral brushes are configured and placed in the flexible sheet to allow the suctioning device to operate both in a first direction and in a second direction substantially opposite to the first direction.

9. The suctioning device according to claim 1, wherein the suctioning device is evenly supported by the first brushes, the middle brushes, and the lateral brushes in order to move through a water body and avoid the suctioning device to lift from a bottom surface of the water body.

10. The suctioning device according to claim 1, wherein the flexible sheet is made from a material selected from polycarbonate, polypropylene, carbon fiber, polyethylene, polystyrene, PTFE, PVC, acrylic, and metallic materials.

11. The suctioning device according to claim 1, wherein bristles of the first brushes, the middle brushes, and the lateral brushes are made from a material selected from polypropylene, nylon, animal hair, vegetal fiber, carbon fiber, polyester, peek, polyethylene, polycarbonate, polystyrene, PTFE, PVC, rubbers, acrylic fibers, and metal wire bristles.

12. The suctioning device according to claim 1, wherein the safety wheels are built out of a material selected from polyethylene, polypropylene, polycarbonate, rubbers, plastics,

polystyrene, PTFE, and PVC.

13. The suctioning device according to claim 1, wherein the safety wheels provide secondary support to the device.

14. The suctioning device according to claim 1, further comprising lateral wheels for providing a bumper to avoid damage to lateral walls.

15. The suctioning device according to claim 1, wherein the suctioning device is able to clean a combination of different sloped bottoms from large artificial water bodies.

16. The suctioning device according to claim 1, wherein the device is designed to clean irregular bottoms of sand or soil covered with plastic liners.

17. The suctioning device according to claim 1, wherein the coupling means comprise rigid or flexible coupling components selected from elbows, flanges, shafts, sleeve-style couplings, clamped couplings, and beam couplings.

18. The suctioning device according to claim 1, wherein the collecting means comprise different concentration components, such as manifolds, and multiple-inlet pipes.

19. The suctioning device according to claim 1, wherein elements of the suctioning device are connected to the flexible sheet by means of welding, brazing, soldering, adhesive bonding, and/or mechanical assembly such as screws, bolts and fasteners.

20. The suctioning device according to claim 1, wherein the flexible sheet comprises one or more arm connectors configured to attach one or more connection arms.

21. The suctioning device according to claim 20, wherein the one or more connection arms are connected to propelling device to provide a required driving force and allow the suctioning device to move through the bottom of the large artificial water bodies.

22. The suctioning device according to claim 1, wherein the flexible sheet comprises one or more connections for connecting a propelling device.

23. The suctioning device according to claim 22, wherein the propelling device comprises a boat with an engine.

24. The suctioning device according to claim 22, wherein the propelling device comprises a track system.

25. The suctioning device according to claim 22, wherein the propelling device comprises an automated system located within the suctioning device.

26. The suctioning device according to claim 25, wherein the automated system comprises

a caterpillar system.

27. The suctioning device according to claim 1, wherein the bottom water flow entering the suctioning device is dependent on an advancing speed, an advancing length and the suction height of the suctioning device.

28. The suctioning device according to claim 1, wherein the water flow suctioned by the external pumping system is sent to a filtration system and a purified water flow is returned into a large water body.

29. The suctioning device according to claim 28, wherein the filtration system is not attached to the suctioning device.

30. The suctioning device according to claim 1, further comprising a plurality of underwater lights in order to illuminate a path of the suctioning device.

31. The suctioning device according to claim 1, further comprising a plurality of cameras in order to provide images and/or video for monitoring an operation of the suctioning device.

32. A system for maintaining a large artificial water body of at least 10,000 m^2, the system comprising:

a plastic liner located along the bottom of the water body; a pumping system for suctioning water from the water body; and

the suctioning device of claim 1, connected to the pumping system.

33. A method of operating a suctioning device, the method comprising:

placing a suctioning device along a bottom surface of a body of water;

providing suction to the suctioning device;

allowing water to be directed into apexes formed in brushes, the brushes mounted on the undersurface of the suctioning device, moving the suctioning device along the bottom surface; and

permitting only the brushes to contact the bottom surface.

34. The method of claim 33, wherein the suction of the providing step is provided by an external pumping system and wherein the resulting rate ($\dot{Q}_{SC}$) of the bottom water flow entering the suctioning device is the same or higher than the rate ($\dot{Q}_{SC}$) of the water flow suctioned by the external pumping system according to the following equation:

$$\dot{Q}_{SC}\left[\frac{m^3}{s}\right] \geq \dot{Q}_{PS}\left[\frac{m^3}{s}\right].$$