SYSTEM FOR ARTIFICIALLY CREATING THE PRACTICE OF A WATER BOARD SPORT

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Abstract
The disclosure relates to a device for practicing water board sports. The device includes a water stream to artificially create a water flow on a support where the user can practice sports and one or more distributors which assist in controlling the created water flow according to the position or to motions on the support of the user or an object moving with the user.
SYSTEM FOR ARTIFICIALLY CREATING THE PRACTICE OF A WATER BOARD SPORT

BACKGROUND

[0001] The present invention relates to a device and a method for artificially recreating the practice of a water board sport.

[0002] From document U.S. Pat. No. 2,815,951 or DE-2837391, such a device is already known, where water stream means artificially create, on a support, a flow of water where the user can practice sport. Such a solution quickly reaches its limits. The conditions for making a figure more particularly in width and the practice types are limited. If an attempt is made to widen the practice area and thus the support of the water area, the energy consumption and the overall dimensions of the device increase, which are drawbacks.

SUMMARY

[0003] One aim of the invention is to provide a solution which makes it possible to increase the width of a practice area without necessarily increasing the consumption of energy to deliver the water flow(s). Another object is to provide a solution which enables varied movements and figures during the practice of the selected sport or sports. Another object is to provide a solution which makes it possible to make progress in this sport or sports without necessarily having to change the practice area. Another object is to provide a solution which reaches the whole or a part of the previous objects without necessarily increasing the overall dimension and thus the size of the device. Another object is to enable a varied practice of many water board sports more particularly water-skiing, wake-skiing, wake-boarding, kite-surfing and surfing, which all require a board. A solution provided for the whole or a part of such aimed object is mentioned in claim 1.

Advantageously, water stream means and detection means make it possible for only a part of the support and thus of the practice area which can be watered by the water flow coming out of the water stream means to be watered so that the sportsman/woman can move thereon. For the method imagined here to artificially obtain conditions for practising a water board sport including water-skiing, wake-skiing, wake-boarding, surfing or even kite-surfing using water stream means creating, on a support, at least a flow of water, whereon the user can practice said sport and make varied movements and figures, it is based on the control of the position of the created water flow or flows by the position or the motions on said support of the user or means moving with him or her.

[0004] The variable (evolutionary) distribution of the created water flow or flows will be provided on the support. Preferably, several parameters such as speed, width and height of the created water flow or flows will vary by acting on the water stream means, thus enhancing the variety of movements and figures during the practice of the sport or sports as well as a progress in the quality of such practice. Advantageously and in addition, the position of such water flow or flows will be controlled by the detection of the position or of the motions on the support of the user or of the means moving with him or her.

BRIEF DESCRIPTION OF THE DRAWINGS

[0005] Other characteristics and advantages of the invention will further appear in the following description and in the appended drawings, which are given as examples and where:

[0006] FIG. 1 is a schematic perspective view from the outside of the device of the invention;

[0007] FIG. 2 is a schematic top view of the possible embodiment;

[0008] FIG. 3 is a lateral inner schematic view;

[0009] FIG. 4 (FIGS. 4a, 4b, 4c) shows successive operations of conditions in the same practice area;

[0010] FIGS. 5 and 6 show a possible embodiment of two adjacent valves;

[0011] FIGS. 7 and 8 (FIGS. 7a, 7b, 7c, 8a, 8b, 8c) show other operations according to two embodiments;

[0012] FIG. 9 illustrate a jumping area;

[0013] FIG. 10 shows a solution for detecting the presence of the user at the end of the cable which he or she can hold;

[0014] FIGS. 11, 12, 13 showing two other possible positions of the detectors; and

[0015] FIGS. 14 and 15 show an all or nothing operation making it possible to rotate the pump or pumps.

DETAILED DESCRIPTION

[0016] FIG. 1 shows a sportsman 1 moving on a water flow 3 created by a device 5. The device 5 includes water stream means 7 and position control means 11 to provide the distribution, on the support 9, of the created water flow according to the position or the motions of the support, of the user and of the means moving with him or her such as a ski board 1a (refer to FIGS. 1, 2, 3) or the cable 2. Hereinafter, “means moving with the user” will be read each time “board” will be mentioned or “cable 2”. Other mobile means could be used as position or motion reference.

[0017] Favorably, such control means 11 include detection means such as 13a1, 13a2, 13b1, 13b2 (FIGS. 2, 4) to detect the position or the motions of the user 1, or of the board 1a during his or her motions on the support 9, and consequently act on the water stream means 7. The sportsman/woman 1 will then be able to move as he or she wants on a water plane, the position of which will follow his or her position or that of his or her board. FIGS. 1, 2 such sportsman/woman holds a cable (or a rod) 2, one end of which is fixed to a mast 4, which here is fixed and positioned on the side where the water flow 3 comes from. Then he or she can move for example along the arc of circle 6 in FIG. 2. He or she stands facing the flow or sideways (turns) without leaving therewith.

[0018] Considering space geometry at the place of the support 9 typically a rectangle with a width 1 and a length 1 (refer to FIGS. 1, 2) and the preferred organization of water stream means 7, detection means such as 13a1, 13a2, 13b1, 13b2 will advantageously be adapted to the detection limit motions of the user or his or her board 1a, sideways with respect to the direction 15 of the water flow on the support (refer to FIGS. 1, 2, 4). In the illustrated preferred version, it can be seen more particularly in FIG. 5 that the water stream means 7 include water distribution means 17 adapted to form a series of water outlets such as 17a, 17b, through the whole or a part of which the water flow runs toward the (above the) support 9 which is positioned horizontally (flush).

[0019] The rate and pressure of the water flow(s) projected by the outlets 17a, 17b will be adapted to provide the skiing sportsman/woman 1 the desired lift, by sending under him/her a layer of water at variable speed and thickness. Then, the speed between the reference water and rider will be complied with. The water outlets such as 17a etc., are carried by a frame 19 containing a collecting box 19a adapted to the circulation of water (FIG. 6). Such box is positioned above the level of the
[0020] The frame 19 here carries the mast 4 which stands above. The water stream means 7 advantageously include FIG. 2 a line 21 of mobile detectors, such as 23a, 23b in FIG. 5, connected to the control means 11 and positioned opposite the line of outlets that they cover or uncover in order to control the water flow towards the support 9. Then, the outlets such as 17a, 17b in FIG. 5 can be opened or closed according to the position or motions of the user or of his or her board 1a.

[0021] Each door with a width L1 is controlled by the control means 11 through a cylinder such as 24a or 24b in FIG. 6. The cylinders will a priori be moved vertically and have a all or nothing operation. Their stroke is guided sideways by guiding elements (such as 26a, 26b) fixed on the frame 19. Still in FIG. 6, a part of the box 19a which here supplies the outlets 17a, 17b having preferably a rectangular shape and delivering the water according to a substantially rectangular flow.

[0022] According to an alternative solution, the front side of the box 19a can be lined by a sliding wall provided with one or several outlets (openings) and moving along such wall thus opening and closing on the front some of the box outlets, with water coming out each time an outlet of the box coincides with an outlet in the wall. Using, more particularly, one of such solutions for controlling the water outlet towards the support 9; it can be guaranteed that the flow means 7 will generally include water distribution means 25 adapted to form a series of water outlets through the whole or a part of which the water stream can flow towards the support 9, with the outlets being adapted to open and to close under the control of the above mentioned detection means 13a1, 13a2, 13b1, 13b2. Water stream means 7 will thus include means (17a, 17b, 23a, 23b, 25) to modify the height, width and speed of the water flow created on the support 9.

[0023] Detection means will advantageously be distributed at several locations along at least one line transversal to the direction 15 of each created water flow and along the areas of the support where the flows can be created. FIG. 2, the schematized detection means are positioned along two lines 27a, 27b which are parallel together and to line 21 of the water outlets thus perpendicular to the general direction 15 of the water flow or flows generated on the practice support 9. More particularly in FIG. 2, it can be understood that the detection means such as 13a1, 13a2, 13b1, 13b2 include a series of beam detectors and that here the opening and closing of each outlet such as 17a, 17b is controlled by a pair of such detectors positioned on either side of the concerned outlet, except towards the side ends of the support where the first and last outlets of the series are respectively controlled by the first and last detectors of such series located towards these ends; here: 13a0/13b0 on the left and 13a1/13b1 on the right. It is advisable that the detections means include optical beam detectors. Such detectors can more particularly be oriented in pairs to detect parallel to the direction 15 of each water flow created on the support 9.

[0024] Considering again the structure of device 1, the support 9 will advantageously include a flexible underlying mat 29. Such mat will favorably be stretched by stretching means 31, such as a weight pulling a flexible resistant fabric. To avoid limit water loss, it is further advised that, downstream of the mat, the each created water flow should flow towards a collecting circuit through a net or a grated mat 33.

[0025] FIG. 3, the net is positioned sloping like a protection edge. The bottom edge thereof is located at the rear limit of the support 9, the upper edge is fixed where inflatable tubes 35 surround the device periphery. The support 9 and each water layer 28 are thus provided with protective tubes.

[0026] A structure 37 extends under the support 9, box 19a and net 33 level for supporting the device containing the water recirculation/recycling means 39. Such means 39 include one or several conduits opening upwards at the back, here under the net 33, to enable the water flow 28 to flow therein beyond the rear edge 9a of the support 9. For example, one or several pumps 41 suck water from the pipes and discharge it under pressure into the box 19a supplying the outlets such as 17a, 17b with water, from under the frame 19. Anchoring means 43 can hold the whole device 1 on the ground.

[0027] Considering the global aspect thereof, the solution of the invention makes it possible to reduce the height and the width of the water flow to be supplied to guarantee the lift, a measure regulating the flow. Through the control imagined via the detection system, only a part of the total available water plane 9, i.e. around the user, is watered. In addition, the solution of the invention makes it possible to obtain an almost limitless practising area for the same quantity of water flowing; the size and width (L, FIGS. 1, 2) thereof are totally adaptable. It also makes it possible to adapt the water layer 3 to the user’s level, width, thickness and velocity of the flow are controlled.

[0028] Thanks to the position detectors 13a0, 13a1, 13b0, 13b1, the position of the user or of his or her board will then be continuously detected by the control system 7, 11, 17 which translate information from the sensors for the mechanic actuators such as 23a, 23b, with the latter enabling the movement of the water flow 3 according to the detected position and thus watering only the desired practising area. As mentioned above, the detection system will thus advantageously include a set of optical lines, each one defined by an emitter-receptor pair, such as 13a0, 13b0, 13a1, 13b1. Detections are performed each time the user (or his or her board) cuts an optical line. The signals sent by the sensors control the hatches 23a through a programmable automaton 45 belonging to the control means 11.

[0029] Hereunder, the space situated between two successive optical lines of emitters/receivers positioned on either side of a practice area which can be watered (width space 1.4 where water can flow (cf. FIGS. 2, 4), will be called a door. In FIG. 4, the width 1.4 of the created flow could be different from (a priori lower than) the distance between two such successive optical lines. In the illustrated example (where the only outlet 17a is shown), when the user 1 is positioned in the middle of such a door, the valve 17a’/23a is open and water flows. When the user is out of the space the door 23a closes and stops the flow on the whole area.

[0030] In the situation shown in FIG. 4a the rider is on the right of the door and the valve is closed. In the situation shown in FIG. 4b, the rider is in the middle of the door and the rider has been detected in the area, the valve is open and the area is watered. In the situation shown in FIG. 4c, the rider is on the left of the door; the valve is closed again. Here, the distance between two optical lines is equal to the width (such as 1.4) of the controlled water flow; a valve is positioned in the middle of two optical lines, here forming a door with a width 1.4.

[0031] In the illustration of the possible complete system like FIG. 7 (FIGS. 7a, 7b, 7c) an optical line is formed by two pairs of adjacent emitters-receivers, such as 13a11, 13a12, 13b11, 13b12.
This pair which forms two consecutive beams makes it possible to know in which direction the user is moving, i.e., on which side he or she is located with respect to the optical line and thus between what optical doors he or she is standing. Each valve (exit/hatch) is associated with two double optical lines, which form together a detection door, except for the two on each side which are associated with only one double line, because the user cannot go beyond the ends. The optical door of valve 17a/23a is formed by the double detector optical lines 13a/11, 13b/11: 13c/12, 13d/12 and double 13/13: 13/14, 13/14. The optical door of the outlet 17c, is formed by the double optical line Lo9, Lo10 only since it has been assumed here that, with a rider practising, three successive valves are always open and the other ones are closed. The grey area shows the localised water flow and the arrows show the three open valves according to the user’s position.

As illustrated in FIG. 8 (FIGS. 8a, 8b, 8c), another way to set control would consist in opening the hatches on each side and on the opposite side (if need be) of the last cut optical line. Here, a configuration of opening and closing of hatches corresponds to a single cut optical line. The optical lines such as Lo1, Lo3 are positioned in the middle of each valve (exit/hatch), except for those at the ends. It can be seen that, when the user last cut the line Lo1, the first three hatches on the right of FIG. 8c are open and the other ones are closed. Similarly, when the user last cut the line Lo3 (FIG. 8c) the hatches 23a, 23b, 23c are open and the other ones are closed.

In this solution, the opening and closing of each outlet is thus controlled by at least one detector activated by the user or his or her board cutting the beams. Beams, which are not optical beams, could also be used. In FIG. 1, a series of individual flows 3 m in width (L3), valves (exit/hatch) 1 m wide (L4), and a surfing area with a total width of 15 m (L) have been imagined.

As an alternative solution, the device can be given various other detection systems like detectors measuring the position of the rope 2, which is moved with the user, or an angle detector, for example positioned on the anchoring point of the rope 2 and measuring the angle thereof with respect to the original position. Then, the position of the user is indirectly obtained. It is also possible to detect the rope using the same detection principle as in the exemplary optical line, thanks to a detection frame 100 through which the rope goes and which includes several detectors, such as 101a, 103a, 101b, 103b, defining a series of detection lines 110, 112, here vertical ones.

Such a solution is efficient and practical and can be easily installed (cf. FIGS. 11 and 12). Another solution consists in detecting the position of the user’s board or skis. The detectors are positioned in the practising mat 9 and can use the same control principle via optical lines, such as 121, 123 (cf. FIG. 13).

It is also possible to directly detect the user’s position using a camera measuring its position in a definite space. As an alternative solution, it can also be noted that it is possible not to use an automat. Sensors directly opening and closing the switches of an electric circuit connected to the cylinders of the hatches or equivalents can also be imagined.

Possibly (refer to FIG. 9), the device according to the invention can also include a raised structure 47 to define a jumping surface on which the user could move. Preferably, for controlling the quantity of water used and the security and comfort of the user, the device should include the following system, it being understood that the latter could be used alone, not necessarily within the scope of the appended independent claim or claims.

What is mentioned hereunder could thus be the subject of an independent protection. This more particularly relates to additional detection means 49 connected to the control means 11 to detect (and transmit thereto data related to) the presence or the absence of the user at the end of the cable 2. Such control means will then be adapted for controlling the water stream means 7 to adopt the presence of water and/or the distribution thereof on the support 9 according to the detection data transmitted by said additional detection means 49.

If there is no tension, the user can be ‘detected’ as absent at the end of the rope 2. New information translated by the automat will make it possible to modify the detection system control mode described above. Thus, using the water distribution means 25, it will be possible, at the beginning of the sports session, to start projecting water onto the area only when the presence of the user has been detected at the end of the cable 2.

If, for example, the user falls during the session, the device will then be able (according to the programme selected for the control means) for example either to stop the flow or to significantly reduce it, or to distribute it differently, more particularly away from the location of the fall, then no longer watering the area around the user. A tension sensor will then be more particularly adapted to detect tension in the cable. FIG. 10 is a diagram thereof. Thus, the presence or the absence of the user will be detected at the end of the cable 2, which he or she is supposed to hold and the flow means 7 will then be controlled, so that they can supply, or not, the support with water, accordingly.

The device operation can be compared to all or none operation: if the user is detected as riding, the control starts the water flow under him/her, on the mat 9, according to his/her position. If the user is detected as not riding, water is no longer projected onto the mat, but it is directly sent to the collecting tank 39a (see FIGS. 14, 15). Suitable means, here a hatch 125, collects water and prevents it to reach the mat. Thus, if the user falls, he/she drops the rope 2 and the device stops any incoming water on the riding mat 9, without stopping the operation of the water pump 41. And the user can easily stand up.

1. A device for practising a water board sport including one at least among water-skiing, wake-skiing, wake-boarding, surfing or kite-surfing, the device comprising:
   a water stream for artificially creating, a water flow on a support, whereas a user can practice said sport and make varied movements and figures; and
   a detector for detecting at least one of a position and motions of the user or an object moving with the user during the varied motions on the support, and consequently operating the water stream so as to distribute the water flow on the support by moving the water flow according to the position or movements of the user or the object.
2. The device according to claim 1, wherein the water stream and the detector are adapted so that, transversely to a water flowing direction, only a part of the support and thus of the practice area which can be watered by the water flow coming out of the water stream, is watered so that the user can practice the sport.
3. The device according to claim 1, wherein the object moving with the user includes a board on which the user moves.

4. The device according to claim 3, wherein the object moving with the user includes a cable held by the user to practice said sport.

5. The device according to claim 1, wherein the water stream includes at least one water distributor adapted to form a series of water outlets positioned in line transversely to the water flowing direction and through only a part of which the water flow runs toward the support.

6. The device according to claim 1, wherein the water stream includes at least one water distributor adapted to form a series of water outlets through at least a part of which the water flow runs toward the support, with the outlets being adapted to open and to close under control of said detector which are distributed at several locations along at least one line transverse to the direction of each water flow thus created.

7. The device according to claim 6, wherein:
the detector includes a series of beam sensors; and
the opening and/or the closing of each outlet are controlled either by a pair of such detectors positioned on either side of said outlet except towards side ends of the support where first and last outlets of the series are respectively controlled by first and last detectors of said series located towards said ends,
or by one of said beam sensors activated by cutting of a beam by the user or by the object moving with the user.

8. The device according to claim 7, wherein the support on which the user moves defines a layer of water which is positioned substantially horizontally.

9. The device according to claim 1, wherein downstream of the practice support, the created water flow flows towards a collection circuit through a net.

10. The device according to claim 1, further comprising:
a cable held by the user to practice said board sport; and
additional detectors to detect the presence or the absence of the user at the end of the cable, the detector being adapted to control the water stream for adapting the presence of water and/or the distribution thereof on the support according to the detection data transmitted by the additional detectors.

11. The device according to claim 10, wherein the additional detectors include a voltage sensor making it possible to detect voltage in the cable.

12. A method for artificially obtaining conditions for practicing a water board sport including at least one among water-skiing, wake-skiing, wake-boarding, surfing, said method comprising the steps of:
using a water stream created on a support, having at least a flow of water on which a user can practice said sport and make varied motions and figures, wherein a position of said created water flow(s) is controlled by the position or the motions on such support, of the user or of an object moving the user.

13. The method according to claim 12, wherein the position of the created water flow(s) is controlled by detecting the position or the motions on the support of the user or of said object moving with the user, so as to distribute the water flow on the support and by moving it according to the detection executed transversally to the water flowing direction.

14. The method according to claim 12, wherein the detectors act on the water stream so that only a part of the support, and thus of the practice area, which can be watered by the water flow coming out of said water stream is watered so that the user can practice sports.

15. The method according to claim 12, wherein the user’s presence or absence at the end of a cable which the user holds to practice said sport is detected and the water stream is controlled so that they selectively supply said support with water.

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