US 20050130515A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2005/0130515 A1

Erb, JR. et al. (43) Pub. Date: Jun. 16, 2005

(54) NOVEL WING ARRANGEMENT

(76) Inventors: **Donald M. Erb JR.**, Redding, CA (US); **Michael J. Murphy**, Lake Elsinore, CA (US)

Correspondence Address:
**JOSEPH E. MUETH, ESQ.**
**8TH FLOOR**
**225 SOUTH LAKE AVE.**
**PASADENA, CA 91101 (US)**

(21) Appl. No.: **10/996,836**

(22) Filed: **Nov. 24, 2004**

**Related U.S. Application Data**

(60) Provisional application No. 60/524,363, filed on Nov. 24, 2003.

**Publication Classification**

(51) **Int. Cl.**[7] ..... **B63B 1/00**
(52) **U.S. Cl.** ..... **441/72**

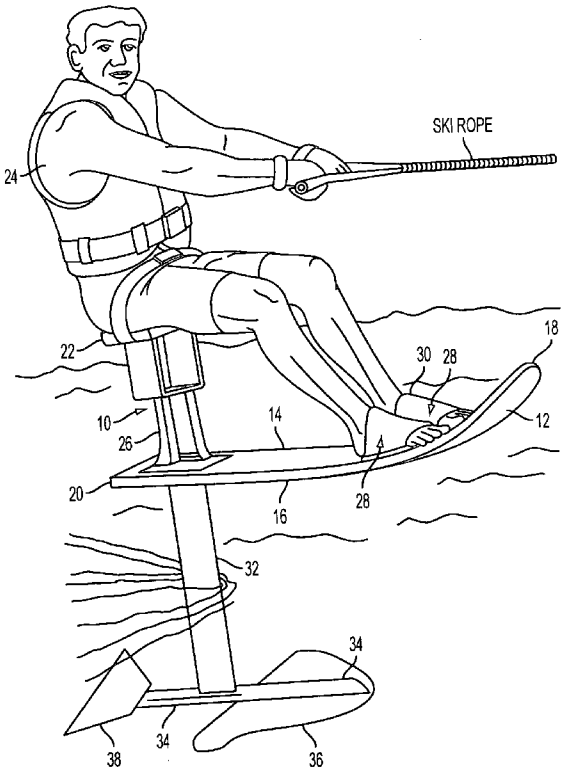
(57) **ABSTRACT**

A water sports device for supporting a seated human rider while the rider and the device are towed behind a powered water craft, the device including an elongated board having a front end and a back end to which is secured a seat for supporting the buttocks of the rider in a position spaced from and roughly centered above the back one-third of the board, a holder for securing the feet of the rider over the top of the board secured to the board spaced at least about two feet toward the front end of the board from the seat. An elongated hydrofoil extends downward from the board and front and rear planing blades carried by an arm which is generally parallel to the board. The arm is secured to the hydrofoil and spaced from the board, so that the blades are generally parallel to the board. The planing blades provide essentially no lift when the board is horizontal,

The improvement resides in the front planing blade being carried lower on the arm than the rear planing blade such that the flow of water over the front planing blade produces less turbulence over the rear planing blade.

In a water sports device for supporting a standing human rider while the rider and the device are towed behind a powered water craft, the device including an elongated board having a front end and a back end, an elongated hydrofoil extends downward from the board, front and rear planing blades carried by an arm which is generally parallel to the board, said arm being secured to the hydrofoil and spaced from the board, so that the blades are generally parallel to the board, the planing blades provide essentially no lift when the board is horizontal,

the improvement wherein the front planing blade is carried lower on said arm than the rear planing blade such that the flow of water over the front planing blade produces less turbulence over the rear planing blade.



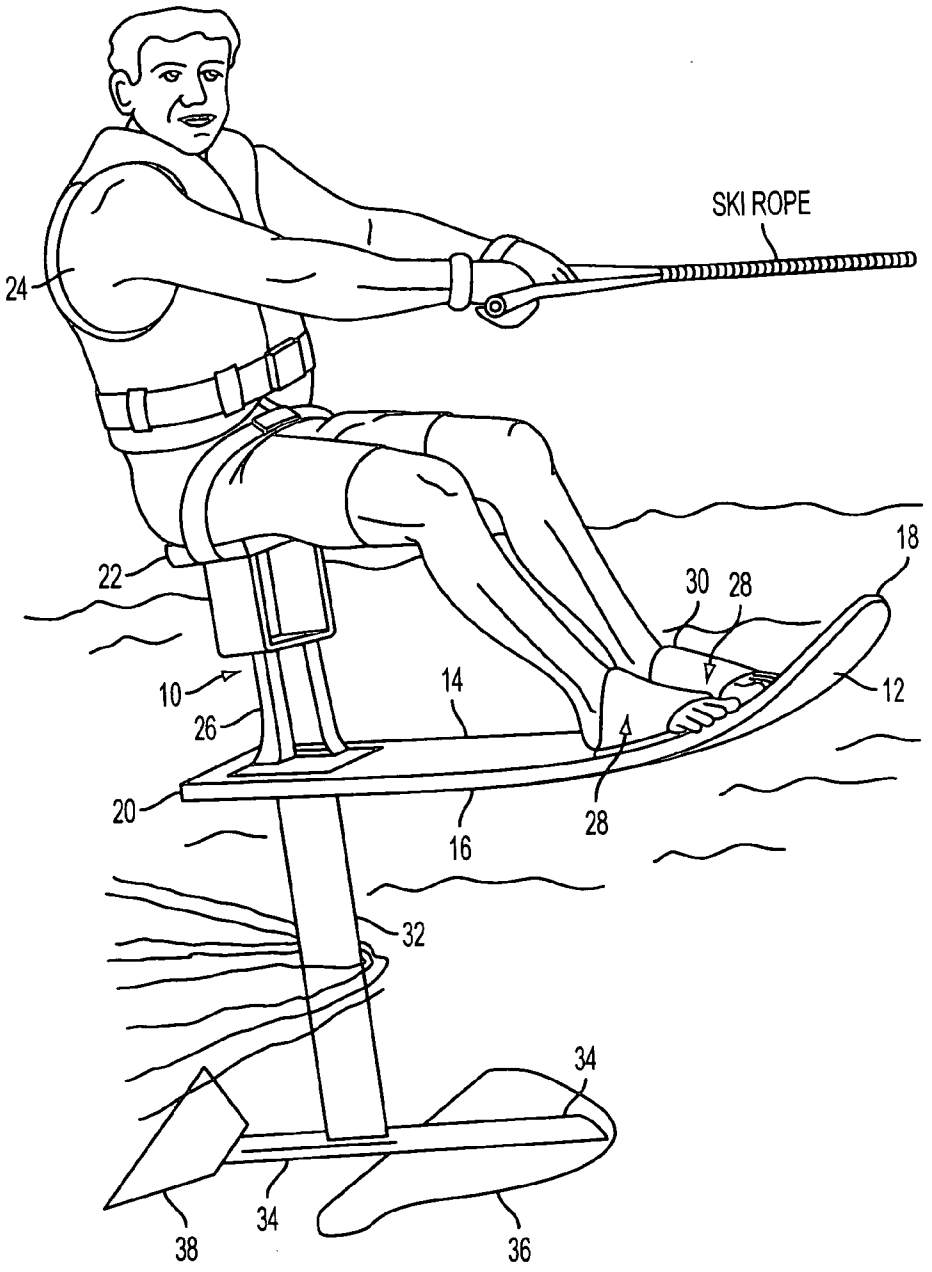



FIG. 1

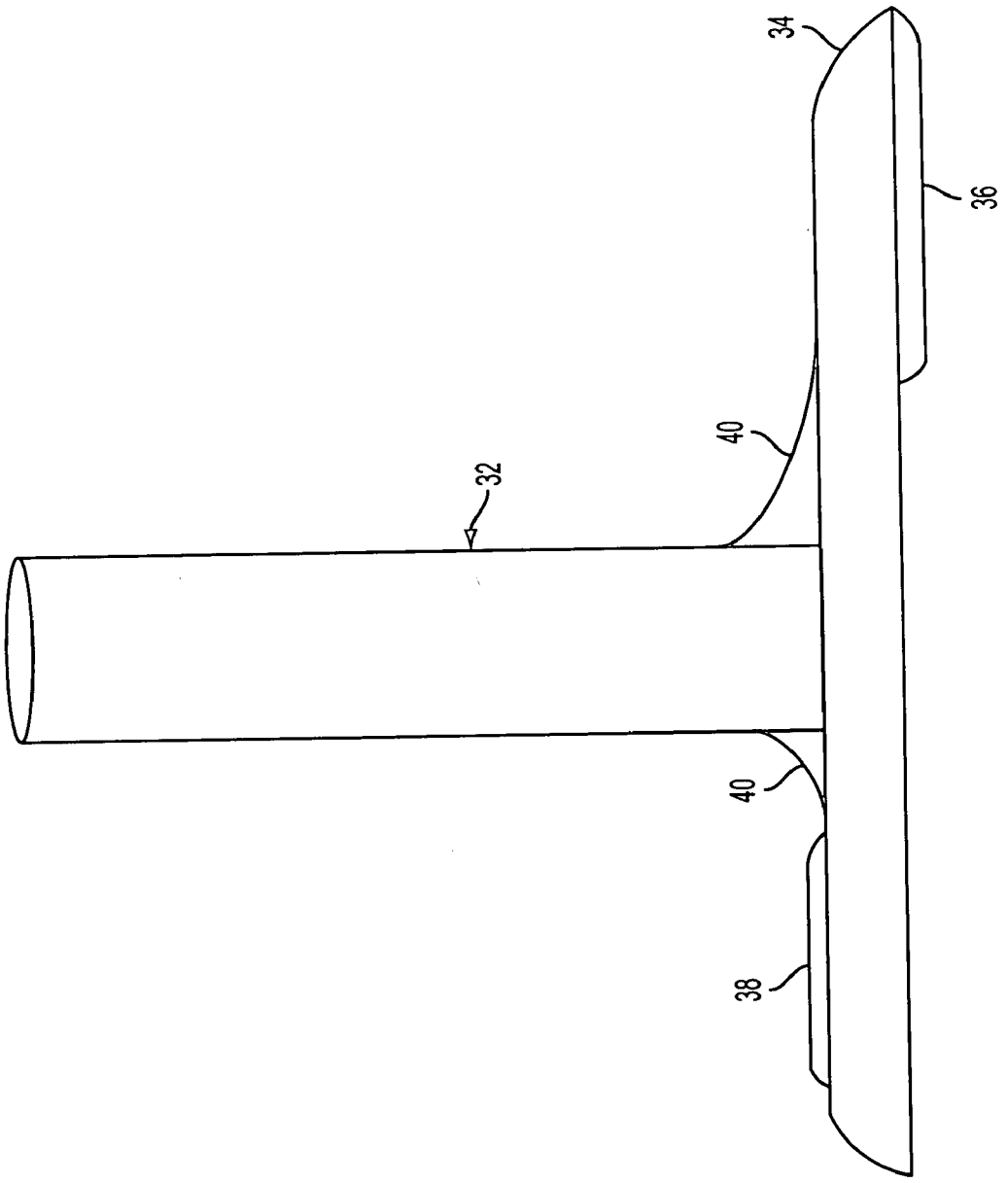



FIG. 2

# NOVEL WING ARRANGEMENT

[0001] This patent claims the filing date of U.S. Provisional Patent Application Ser. No. 60/524,363, filed Nov. 24, 2003.

## BACKGROUND OF INVENTION

[0002] U.S. Pat. Nos. 5,100,354, 5,249,998, 6,179,676 B1, 6,551,158 B2, 6,234,856 and 6,443,786 disclose water sport devices for supporting a seated human rider while the rider and the device are towed behind a powered water craft. The devices include an elongated board to which a seat and foot holders are secured. An elongate strut in the shape of a hydrofoil projects downwardly from the board. The lower end of the strut carries an arm which is generally parallel to the board. Front and rear planing blades are carried by the arm. The positioning of the rigidly mounted seat and the planing blades, the use of a single vertical strut, the size of the planing blade and the positioning of the foot holders provides a water sports device which is relatively easy to ride, while at the same time being highly maneuverable and capable of high jumps.

[0003] The present invention provides a significant improvement in water sport devices disclosed in the above-identified patents, the disclosures of which are expressly and fully incorporated herein by reference.

## SUMMARY OF INVENTION

[0004] In a water sports device for supporting a seated human rider while the rider and the device are towed behind a powered water craft, the device including an elongated board having a front end and a back end to which is secured a seat for supporting the buttocks of the rider in a position spaced from and roughly centered above the back one-third of the board, a holder for securing the feet of the rider over the top of the board secured to the board spaced at least about two feet toward the front end of the board from the seat, an elongated hydrofoil extends downward from the board, front and rear planing blades carried by an arm which is generally parallel to the board, said arm being secured to the hydrofoil and spaced from the board, so that the blades are generally parallel to the board, the planing blades provide essentially no lift when the board is horizontal,

[0005] the improvement wherein the front planing blade is carried lower on said arm than the rear planing blade such that the flow of water over the front planing blade produces less turbulence over the rear planing blade.

[0006] In a water sports device for supporting a standing human rider while the rider and the device are towed behind a powered water craft, the device including an elongated board having a front end and a back end, board from the seat, an elongated hydrofoil extends downward from the board, front and rear planing blades carried by an arm which is generally parallel to the board, said arm being secured to the hydrofoil and spaced from the board, so that the blades are generally parallel to the board, the planing blades provide essentially no lift when the board is horizontal,

[0007] the improvement wherein the front planing blade is carried lower on said arm than the rear planing blade such that the flow of water over the front planing blade produces less turbulence over the rear planing blade.

[0008] In the past the front wing has been attached to the top of the arm and the rear wing has been attached to the bottom of the arm, that is, the front wing is higher than the rear wing. This results in unwanted water turbulence over the rear planing blade. According to this invention, the extent of turbulence over the rear blade is diminished by having the front blade lower than the rear wing.

[0009] The wing arrangement of the present invention can be achieved in a variety of ways. For example, in a first embodiment, the front wing can be attached to the bottom of the arm and the rear wing attached to the top of the arm to make the rear wing higher than the front wing. Alternatively, in a second embodiment, both wings can be attached to the upper surface of the arm with the rear wing being elevated by about 2 or 3 inches above the top surface of the arm. This is accomplished by the insertion of a rigid washer or spacer between the top surface of the arm and the underside of the rear wing and bolting or joining these parts together.

[0010] The first embodiment reduces the impact and stress on the bolts used to hold the wing to arm and the front wing is more firmly attached to the arm when impacting the water due to the pressure now pushing the wing into the arm. The result is a stronger product with less flex from left to right. There is also a larger wing surface to the bottom of the wing due to the lack of the width of the arm being in the way and displacing water out to the side of the blade. The result is a larger planing surface and a stronger planing surface. The higher rear wing allows the board to switch its angle of attack needed in jumping the towable hydrofoil as the strut displaces and cuts through the water resulting in less resistance or drag on the rear wing. When the water hits the strut there is less resistance than when it hits the entire flat surface of the wing. The previous designs did not take this into consideration and resulted in a slower reacting hydrofoil and weaker components.

## DESCRIPTION OF THE DRAWINGS

[0011] **FIG. 1** is an overall perspective view of the water sport device of the invention with the rider being towed by a tow rope.

[0012] **FIG. 2** is a partial side view of the hydrofoil, arm, front wing and rear wing elements of **FIG. 1**.

## DESCRIPTION OF THE PREFERRED EMBODIMENT

[0013] Turning to the drawings in greater detail.

[0014] Referring to **FIG. 1**, there is shown a "flying ski"**10** which embodies the preferred design of the water sports device present invention. The flying ski **10** includes an elongate board **12** having an upper surface **14** and a lower surface **16**, and a front end **18** and a back end **20**. A seat **22** extends generally perpendicular to and upward from the upper surface **14** of the board for supporting the buttocks of a seated rider **24** at a point spaced above the back of the board.

[0015] The seat **22** is carried by the support member **26**.

[0016] The rider's legs extend forward toward the front of the board, where they are secured by a holders **28**, such as a pair of rubber sheets **30**, which are attached to the board

about two feet forwardly of seat **22** so as to form two elongate generally semicircular loops into which the feet of the rider can be inserted.

[**0017**] An elongate hydrofoil **32** extends generally perpendicular to and thru a tight fitting opening in the board **10**, and usually is secured to support **26**. The portion of hydrofoil **32** extending below the board **12** is of a water foil shape in cross section. The upper end of the hydrofoil **32** can be affixed to the board **10**, generally beneath support member **26**. The arm **34** having a forward end and rearward end is fixed to the bottom end of the hydrofoil **32** at a point just forward of the middle of the arm **34**. A forward planing blade **36** is secured to the bottom of the forward end of the arm **34** so as to be generally parallel to the board **12**. The rear planing blade **38** is secured to the top of the rearward end of arm **34** generally parallel to the board **12**.

[**0018**] As indicated above, there are alternative arrangements which will position the rear planing blade **38** above the forward planing blade **36**, with both blades being carried on the upper surface of arm **34**, to secure some or all of the benefits of this invention.

[**0019**] In the first embodiment, the invention can be made by simply inverting the arm **34** carrying the front and rear blades **36** and **38**. Thus, one can remove the arm, turn it over, and then weld it to the hydrofoil **32**.

[**0020**] Optionally, further strengthening can be provided by gussets **40** as shown in **FIG. 2**. The gussets **40** can be integrally formed with arm **34** to create an opening for receiving the end of hydrofoil **32**. Once assembled, these parts can be easily welded.

[**0021**] It will be understood that seat **22**, support **26** and holders **28** are eliminated in the alternative wherein the rider stands up with his feet on the upper surface **14** of elongate board **12**.

**1**. In a water sports device for supporting a seated human rider while the rider and the device are towed behind a powered water craft, the device including an elongated board having a front end and a back end to which is secured a seat for supporting the buttocks of the rider in a position spaced from and roughly centered above the back one-third of the board, a holder for securing the feet of the rider over the top of the board secured to the board spaced at least about two feet toward the front end of the board from the seat, an elongated hydrofoil extends downward from the board, front and rear planing blades carried by an arm which is generally parallel to the board, said arm being secured to the hydrofoil and spaced from the board, so that the blades are generally parallel to the board, the planing blades provide essentially no lift when the board is horizontal,

the improvement wherein the front planing blade is carried lower on said arm than the rear planing blade such that the flow of water over the front planing blade produces less turbulence over the rear planing blade.

**2**. The improvement of claim 1 wherein the front planing blade and the rear planing blades are carried on opposite surfaces of said arm.

**3**. The improvement of claim 1 wherein the front planing blade and the rear planing blade are carried on the same surface of said arm.

**4**. The improvement of claim 1 wherein gussets are provided between the hydrofoil and arm at the front and rear of the arm.

**5**. In a water sports device for supporting a standing human rider while the rider and the device are towed behind a powered water craft, the device including an elongated board having a front end and a back end, board from the seat, an elongated hydrofoil extends downward from the board, front and rear planing blades carried by an arm which is generally parallel to the board, said arm being secured to the hydrofoil and spaced from the board, so that the blades are generally parallel to the board, the planing blades provide essentially no lift when the board is horizontal,

the improvement wherein the front planing blade is carried lower on said arm than the rear planing blade such that the flow of water over the front planing blade produces less turbulence over the rear planing blade.

* * * * *