

CLAIMS

1. A configurable hydroponic cultivation unit for cultivating plants in a continuously flowing culture solution, comprising a tank, wherein the tank comprises:
 - 5 at least one separation bar, disposed on a bottom side of the tank and configured to separate the tank into a plurality of trough regions; and
 - at least one removable dam member, configured to be removably mounted in the tank to thereby block the culture solution from flowing therethrough;
 - wherein:
 - 10 the at least one separation bar and the at least one removable dam member are configured to allow a configurable passageway for the culture solution flowing in the tank.
2. The hydroponic cultivation unit according to Claim 1, wherein the at least one separation bar and the at least one removable dam member are configured such
 - 15 that the culture solution flowing in the tank takes a winding passageway.
3. The hydroponic cultivation unit according to Claim 2, wherein the at least one separation bar and the at least one removable dam member are configured such that the culture solution flowing in the tank takes a zigzag passageway.
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4. The hydroponic cultivation unit according to Claim 1, wherein the at least one removable dam member is removably mounted before an outlet in the tank to thereby allow a configurable depth for the culture solution flowing in the tank.
- 25 5. The hydroponic cultivation unit according to Claim 4, wherein the at least one removable dam member comprises at least two removable dam members of a different height.
6. The hydroponic cultivation unit according to Claim 4, wherein the at least one removable dam member is configured to be removably mounted in the tank via a tongue-groove connection.
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7. A hydroponic cultivation unit for cultivating plants in a continuously flowing culture solution, comprising at least one first flow-splitting bar aligned across at least one trough region of a tank, wherein:

the at least one flow-splitting bar forms at least two openings across each of the at least one trough region, and is configured to split, and to thereby substantially evenly distribute, the culture solution flowing in the tank.

5 8. The hydroponic cultivation unit of Claim 7, wherein the at least one first flow- splitting bar aligned in a trough region immediately following a turning point of a passageway of the culture solution has an increasingly bigger aperture ratio for each opening along a direction of alignment roughly same with a direction of flow of the culture solution at the turning point of the passageway.

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9. The hydroponic cultivation unit of Claim 8, wherein the at least one first flow- splitting bar forms three openings across the trough region, having aperture ratios of about 5:6:8 along the direction of alignment roughly same with the direction of flow of the culture solution at the turning point of the passageway.

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10. The hydroponic cultivation unit of Claim 7, further comprising at least one second flow-splitting bar in a last trough region immediately before an outlet, wherein the at least one second flow-splitting bar has a smaller aperture ratio for each opening formed by the at least one second flow-splitting bar compared with the at least one first flow-splitting bar.

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11. A hydroponic cultivation unit for cultivating plants in a continuously flowing culture solution, comprising at least one removable dispenser, wherein:

the at least one removable dispenser is removably mounted across at least one trough region of a tank and is configured to substantially evenly distribute the culture solution flowing in the at least one trough region of the tank.

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12. The hydroponic cultivation unit of Claim 11, wherein each of the at least one removable dispenser is configured to be removable mounted onto at least one flow-splitting bar aligned across the at least one trough region of the tank.

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13. The hydroponic cultivation unit of Claim 11, wherein each removable dispenser comprises at least one of:

at least one rectifying hole, arranged to run across the each removable dispenser; or

at least one rectifying indentation, arranged on a top side of the each removable dispenser.

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14. The hydroponic cultivation unit of Claim 11, wherein each removable dispenser is of a hollow structure, wherein the hollow structure is provided with at least one top hole on a top side thereof, and at least one side hole on a side thereof, configured to facilitate release of air trapped inside the hollow structure of the each removable dispenser during flow of the culture solution in the tank to thereby prevent the each removable dispenser from floating up.

15. A hydroponic cultivation unit for cultivating plants in a continuously flowing culture solution, comprising a tank, wherein:
the tank is provided with a plurality of reinforcing bars on a back side opposing to a top opening of the tank, configured such that the plurality of reinforcing bars have a denser distribution in a middle region than in a non-middle region.

16. The hydroponic cultivation unit of Claim 15, wherein the plurality of reinforcing bars are arranged in rows and columns.

17. The hydroponic cultivation unit of Claim 15, wherein the plurality of reinforcing bars are of an integrated structure with the tank.

18. A hydroponic cultivation unit for cultivating plants in a continuously flowing culture solution, comprising a filter, removably mounted before an outlet and configured to retain certain solid matters while allowing the culture solution to drain out of the outlet, wherein:
mounting of the filter is configured to leave an unoccupied zone behind the filter and before the outlet, so as to effectively prevent the outlet from being blocked by the certain solid matters in the culture solution.

19. The hydroponic cultivation unit of Claim 18, wherein the filter is of a shape having a sloping side, wherein the sloping side is next to the unoccupied zone upon mounting of the filter, and the sloping side is provided with at least one filtering net of a preset mesh size, configured to retain solid matters of a size bigger than the preset mesh size.

20. The hydroponic cultivation unit of Claim 19, wherein the filter further comprises a bottom side, wherein the bottom side is provided with at least one filtering net of a preset

mesh size, configured to allow collection of the certain solid matters retained at the filter upon removal of the filter.

21. The hydroponic cultivation unit of Claim 20, wherein the filter is of a trapezoid, and
5 comprises a top side, configured to attach with a sidewall upon mounting of the filter.

22. The hydroponic cultivation unit of any one of Claims 1-21, further comprising a
planting board, wherein:
the planting board is removably disposed over a top opening of a tank; and
10 the planting board is provided with a plurality of through-holes, wherein each through-
hole is configured to provide a holding space for one of the plants being cultivated on the planting
board.

23. The hydroponic cultivation unit of Claim 22, wherein the planting board further
15 comprises at least one plug, configured to be removably mounted on at least one through-hole
to thereby alter a distribution of the plants being cultivated on the planting board.

24. A hydroponic cultivation system for cultivating plants in a continuously flowing culture
solution, comprising at least one hydroponic cultivation unit having a tank, an inlet and an outlet,
20 and further comprising a plurality of support members, wherein:

each of the at least one hydroponic cultivation unit is vertically stacked with one another
to form a multi-level structure; and

the culture solution is configured to flow top-to-bottom through each of the at least one
hydroponic cultivation unit on each level;

25 the plurality of support members are removably disposed, and configured to provide
mechanical support, between two hydroponic cultivation units on every two neighboring levels;
and

at least one of the plurality of support members connecting two hydroponic cultivation
units on every two neighboring levels comprises a pipe having a top opening, a bottom opening,
30 and an empty inner space, configured to provide a means for arranging at least one of a
hydrological connection or an electrical coupling between the two hydroponic cultivation units on
the every two neighboring levels.

25. The hydroponic cultivation system according to Claim 24, further comprising at least one
35 light source, wherein each of the at least one light source is disposed over a back side of one

hydroponic cultivation unit on a first level and is configured to emit a plant-compatible light to thereby support growth of the plants being cultivated on another hydroponic cultivation unit on a second level, wherein the second level is one level lower than the first level.

5 26. The hydroponic cultivation system according to Claim 25, wherein each of the at least one light source comprises a plant-compatible LED lamp.

27. The hydroponic cultivation system according to Claim 24, wherein the pipe is configured to provide a means for arranging a hydrological connection between the two hydroponic
10 cultivation units on the every two neighboring levels, wherein:

 an outlet of a first hydroponic cultivation unit on a first level is hydrologically connected with the top opening of the pipe; and

 the bottom opening of the pipe is hydrologically connected with an inlet of a second hydroponic cultivation unit on a second level;

15 wherein:

 the second level is one level lower than the first level.

28. The hydroponic cultivation system according to Claim 27, wherein the outlet of the first hydroponic cultivation unit on the first level is hydrologically connected with the top opening of
20 the pipe via an outlet portion of the first hydroponic cultivation unit, wherein the outlet portion comprises:

 a lower opening, connected with the top opening of the first pipe; and

 a side opening, connected to the tank of the first hydroponic cultivation unit.

25 29. The hydroponic cultivation system according to Claim 28, wherein the lower opening of the outlet portion is arranged on a lower protrusion, protruding downward from the outlet portion, wherein an outer wall of the lower protrusion is attached with an inner wall of the pipe.

30 30. The hydroponic cultivation system according to Claim 29, wherein the outer wall of the lower protrusion is provided with a plurality of reinforcing bars, configured to provide a stronger means for attaching the outer wall of the lower protrusion with the inner wall of the pipe.

31. The hydroponic cultivation system according to Claim 27, wherein the bottom opening of the pipe is hydrologically connected with the inlet of the second hydroponic cultivation unit on the second level via an inlet portion of the second hydroponic cultivation unit, wherein the inlet portion comprises:
- 5 an upper opening, connected with the bottom opening of the pipe;
a side opening, connected to the tank of the second hydroponic cultivation unit; and
a bottom wall, disposed below the side opening.
32. The hydroponic cultivation system according to Claim 31, wherein the upper opening of the inlet portion is provided with a plurality of reinforcing bars, protruding from an inside wall of the upper opening and configured to function as a step for the bottom opening of pipe to stand thereon to thereby allow a hydrological connection between the pipe and the side opening of the inlet portion.
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33. The hydroponic cultivation system according to Claim 31, wherein the pipe is provided with a nick at a bottom end and next to the bottom opening, configured to hydrologically connect with the side opening of the inlet portion while allowing the bottom end of the pipe to attach with the bottom wall of the inlet portion.
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34. The hydroponic cultivation system according to Claim 24, wherein the pipe is configured to provide a means for arranging an electrical coupling between the two hydroponic cultivation units on the every two neighboring levels.
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35. The hydroponic cultivation system according to Claim 34, wherein a main stem of a wiring circuit runs through each pipe connecting two hydroponic cultivation units on every two neighboring levels.
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36. The hydroponic cultivation system according to Claim 35, wherein the main stem of the wiring circuit further runs through a wiring portion in each hydroponic cultivation unit on each level, wherein the wiring portion comprises:
- 30 an upper opening, connected with a bottom opening of a first pipe;
a lower opening, connected with a top opening of a second pipe; and
a side opening;
wherein:

at least one of the upper opening and the lower opening is configured to allow a first electrical connection between two segments of the main stem; and

the side opening is configured to allow a second electrical connection between the main stem and a unit branch of the wiring circuit, wherein the unit branch corresponds to, and electrically connects with a plant-compatible light source of, the each hydroponic cultivation unit on each level.

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