tilting a plate, blade or piston to cause agitation in the water. The use of a piston is constructively relatively simple, and effective in producing waves or agitation in the aquatic medium. A piston is understood to be a panel which repeatedly moves backwards and forwards within a mass of water, which is repeatedly tilted backwards and forwards within a mass of water, or which presents a combination of both movements (translation and tilting) with respect to a mass of water, in order to move water horizontally.

In an attempt to generate surfable waves using the piston technique, wave generator systems have been developed based on a series of pistons that are aligned or placed in a row, and operate in a sequence to obtain a wave that breaks gradually and with an optional barrel, the wave suitable for surfing. Examples of such systems can be found in patents US6920651, US4062192 and US4783860.

Due to the fact that surfable waves must be relatively high and rapid and hence transport a high amount of energy, the electrical consumption required for surfable wave generator systems is very high, often making such systems economically unviable in practice. Wave generator systems known in the prior art usually try to increase the economic viability of the systems by increasing the number of waves that the system is capable of generating per time unit, among others, as this will enable the system to be used by more users over time and hence increase revenue from the operation of the system.

This disclosure aims to create a surfing wave generation system based on pistons that is economically viable and can be successfully operated in practice.

Summary

In an aspect, the present disclosure provides a wave generator system, characterised in that it comprises: a continuous and elongated barrier, arranged along a longitudinal direction, and having a front side and a rear side along a length of the barrier, where the front side is facing a first mass of water and the rear side is facing a second mass of water,

wherein the barrier prevents the passage of water between the first mass of water and the second mass of water, through, above and under the barrier and along the length; a first reef formed in a floor beneath the first mass of water and at a distance from the front side, and a second reef formed in a floor beneath the second mass of water and at a distance from the rear side, wherein the barrier is movable along the whole of the length with a serpentine movement, wherein the front side pushes water of the first mass of water towards the first reef for the formation of a wave in the first mass of water, whilst the rear side pushes water from the second mass of water towards the second reef for the formation of a wave in the second mass of water.

An object of the disclosure is a wave generation system comprising a continuous and elongated barrier, arranged in a longitudinal direction. The barrier has a front side and a rear side along a length of the barrier. The front side is facing a first mass of water, whilst the rear side is facing a second mass of water. The barrier prevents the passage of water from the

first mass of water towards the second mass of water, and vice versa. A first reef is arranged on a floor under the first mass of water, at a certain distance from the barrier. Similarly, a second reef is arranged on a floor under the second mass of water, at a certain distance from the barrier. The barrier is movable along its whole length with a serpentine movement that forms lateral undulations on its front side and on its rear side. The undulations move reciprocally towards the first mass of water and the second mass of water. The front side pushes water from the first mass of water towards the first reef to form a wave in the first mass of water. In turn, the rear side pushes water from the second mass of water towards the second reef to form a wave in the second mass of water.

The wave generator system enables a high number of waves to be generated as it simultaneously generates waves in two directions, i.e. towards two, the first and second areas. Furthermore, the waves present a gradual breaking, carry a high amount of energy and are suitable for surfing, while the generator system requires reasonable energy consumption, a reasonable volume of water, a reasonable surface area of the total mass of water and a reasonable surface area of the system in general (often referred to as a “footprint” of the system). All of this helps make the system economically viable and allows the system to be successfully put into practice.

Another embodiment of the disclosure is a wave generator system comprising a wave generator, a mass of water and a reef formed on a floor beneath the mass of water. The reef provides a transition between a deeper area located between the reef and the wave generator and a shallower area located beyond the reef. The wave generator faces the mass of water to cause the displacement of water towards the reef and the formation of a wave in the mass of water. The reef is at least partially surrounded by a channel that is deeper than the shallower area and connects the deeper area with an end of the shallower area through which the wave exits the shallower area. The water displaced by the wave generator can be guided back by the channel towards the deeper area between the wave generator and the reef for generating new waves, without interfering with the surfable waves

traveling along the shallower

CLAIMS

1. Wave generator system (1), characterised in that it comprises:

- a continuous and elongated barrier (4), arranged along a longitudinal direction (5), and having a front side (4a) and a rear side (4b) along a length (L) of the barrier (4), where the front side (4a) is facing a first mass of water (2) and the rear side (4b) is facing a second mass of water (3), wherein the barrier (4) prevents the passage of water between the first mass of water (2) and the second mass of water (3), through, above and under the barrier (4) and along the length (L);

- a first reef (12) formed in a floor (6) beneath the first mass of water (2) and at a distance from the front side (4a), and a second reef (15) formed in a floor (8) beneath the second mass of water (3) and at a distance from the rear side (4b), wherein

- the barrier (4) is movable along the whole of the length (L) with a serpentine movement, wherein the front side (4a) pushes water of the first mass of water (2) towards the first reef (12) for the formation of a wave (W) in the first mass of water (2), whilst the rear side (4b) pushes water from the second mass of water (3) towards the second reef (15) for the formation of a wave (W) in the second mass of water (3).

2. Wave generator system (1), according to claim 1, characterised in that the barrier (4) extends from a floor beneath the barrier (4).

3. Wave generator system (1), according to claim 2, characterised in that the barrier (4) extends up to a height above the crest of the wave (W).

4. Wave generator system (1), according to claim 1, characterised in that at least one of the first reef (12) and the second reef (15) is at least partially straight.

5. Wave generator system (1), according to claim 1, characterised in that at least one of the first reef (12) and the second reef (15) is at least partially curved.

6. Wave generator system (1), according to claim 1, characterised in that either at least one of the first reef (12) and the second reef (15) forms an angle of -20 to 20 degrees with the longitudinal direction (5) of the barrier (4) in top plan view.

7. Wave generator system (1), according to claim 1, characterised in that the barrier (4) comprises a series of articulated panels (70), with edges (71) that are reciprocally movable towards the first mass of water (2) and towards the second mass of water (3) with a time offset between them.

8. Wave generator system (1), according to claim 1, characterised in that the front side (4a) and the rear side (4b) of the barrier (4) have a plurality of front sides (50a; 60a; 80a; 90a) and rear sides (50b; 60b; 80b; 90b) arranged in the longitudinal direction (5) and movable transversely and reciprocally towards the first mass of water (2) and towards the second mass of water (3) with a time offset between them.

9. Wave generator system (1), according to claim 8, characterised in that the barrier (4) comprises at least one movable intermediate element (50; 60c; 81; 92) arranged between adjoining front sides (80a; 90a) of the front side (4a) of the barrier (4).

10. Wave generator system (1), according to claim 9, characterised in that the intermediate element (50; 60c; 81; 92) is rigid, flexible or a combination thereof.

11. Wave generator system (1), according to claim 8, characterised in that the barrier (4) comprises at least one movable intermediate element (50; 60c; 81; 92) arranged between adjoining rear sides (80b; 90b) of the front side (4a) of the barrier (4).

12. Wave generator system (1), according to claim 11, characterised in that the intermediate element (50; 60c; 81; 92) is rigid, flexible or a combination thereof.

13. Wave generator system (1), according to claim 8, characterised in that the barrier (4) comprises adjacent blocks (60) that are reciprocally movable towards the first mass of water (2) and towards the second mass of water (3) with a time offset between them, wherein the front sides (60a) and the rear sides (60b) are rear and front sides of the blocks (60).

14. Wave generator system (1), according to claim 8, characterised in that the barrier (4) comprises plates (20; 80; 90) arranged in the longitudinal direction (5) and transversely and reciprocally movable towards the first mass of water (2) and towards the second mass of water (3) with a time offset between them, wherein the front sides (20a; 80a; 90a) and the rear sides (20b; 80b; 90b) are rear and front sides of the plates (20; 80; 90).

15. Wave generator system (1), according to claim 14, characterised in that the barrier (4) comprises at least one articulated element that is flexible, rigid or a thereof and arranged between adjacent plates (20; 80; 90).

16. Wave generator system (1), according to claim 14, characterised in that the barrier (84) comprises two rigid, articulated panels (50; 92) between adjacent plates (20; 90) and articulately connected to the adjacent plates (20; 90).

17. Wave generator system (1), according to claim 14, characterised in that each plate (90) is movable with a pivoting movement.

18. Wave generator system (1), according to claim 14, characterised in that each plate is movable with a translation and pivoting movement.

19. Wave generator system (1), according to claim 14, characterised in that each plate (20; 80) is movable with a translation movement.

20. Wave generator system (1), according to claim 19, characterised in that each plate (20) is operated by a drive system (21) arranged above the plate (4).

21. Wave generator system (1), according to claim 19, characterised in that each plate (20) is suspended from an upper structure (31).

22. Wave generator system (1), according to claim 19, characterised in that each plate (20) is suspended from a corresponding carriage (40) that is longitudinally movable forwards and backwards along a frame (24).

23. Wave generator system (1), according to claim 22, characterised in that each plate (20) is rigidly connected to a corresponding carriage (40).

24. Wave generator system (1), according to claim 22, characterised in that the frame (24) comprises lateral guide channels (29) on which lateral wheels (41) of the carriage (40) can roll.

25. Wave generator system (1), according to claim 24, characterised in that the carriage (40) comprises a rack (42) arranged between the lateral wheels (41) of the carriage (40), and the frame (24) has an associated motor and transmission set (22) that causes the rotation of a pinion (23) coupled to the rack (42), wherein rotation of the pinion (23) causes a longitudinal movement of the corresponding rack (42), carriage (40) and plate (20).