



(19) **United States**

(12) **Patent Application Publication**
Davis

(10) **Pub. No.: US 2011/0143846 A1**

(43) **Pub. Date: Jun. 16, 2011**

(54) **MOTORIZED RETRACTABLE LINE FOR A WATER SPORTS FACILITY**

(57) **ABSTRACT**

(76) Inventor: **Richard P. Davis**, Hayden, ID (US)

(21) Appl. No.: **13/033,420**

(22) Filed: **Feb. 23, 2011**

Related U.S. Application Data

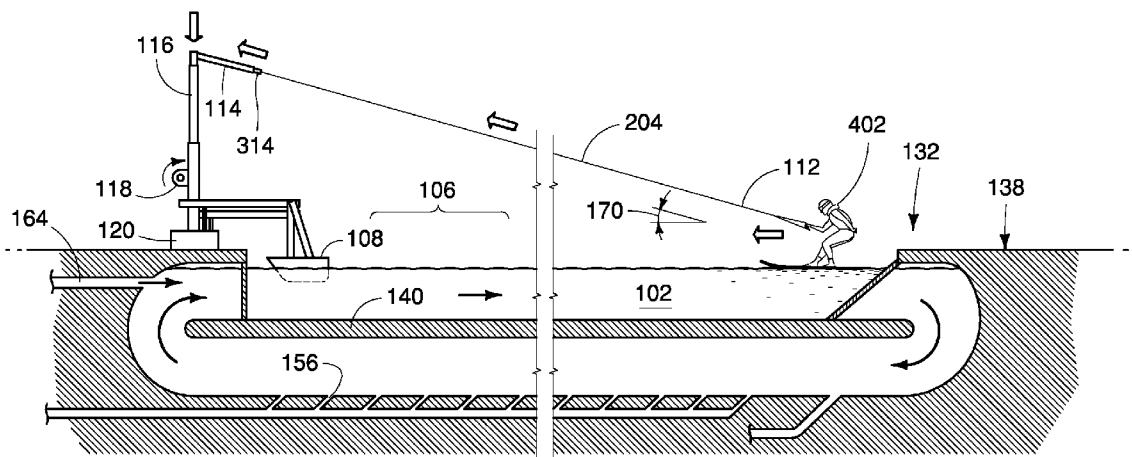
(63) Continuation-in-part of application No. 12/214,422, filed on Jun. 17, 2008.

Publication Classification

(51) **Int. Cl.**
A63G 31/00 (2006.01)

(52) **U.S. Cl.** **472/128**

Described are systems, devices and methods for providing a motorized retractable line or ski rope for a facility in which to practice water sports such as wakeboarding, wake surfing, wake skating, waterskiing, kneeboarding and the like. A motorized retractable line may operate by manual control or preferably by automation. Operation is in response to one or more detectable events or one or more controls. When a water sport participant loses contact with a handle of the ski rope, the motorized retractable line extends by unwinding from a winch or by another mechanism. The motorized retractable line is carried in the flow of water until it reaches a designated length or a maximal length (e.g., to a downstream side of the water sports facility), or until a participant re-connects with the handle of the ski rope. A participant may re-engage in a water sport from any position in the water sports facility after losing contact with the ski rope. A participant is returned to a designated participation area. A participant may re-engage more quickly in a water sport in a water sports facility after losing contact with the ski rope than previously possible. A participant may be able to engage in an increased number of runs or water sport sessions within a block of time or rental session.



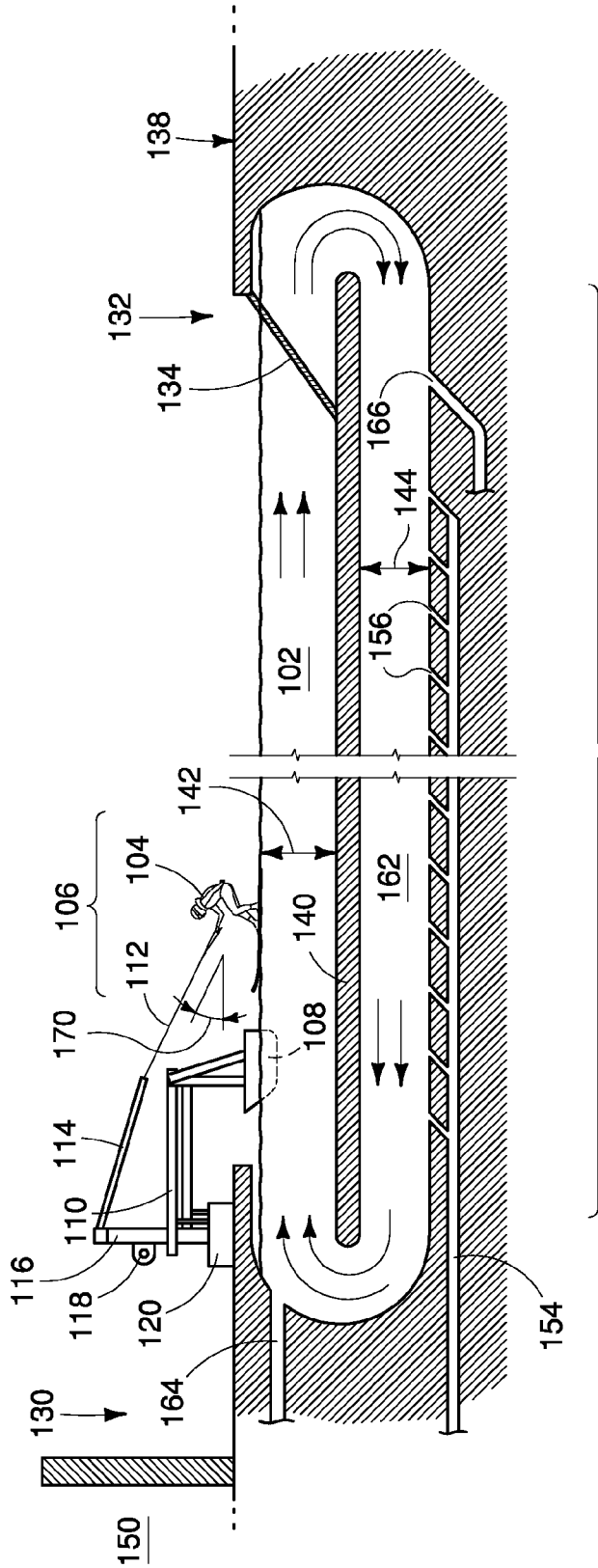


FIG. 1

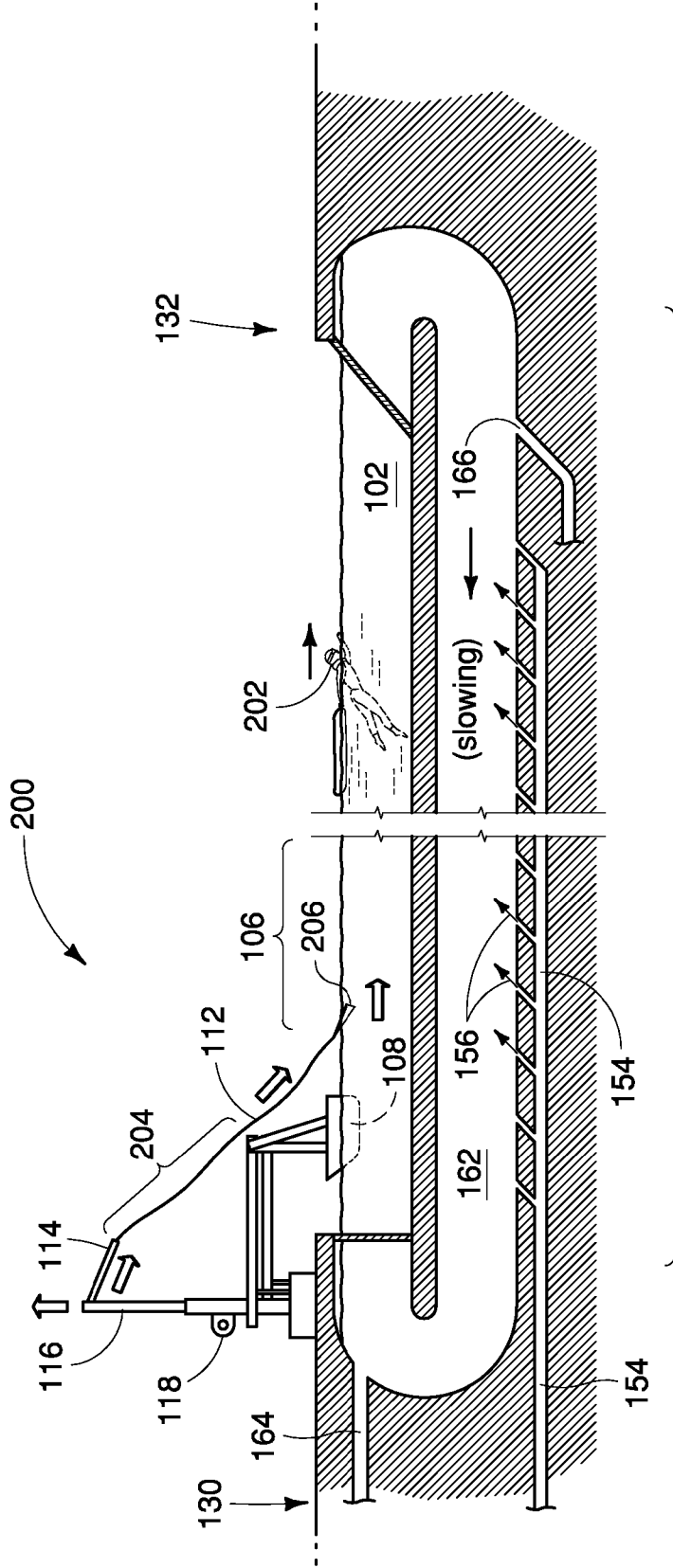


FIG. 2

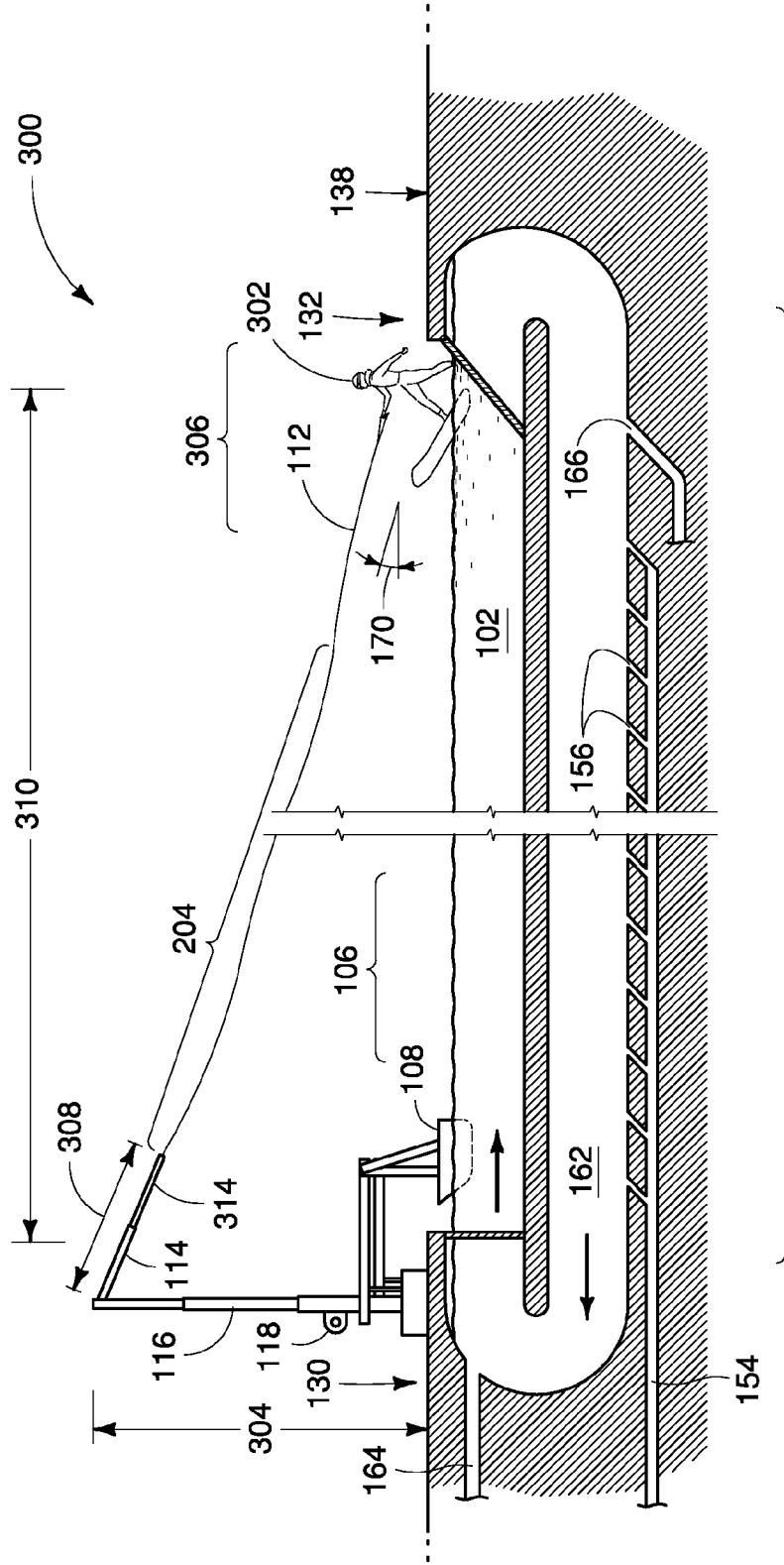


FIG. 3

MOTORIZED RETRACTABLE LINE FOR A WATER SPORTS FACILITY

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] The present application is related to, and claims the benefit of, the earliest available effective filing date(s) from the following application(s) (the "Related Application(s)") (e.g., claims earliest available priority dates for other than provisional patent application(s) or claims benefits under 35 USC §119(e) for provisional patent applications, for any and all parent, grandparent, etc. applications of the Related Application(s)).

RELATED APPLICATION(S)

[0002] For purposes of the USPTO extra-statutory requirements, the present application constitutes a continuation-in-part of U.S. patent application Ser. No. 12/214,422, preliminarily titled Water Sports Facility, naming Richard P. Davis and Chad M. Davis as inventors, filed 19 Jan. 2011, which is currently co-pending, or is an application of which a currently co-pending application is entitled to the benefit of the filing date.

[0003] The United States Patent Office (USPTO) has published a notice to the effect that the USPTO's computer programs require that patent applicants reference both a serial number and indicate whether an application is a continuation or continuation-in-part. Stephen G. Kunin, Benefit of Prior-Filed Application, USPTO Official Gazette 18 Mar. 2003. The present Applicant Entity (hereinafter "Applicant") has provided above a specific reference to the application(s) from which priority is being claimed as recited by statute. Applicant understands that the statute is unambiguous in its specific reference language and does not require either a serial number or any characterization, such as "continuation" or "continuation-in-part," for claiming priority to U.S. patent applications.

[0004] Notwithstanding the foregoing, Applicant understands that the USPTO's computer programs have certain data entry requirements, and hence Applicant is designating the present application as a continuation-in-part of its parent applications as set forth above, but expressly points out that such designations are not to be construed in any way as any type of commentary and/or admission as to whether or not the present application contains any new matter in addition to the matter of its parent application(s). All subject matter of the Related Applications and of any and all parent, grandparent, great-grandparent, etc. applications of the Related Applications is incorporated herein by reference to the extent such subject matter is not inconsistent herewith.

BACKGROUND

[0005] 1. Field of the Invention

[0006] The present invention relates generally to systems, devices and methods for assisting in participation in water sports in a water sports facility, and, in particular, the invention relates to providing a motorized retractable line to water sports participants at a range of locations within the water sports facility.

[0007] 2. Description of the Related Art

[0008] Generally, water sports such as wakeboarding, wake surfing, wake skating, waterskiing, kneeboarding, and others, have become increasingly popular forms of recreation. One

form of this type of water sport involves towing a participant across the surface of a pool or water sports facility. Another form of this type of water sport involves planing on the surface of flowing or circulating water while holding onto an anchored tether or ski rope.

[0009] Enjoyable participation in such water sports facility requires a participant to maintain a hold to a tow cable, tow rope, ski rope or anchor rope (herein "ski rope"). Typically, if a water sports participant loses contact with the ski rope prior to the end of a run (e.g., reaching the limit of the tow cable), the session ends and the participant stops and is forced to return to a starting position. The ski rope or tow rope likewise must be returned to the water sports participant, a starting position or both the water sports participant and starting position.

SUMMARY

[0010] A participant engages in a water sport while holding onto a ski rope while planing on flowing and/or circulating water in a pool or water sports facility.

[0011] A motorized retractable line or ski rope is provided to a participant in the facility to practice water sports such as wakeboarding, wake surfing, wake skating, waterskiing, kneeboarding, and others. Components of a motorized retractable line may operate by manual control or automatically in response to one or more detectable values such as a position of a terminal end of a ski rope in the water sports facility or an amount of extension released from a winch or spool. A speed of retracting of a ski rope may be controlled by a water sport participant, partially by a water sport participant or may be controlled automatically or programmatically based on one or more variables.

[0012] In practice, a motorized retractable line releases and is carried in the flow of water when a water sport participant loses contact with a handle of the ski rope. The motorized retractable line extends until it reaches a designated length or until a participant re-connects with or again contacts a handle or other portion of the ski rope.

[0013] A participant may re-engage in a water sport from any position in the water sports facility after losing contact with the ski rope. A participant may re-engage more quickly in a water sport after losing contact with the ski rope. A participant may be able to engage in an increased number of runs or water sport sessions within a block of time or rental session. A participant may be able to engage in a water sport for an overall longer duration of time within a block of time or rental session as compared to participation without the motorized retractable line. Thus, a participant gains increased ride time, increased rope time or increased handle time.

[0014] A participant returns to a designated participation area, a point of riding or a region of riding upon activating the motorized retractable line.

[0015] This Summary has introduced a non-exclusive selection of aspects or concepts about the present invention in a simplified form that are further described below in the Detailed Description. This Summary is not intended to identify key or essential features of the claimed subject matter, nor is the Summary intended to be used to limit the scope of the claimed subject matter.

BRIEF DESCRIPTION OF THE DRAWINGS

[0016] The novel features believed characteristic of the subject matter are set forth in the appended claims. Through-

out, like numerals refer to like parts with the first digit of each numeral generally referring to the figure which first illustrates the particular part. The subject matter and a preferred mode of use are best understood by reference to the following Detailed Description of illustrative implementations when read in conjunction with the accompanying drawings, wherein:

[0017] FIG. 1 is a cross-sectional side view of a water sports facility according to an exemplary implementation of the invention with a participant in a preferred participation location or region;

[0018] FIG. 2 is a cross-sectional side view of the water sports facility as shown in FIG. 1 with a participant in a fallen position;

[0019] FIG. 3 is a cross-sectional side view of the water sports facility as shown in FIG. 1 with a participant in a second or stable position after having fallen during a water sport session; and

[0020] FIG. 4 is a cross-sectional view of the water sports facility as shown in FIG. 1 with a participant in a third position in route to a preferred participation location or region.

DETAILED DESCRIPTION

[0021] Described herein are systems, devices and methods that allow a water sport participant to more quickly regain contact with a tow cable, tow rope, ski rope or anchor rope (herein "ski rope") after losing contact with it during a water sport session. In a typical scenario, when a water sports participant loses contact with a ski rope prior to the end of a run, the session ends prematurely and the participant must return to a starting position or at least wait for someone to return the ski rope to him. Thus, a need has existed for a water sport participant to more quickly re-establish contact with a ski rope and to return to active participation in a desired water sport. This need is met by use of the present invention.

Sports Facility

[0022] FIG. 1 is a cross-sectional side view of a water sports facility 100 according to an exemplary implementation of the invention. In FIG. 1, the water is flowing so as to allow a water sports participant (wakeboarder 104) to participate in a water sport. The cross-sectional view is of both ends of an entire pool 102 or water sports facility 100. The pool 102 or water sports facility 100 may be of any length.

[0023] A water sports facility 100 comprises a pool 102 wherein a wakeboarder 104 may participate in wakeboarding. Herein, wakeboarding serves as an exemplary water sport with which to use the present invention. However, the invention may be used with other water sports. The wakeboarder 104 may move laterally across the pool 102 and ride across a wake (not shown) generally within a desired or designated participation area 106. A wake may be created by a water displacement hull, wake inducing device or wake inducing form 108 submerged or partially submerged in the pool 102. The wake may be induced by any means such as, but not limited to, a water displacement hull, model boat, portion or entirety of an actual boat, a miniature boat hull, a series of vanes, a submerged form, a submerged vessel or one or more water flows, outlets, effluents or jets.

[0024] In FIG. 1, a water displacement hull 108 is held in place toward an upstream side 130 of the pool 102 by one or more supports 110. The wakeboarder 104 resists the flow of the water (moving as shown by the arrows) by holding onto a participant support such as a ski rope 112 which is anchored

in the designated participation location 106 relative to the water displacement hull 108 by a ski rope fixture 114. The ski rope 112 is held at a desired or participant-selected angle 170 relative to the surface of the pool 102. A participant support may be any fixture or implementation such as a single support bar, a plurality of handles, a plurality of ropes, a series of support bars, etc., within reach of a water support participant 104. The participant support may be located anywhere within the water support facility and sufficiently close to the pool 102. In a preferred implementation, the ski rope 112 is held in place to mimic or exactly match conditions associated with wakeboarding in a natural environment (e.g., wakeboarding behind a ski boat operating on a lake).

[0025] In a preferred implementation, a pool width (not shown in FIG. 1) is preferably about 100 feet (about 31 meters), and a pool length is preferably about 200 feet (about 62 meters). Pool length is measured from an upstream side 130 to a downstream side 132. Further, in a preferred implementation, the pool depth 142 is from about 3 feet (about 1 meter) to about 5 feet (about 1.5 meters). However, other depths may be used at the point of the user or wakeboarder 104 in the pool 102 or at other locations in the pool 102. An exemplary range of depths in the pool 102 at which to practice the present invention is from about 1 foot (about 0.3 meters) to about 6 feet (about 2 meters). The depth of the pool 102 at any given location may vary from location to location within the pool 102 and from time to time during operation of the water sports facility 100.

Water Operation

[0026] With reference to FIG. 1, during operation, water flows from the upstream side 130 toward the downstream side 132 of the pool 102 as indicated by arrows in the pool 102. When a wakeboarder 104 falls during a wakeboarding session, the flow of water pushes the wakeboarder 104 and any equipment downstream and eventually to the downstream side 132 of the pool 102. This action happens in the space of a few seconds. A porous, permeable or grate-like ramp or floor 134 prevents the wakeboarder 104 and any equipment from entering a submerged return channel 162. While the grate-like ramp or floor 134 is shown as an inclined plane, the grate-like ramp or floor 134 may be of any shape or orientation including in a vertical plane. Further, the grate-like ramp or floor 134 may take any shape or follow any contour along the pool width. In a preferred implementation, the grate-like ramp or floor 134 is sloped from the pool bottom 140 toward the pool deck 138.

[0027] When water is flowing in the pool 102, the grate-like ramp or floor 134 is capable of directing or pushing the wakeboarder 104 and any equipment upward and out of the pool 102 and onto the pool deck 138 despite any lateral forces from flowing water. The shape or form of the grate-like ramp or floor 134 allows the passage of the water without appreciable interference with the flow or circulation of water.

[0028] An equipment room 150 preferably houses the source or sources of power for circulating the water in the pool 102 and submerged return channel 162. Other geometries and arrangements are possible. In a preferred implementation, equipment room 150 also houses controls for the various components in the water sports facility 100. Although not shown, various sensors, controls, actuators, etc. exist to enable the operation of the water sports facility 100 including the motorized retractable line. These sensors, controls, actua-

tors, etc. may be located anywhere within the water sports facility 100 or on participants or operators within the water sports facility 100.

[0029] With reference to FIG. 1, water circulates in the pool 102 and submerged return channel 162 in response to vigorously flowing, injecting or ejecting water by a plurality of pump motors (not shown) through a plurality of effluents 164. Water is supplied to the circulating pump motors by a plurality of influents 166. In an exemplary implementation, there is one effluent 164 for each of the pump motors and one influent 166 for each of the pump motors 160. Each of the plurality of effluents 164 terminates at the upstream side 130 of the pool 102 and under the decking 138 of the pool 102. While not shown, in a preferred implementation, a cowling, scoop or contour is formed at or near the entrance of each influent 166 so as to encourage water circulating in the submerged return channel 162 to enter each influent 166.

[0030] In a preferred implementation, the exiting ends of the effluents 164 are below the surface of the water and are directed in line or parallel with the surface of the water in the pool 102. Also in a preferred implementation, the upstream effluents 164 from pump motors are about eight inches in diameter (20 cm); the influents are larger such as about 10 inches in diameter (25 cm). Other sizes of effluents 164 and influents 166 may be used. The effluents 164 and influents 166 may be round, square or of a contoured or shaped design.

[0031] As explained further below, the equipment room 150 also houses a second plurality or set of deceleration water pumps (not shown in FIG. 1) that eject, flow or inject water, air, or a combination of water and air into the submerged return channel, the floor of the submerged return channel, the immediate floor of the pool, or at a combination of locations or surfaces in the water sports facility 100. The deceleration water pumps eject, inject or flow water through pipes, passages or effluent channels 154 that run beneath the pool 102 and submerged return channel. Injection, ejection or flow of water, air or combination of water and air from the deceleration water pumps decelerates the flow of water passing through the submerged return channel and thus slows the water circulating in the water sports facility 100 at a desired or designated time (e.g., when a wakeboarder 104 falls and loses contact with the ski rope 112).

[0032] In an exemplary implementation, 10-50 water circulation or pump motors, each of about 30 hp capacity, are installed as a first plurality of pump motors and flow or circulate water in the water sports facility 100 and help provide sufficient water flow so as to enable a participant 104 to engage in a water sport such as wakeboarding. In a preferred implementation, at least 15 pump motors are used. In the exemplary implementation, 20-70 deceleration pump motors, each of about 3 hp capacity, are installed as a second plurality of pump motors and slow, stop or circulate water in a reverse direction in the water sports facility 100. In a preferred implementation, at least 10 deceleration pump motors 152 are used. Other numbers, other capacities and other configurations of pump motors may be used.

[0033] The sports facility 100 preferably comprises one or more pool heating, filtration and treating units (not shown in FIG. 1). In a preferred implementation, the one or more pool heating, filtration and treating units are located and operated in the equipment room 150. The one or more pool heating, filtration and treating units necessitate one or more heating and treating influents and one or more heating and treating effluents. These influents and effluents may be synonymous

with, separate from or connect with the intake and outlet pipes or fixtures described in connection with causing the flow of water in the water sports facility 100.

[0034] With reference to FIG. 1, during a water sport session (e.g., wakeboarding, wake surfing, wake skating), water flows from left to right in the open air channel or pool 102, from right to left in the submerged return channel 162, and generally clockwise in the water sports facility 100. A plurality of jets or effluents 164 from the equipment room 150 thrust water at the upstream side 130 of the pool 102. The effluents 164 may be located at any desired vertical position 165 at or near the upstream side 130 of the pool. Each of the effluents 164 may be placed and oriented separately and at a desired location vertically and horizontally at any point across the pool width. In a preferred implementation, the effluents 164 are about evenly spaced across the pool width.

[0035] When water flows from the effluents 164, water flows under and around the water displacement hull 108. Water flowing from the plurality of effluents 164 accelerates or circulates the water flowing in the pool 102. When water reaches the downstream side 132 of the pool 102, the water flow does not terminate or re-circulate by way of pipes. Instead, the water flows back toward the upstream side of the pool 102 by way of a return channel 162. The extreme downstream side 132 of the pool 102 is preferably curvilinear so encourage a smooth flow of water into the return channel 162. Other geometries and arrangements for connecting the pool 102 and return channel 162 are possible. For example, the pool 102 may have a squared end that drops directly downward to a return channel 162. In another example, water may circulate in an open channel back to the upstream side of the pool 102.

[0036] In a preferred implementation, the return channel 162 is a submerged return channel and is formed, created or located below the pool 102. Thus, in such an implementation, as the one shown in FIG. 1, water flows downward around and below the floor 140 of the pool 102. The water flow reverses direction relative to the pool or open channel 102 by flowing through the submerged return channel 162.

[0037] In a preferred implementation, the depth 142 of the water as measured toward the upstream side 130 of the pool and the depth of the water as measured toward the downstream side 132 of the pool are below the deck 138 at both ends of the pool 102. During operation of the water sports facility, this configuration and level of water accommodates variations, ripples, waves or turbulence at the surface of the pool 102. The deck 138 is cantilevered over the upstream side 130 and downstream side 132 of the pool 102. Further, in a preferred implementation, the depth or height 144 of the submerged return channel 162 is matched to the pool depth 140 along the pool length and to the flow of water in the various portions of the water sports facility 100.

Operation of Motorized Retractable Line

[0038] With reference to FIG. 1, in a preferred implementation, the ski rope fixture 114 is attached to a vertical riser 116. The ski rope fixture 114 is moveably or rotatably fixed at a selected height and location relative to the pool 102 or water displacement hull 108. The vertical riser 116 is actuated by a mechanical lift 120. The mechanical lift 120 provides a mechanism to extend or retract the vertical riser 116 such that the ski rope fixture 114 may be raised or lowered relative to the pool deck 138 and surface of the pool 102. The location and orientations of the ski rope fixture 114 are each adjustable

so as to accommodate various operations and pool conditions, participant size and desired position for the ski rope 112. In a preferred implementation, the ski rope 112 is about 40 feet (about 12 meters) in length when a participant 104 is participating within a desired or designated participation area 106.

[0039] In a preferred implementation, the ski rope 112 may be lengthened or shortened by operation of a ski rope winch 118, as explained further below, to assist a participant to return to a point of riding or region of riding upon activating the motorized retractable line.

[0040] FIG. 2 is a cross-sectional side view of the water sports facility with a fallen participant 202. After falling, the fallen participant 202 is carried toward the downstream side 132 of the pool 102. Upon detection of a fallen participant 202, several components of the water sports facility 100 are engaged to slow the flow of circulating water and to perform other functions. One of these functions is to re-unite the fallen participant 202 with the distal or working end of the ski rope 112. The distal end is the end of the ski rope 112 having a handle 206 and, optionally, controls for the water sports facility 100. Upon detection of a fallen participant 202, the ski rope winch 118 engages to unwind an extension 204 to the ski rope 112. The extension 204 may be a cable, rod or further length of ski rope. The handle 206 and ski rope 112 are pulled or acted upon by the water flowing in the pool 102. Operation of the ski rope winch 118 allows the ski rope 112 and handle 206 to follow and eventually reach the fallen participant 202. The ski rope winch 118 releases the extension 204 until the fallen participant 202 or facility operator actuates a control to stop the operation of the ski rope winch 118, or until the handle 206 of the ski rope 112 reaches the downstream side 132 of the pool 102—a maximum extension.

[0041] At a same or different time as the ski rope winch 118 is operating, the vertical riser 116 is extending upward. Alternatively, or in addition to extension of the vertical riser 116, the ski rope fixture 114 is extending or moving, as needed or desired. A ski rope extension portion 314 shows the extension of the ski rope fixture 114 in FIG. 3. Thus, FIG. 3 shows one implementation of an extendable ski rope fixture 114 that extends to an extension distance 308. Extension of the ski rope fixture 114 may provide increased stability to the ski rope 112 and places the ski rope 112 and/or ski rope extension 204 in a proper orientation or desired position or in a desired orientation and desired position. In one implementation, the extension of the ski rope fixture 114 assists to re-establish or maintain a desired or participant-selected angle 170 even when the ski rope 112 is carried from a desired operating position 106 to a second position.

[0042] Eventually, a fallen participant 202 regains his composure and reaches a stable position in the pool 102 after falling. FIG. 3 is a cross-sectional side view of the water sports facility shown in FIG. 1. With reference to FIG. 3, from this second or stable position 306, the wakeboarder 302 may re-engage in wakeboarding. In a preferred implementation, and as described more fully below, by gaining access to the handle 206, the wakeboarder 302 then has access to one or more controls that enable the wakeboarder 302 to control the water sports facility (e.g., re-start flow of water from upstream effluents 164).

[0043] With reference to FIG. 3, while the wakeboarder 302 is shown at an extreme downstream location near the grate-like ramp or floor 134, a second or stable position 306 may be anywhere outside of a desired or designated participation area 106. In operation, a height 304 of a vertical riser

116 and extended length 306 of a ski rope fixture 114 are selected or programmatically reached based on a horizontal distance 310 to the second or stable position 306 of the participant 302 or by one or more other variables. For example, the height 304, the extended length 306 (if any), or height 304 and extended length 306 may be determined or programmatically reached by correlation to an amount of extension 204 necessary for the ski rope 112 to reach the participant 302. Generally, the more extension 204 needed, the greater height 304 is provided to the vertical riser 116. The extended length 306 may be shorter or longer than when a participant 302 is wakeboarding in a designated participation area 106. The height 304 of the vertical riser 116 and the extended length 306 of the ski rope fixture 114 are selected so as to maintain a consistent ski rope angle 170 for the participant 302 at all places in the pool 102 or facility 300.

[0044] Although not visible in FIG. 3, a second or stable position in the pool 102 may be somewhat lateral to a center axis or central position in the pool 102 as viewed from overhead. A somewhat lateral second or stable position may increase an amount of extension 204 necessary for the ski rope 112 to reach the participant 302. In any event, once activated, the motorized retractable line returns a participant back to central position or region behind the water displacement hull 108 and in a designated participation area 106.

[0045] The designated participation area 106 is the most desired region for engaging in or participating in a water sport for several reasons. One of those reasons is safety. Upon falling, a water sport participant has a relatively large amount of open water surrounding him in which to regain his composure. Further, there is ample room downstream from the designated participation area 106 in which to regain his composure. Participation in other areas of the pool 102 including positions close to a lateral side of the pool presents a risk of impacting the lateral side of the pool 102.

[0046] Another reason is that the designated participation area 106 is the region in the pool where the wake is available and has desirable characteristics for participating in wakeboarding or other water sport.

[0047] By allowing the handle 206 to follow the wakeboarder 302 to a second or stable position 306, the wakeboarder 302 is able to re-engage in wakeboarding in the water sports facility 101 sooner than taking time to travel back to a first or preferred designated participation area 106 proximal to the upstream side 130 of the pool 102. There are several advantages to re-starting participation in a water sport from the second or stable position 306. One of these advantages is an increased number of runs or sessions or an increased percentage of time spent participating in wakeboarding. This increase is in comparison to a scenario in which a wakeboarder 302 is required to return a desired or designated participation area 106 each time the wakeboarder 302 falls and needs to re-start a run or session. In such scenario, no motorized retractable line is available—only a fixed ski rope 112 is available. Thus, for example, by using the invention, a wakeboarder 302 may be able to engage in 14 passes across a wake in a 10 minute session in the water sports facility 100 instead of 9 passes across a wake if the wakeboarder 302 were required to return to a fixed length ski rope and to the desired or designated participation area 106.

Control of Motorized Retractable Line

[0048] FIG. 4 is a cross-sectional view of the water sports facility as shown in FIG. 1 with a water sport participant 402

in a third position and shortly after re-engaging in a water sport. One object of re-starting from any position in the pool 102 is to relocate to a preferred or designated participation location or region 106. Another object is to spend relatively more time participating in a water sport in a given unit of time.

[0049] With reference to FIG. 4, a participating wakeboarder 402 travels from right to left from a downstream side 132 toward an upstream side 130 of the pool 102 as shown by an arrow. Simultaneously, and as shown by an arrow, a ski rope extension 204 is shortening by being pulled by the rotation or operation of a winch 118 or by another mechanism. While the winch 118 is shown at the base of the vertical riser 116, a winch 118 or extension control mechanism may be located in any region of the facility 100 including within an equipment room 150 (shown in FIG. 1). A single winch 118 is shown in FIG. 4, but a plurality of components may be employed to produce the same or similar functionality as retracting a line, cable, ski line 112 or line extension 204.

[0050] Also simultaneously, the vertical riser 116 is lowered as shown by an arrow in FIG. 4. Further, and also simultaneously, the ski rope extension 114, ski rope extension portion 314, or the ski rope extension 114 and ski rope extension portion 314 may be shortened or extended as needed or desired. Various components such as those described operate to maintain a constant desired or participant-selected angle 170 as the wakeboarder 402 travels toward and to the desired or designated participation area 106. Various components operate at one or more constant or variable speeds so as to provide a smooth travel or movement for the wakeboarder 402 to reach the desired or designated participation area 106. While various components are described as operating simultaneously, it is understood that one or more components may operate intermittently relative to one another so as to provide a same or equivalent functionality.

[0051] In a preferred implementation, a participating wakeboarder 402 has access to controls or control actuators to operate the water sports facility 100. These controls are preferably located in or near the handle 206 attached to the ski rope 112. These controls may provide control for one or more of the following: flow of water exiting effluents 164, speed of water circulating in the pool 102, flow of water exiting slowing effluents 156, position (and/or orientation) of the water displacement hull 108 (for generating wake), aeration of water in effluents 156, 164, desired or participant-selected angle 170, speed of retraction line 204 and ski rope 112, speed of operation of extension 314 and ski rope fixture 114, and speed of operation of vertical riser 116. For example, a participant may be able to choose between a slow retraction speed and a fast or participatory retraction speed when engaging a control to retract the retractable ski line.

[0052] In a preferred implementation of the controls, a minimal number of controls is provided to the wakeboarder 402 so as to simplify participation in the water sport. The controls provided are sufficient for the wakeboarder 402 to operate the facility 100 and participate in a desired water sport without requiring the participation or involvement by others. Further, one or more operations or controls provided to the wakeboarder 402 may be automated or linked with operation of other controls.

[0053] For example, a wakeboarder 402 may engage a control to retract the ski rope 112 that, in turn, engages a winch 118 to engage or control the retraction line 204, but which also engages a control to lower the vertical riser 116 so as to automatically maintain constant the desired or participant-

selected angle 170. In a preferred implementation, the control to retract the ski rope 112 is a trigger to engage a process that returns a wakeboarder 402 to the designated participation area 106; the wakeboarder 402 does not have control to stop retraction at an intermediate position between a second or stable position 306.

[0054] In another example, the wakeboarder 402 may engage a control to retract the ski rope 112 that, in turn, engages some or all of water circulation motors and thus increases or starts flow of water from one or more effluents 164.

[0055] In another example, the wakeboarder 402 may engage a control to retract the ski rope 112 that, in turn, engages a timer and audible countdown so as to give the wakeboarder 402 a signal for when the ski rope 112 may engage in retracting and returning the wakeboarder to the designated participation area 106. As another variation of this example, water may begin flowing from the effluents 164 for a predetermined time prior to beginning retraction of the ski rope 112. As another variation of this example, the system or facility may wait until one or more water flow or other conditions are met prior to beginning retraction of the ski rope 112. One of these water flow conditions may be sensing whether the circulating water is traveling at a requisite or predetermined velocity prior to beginning retraction of the ski rope 112. In yet another example, the system or facility may determine a future time at which water may be flowing at a sufficient speed to allow for planing of a participant at a midpoint in the pool or some other location in the pool, or at a participant-designated speed at a certain point in the pool (e.g., designated participation area 106); the system then engages retraction of the motorized retractable line at the future time. These and other examples show that a simple operation and a minimal set of controls may be provided, or a complex set of programmed behavior and combination of controls may be provided in conjunction with use of an extendable ski rope in the water sports facility.

[0056] In an exemplary scenario of operation of the sports facility 100, a wakeboarder 104 is unable to land a trick, falls into the pool 102 and loses handle contact with the handle 206 of the ski rope 112. A sensor in the handle 206 determines that the wakeboarder 202 has fallen from or lost contact with the ski rope 112. At this point, water flow from one or more circulating effluents 164 ceases, water is pumped through deceleration effluents 156, and the winch 118 is programmatically engaged to release or unwind an extension 204 to the ski rope 112. Water flowing in the pool 102 carries the handle 206 and ski rope 112 toward the fallen wakeboarder 202. Thus, with a minimal amount of time, a wakeboarder may regain contact with the handle 206 and ski rope 112. When the wakeboarder 302 regains a grasp of the handle 206, water flow through deceleration effluents 156 ceases and water flow is returned to circulating effluents 164. By engaging another control at or in the handle 206, a wakeboarder 402 triggers shortening of the ski rope extension 204 and ski rope 112 and thus returns to active participation in wakeboarding with minimal delay. A combination of automated and manual controls enables nearly continuous participation in a water sport in the water sports facility—something not previously possible.

Variations

[0057] While the invention is described with respect to exemplary and preferred implementations, other implementations are possible. The concepts disclosed herein apply

equally to other systems, devices and methods for providing a motorized retractable line for participation in power-based water sports in a facility. Furthermore, the concepts applied herein apply generally to all water sports facilities. While wakeboarding, wake surfing, wake skating or other particular sport may be referenced as an exemplary water sport for practicing the invention, the concepts, systems, facilities, devices and methods described herein apply to all water sports. The invention is described with reference to the accompanying figures where it is noted that characteristics and features shown in the figures are not drawn to scale unless otherwise noted herein.

[0058] While a pool **102** and a submerged return channel **162** have been described as separate elements, features or structures above, it is to be understood that the pool **102**, submerged return channel **162**, and connecting passages at the upstream and downstream ends of the pool are part of an overall pool or water-retaining void. The elements, features or structures described herein could just as easily be made in reference to a single pool or void divided into a top open air channel and a return channel by the floor or flooring **140**. Thus, reference to pool **102** herein is for sake of convenience and is not meant to be limiting. In an exemplary embodiment as described above, the water sports facility **100** would be generally equivalent to constructing a 100 foot by 200 foot pool having a depth of about 8 feet (about 31 meters by 62 meters by 2.5 meters).

[0059] Reference is made to effluents, injecting, ejecting and circulation of water and the like. However, other terms may be substituted. Further, other mechanisms for enabling the acceleration and flow of the water in the pool **102** are possible besides the water pumps described herein. For example, impellers, propellers or other mechanical means may be used. The water sports facility may be either an open or closed system in terms of water and water flow. Further, reference is made to flow of water. It is understood that, where appropriate, water flow may also refer to water flow with air or some amount of entrained or accompanying aeration.

[0060] It will be understood that terms used herein, including in the claims, are generally intended as “open” terms (e.g., the term “including” should be interpreted as “including but not limited to,” the term “having” should be interpreted as “having at least,” the term “includes” should be interpreted as “includes but is not limited to”). It will be further understood by those within the art that if a specific number of an introduced claim recitation is intended, such an intent will be explicitly recited in the claim, and in the absence of such recitation no such intent is present.

[0061] For example, as an aid to understanding, the following claims may contain usage of the introductory phrases “at least one” and “one or more” to introduce claim recitations. The use of such phrases should not be construed to imply that the introduction of a claim recitation by the indefinite articles “a” or “an” limits any particular claim containing such introduced claim recitation to inventions containing only one such recitation, even when the same claim includes the introductory phrases “one or more” or “at least one” and indefinite articles such as “a” or “an” (e.g., “a” and “an” should typically be interpreted to mean “at least one” or “one or more”). The same holds true for the use of definite articles used to introduce claim recitations. In addition, even if a specific number of an introduced claim recitation is explicitly recited, those skilled in the art will recognize that such recitation should typically be interpreted to mean at least the recited number

(e.g., the bare recitation of “two recitations,” without other modifiers, typically means at least two recitations, or two or more recitations).

[0062] Furthermore, in those instances where a convention analogous to “at least one of A, B, and C,” is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., “a system having at least one of A, B, and C” would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). In those instances where a convention analogous to “at least one of A, B, or C, etc.” is used, in general such a construction is intended in the sense one having skill in the art would understand the convention (e.g., “a system having at least one of A, B, or C” would include but not be limited to systems that have A alone, B alone, C alone, A and B together, A and C together, B and C together, and/or A, B, and C together, etc.). It will be further understood by those within the art that any disjunctive word and/or phrase presenting two or more alternative terms, whether in the description, claims, or drawings, should be understood to contemplate the possibilities of including one of the terms, either of the terms, or both terms. For example, the phrase “A or B” will be understood to include the possibilities of “A” or “B” or “A and B.” Moreover, “can” and “optionally” and other permissive terms are used herein for describing optional features of various embodiments. These terms likewise describe selectable or configurable features generally, unless the context dictates otherwise.

[0063] The described aspects of the invention depict different components contained within, or connected with, different other components. It is to be understood that such depicted architectures are merely exemplary, and that in fact many other architectures can be implemented which achieve the same functionality. Further, it is to be understood that one of ordinary skill in the art as to the invention described herein is someone familiar with constructing commercial swimming pools.

[0064] The foregoing discussion has been presented for purposes of illustration and description. Various features from one implementation can be combined with other features from other implementations. The description is not intended to limit the invention to the form or forms disclosed herein. Consequently, variation and modification commensurate with the above teachings, within the skill and knowledge of the relevant art, are within the scope of the present invention. The implementations described herein and above are also intended to explain the best mode presently known of practicing the invention and to enable others skilled in the art to use the invention, or in other implementations, and with the various modifications required by their particular application or uses of the invention. It is intended that the appended claims be construed to include alternate implementations to the extent permitted. Thus, the appended claims are to encompass within their scope all variations and modifications as are within the spirit and scope of this subject matter described herein.

I claim:

1. A water sports facility comprising: an open channel comprising an open channel length, an open channel width, an upstream side, and a downstream side, wherein the open channel is configured to allow water to flow along the open channel length from the upstream side toward the downstream side;

one or more effluents capable of ejecting water into the upstream side of the open channel;
 one or more water inlets that provide water to the one or more effluents; and
 a retractable ski rope capable of reaching the downstream side of the open channel.

2. The water sports facility of claim 1 wherein the water sports facility further comprises a mounted ski rope fixture.

3. The water sports facility of claim 2 wherein the mounted ski rope fixture is extendable.

4. The water sports facility of claim 1, wherein the water sports facility further comprises a motorized winch for retracting the retractable ski rope.

5. The water sports facility of claim 4, wherein the retractable ski rope comprises a winch control for controlling, directly or indirectly, operation of the motorized winch.

6. The water sports facility of claim 5, wherein the winch control is accessible by a participant, and wherein the winch control retracts the retractable ski rope to a designated participation area and to no other area when engaged.

7. The water sports facility of claim 4, wherein the motorized winch operates at a sufficient speed to allow a participant to plane on water in the open channel.

8. The water sports facility of claim 1, wherein the water sports facility further comprises a vertical riser, wherein the vertical riser is configured to raise and lower a point of origin of the retractable ski rope above a plane of the open channel.

9. The water sports facility of claim 8 wherein the vertical riser is configured to programmatically maintain the retractable ski rope at a desired angle relative to a plane of the open channel throughout a plurality of locations in the open channel.

10. A method for providing a retractable ski rope to a water sport environment, the method comprising:
 flowing water into the water sport environment at a rate measured in volume per time;
 providing a retractable ski rope at a first position within the water sport environment;
 detecting an indication of a condition in the water sport environment;
 extending the retractable ski rope to a second position within the water sport environment; and
 retracting the retractable ski rope to the first position within the water sport environment.

11. The method of claim 10, wherein retracting the retractable ski rope to the first position further comprises:
 maintaining the retractable ski rope at a desired angle relative to a plane in the water sport environment as the retractable ski rope is retracted.

12. The method of claim 10, wherein a speed of the retracting the retractable ski rope is controlled programmatically once retraction of the retractable ski rope begins.

13. The method of claim 10, wherein the detecting an indication of a condition in the water sport environment further comprises:
 detecting a disengagement of a participant from a handle of the retractable ski rope.

14. The method of claim 10, wherein the method further comprises:
 performing a change in operation of the water sport environment after detecting the indication of a condition in the water sport environment and while extending the retractable ski rope to the second position within the water sport environment.

15. The method of claim 14, wherein the performing a change in operation of the water sport environment comprises:
 ejecting water against a circulation of water in the water sport environment upon receiving an indication of non-participation by a water sport participant.

16. A method for providing a retractable ski rope to a water sport participant in a water sports facility, the method comprising:
 ejecting water from a plurality of effluents at an upstream side of an open channel in the water sports facility for use by the water sport participant;
 providing the retractable ski rope to the water sport participant; and
 extending the retractable ski rope upon detection of a condition in the water sports facility.

17. The method of claim 16, wherein the method further comprises:
 ceasing the extending the retractable ski rope upon detection of a contact with the ski rope by the water sport participant.

18. The method of claim 16, wherein the method further comprises:
 providing a control to initiate retraction of the retractable ski rope to the water sport participant.

19. The method of claim 16, wherein the method further comprises:
 retracting the retractable ski rope beginning a fixed time after the water sport participant regains contact with the retractable ski rope.

20. The method of claim 15, wherein the method further comprises:
 automatically controlling at a relatively constant value a participant-selected angle of the retractable ski rope irrespective of an amount of extending the retractable ski rope, wherein the participant-selected angle of the retractable ski rope is measured relative to a plane defined by water in the open channel.

* * * * *