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F. E. PALMORE
HYDRO-FOIL APPARATUS
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3,105,249

Fig. 1

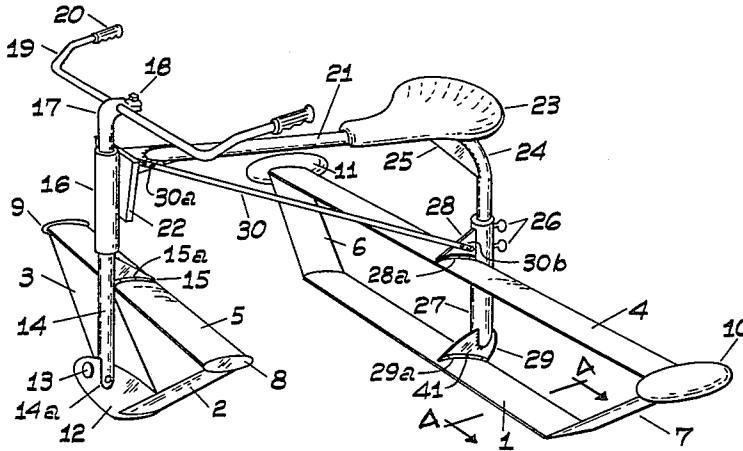


Fig. 2

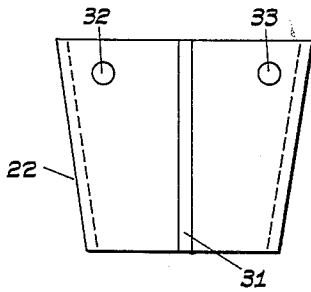


Fig. 3

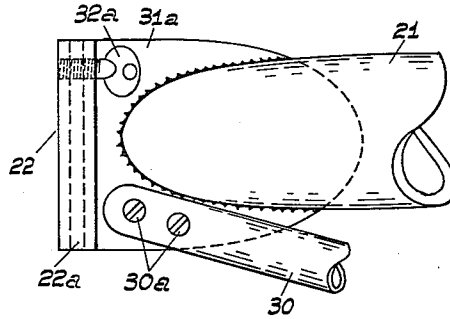


Fig. 4

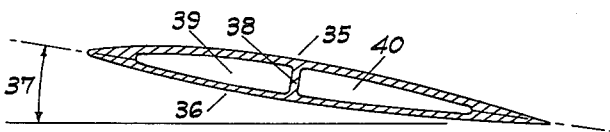
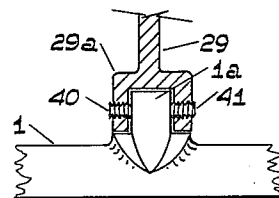


Fig. 5



Frank E. Palmore
INVENTOR.

BY Roy L. Van Ninkels
Agent

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HYDRO-FOIL APPARATUS
Frank E. Palmore, 2316 Bellview Drive,
Oklahoma City, Okla.
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This invention relates generally to hydro-foil equipped apparatus. More particularly, it relates to a riding type hydro-foil apparatus which is adapted to be towed behind a motor boat.

In the past, many types of boat-towed devices have been used by persons engaging in water sports. Among these, and perhaps the most popular, is water skis. While water skis have provided a means of moving over the water at fairly high speeds behind motor boats, they have several inherent disadvantages. For example, they are surface skimmers which means that they are subject to and limited in use by the surface condition of the water. They are constructed in such a manner that a person riding them is in a standing position. Furthermore, the tow-rope is held by the water-skier which is very tiring and difficult particularly during the time the water-skier is trying to get onto the surface of the water.

One object of this invention is to provide an improved hydro-foil apparatus upon which the rider sits while being towed through the water.

Another object of this invention is to provide an improved steerable hydro-foil apparatus upon which the rider sits while being pulled through the water.

A further object of this invention is to provide an improved hydrofoil apparatus that utilizes only the lift generated by the hydro-foils to raise the rider to a position above the water surface.

This invention comprises generally a pair of spaced apart hydro-foil members, means connecting the hydro-foil members, a seat on the connecting means, and a handle-bar member.

Other and further objects and advantages of this invention will become more apparent as the following description is read in conjunction with the accompanying drawing wherein like reference characters denote like parts in all views and wherein:

FIGURE 1 is a pictorial view of apparatus constructed in accordance with the invention.

FIGURE 2 is an enlarged view of one portion of the latching mechanism used for removably joining the front and rear hydro-foil assemblies.

FIGURE 3 is an enlarged side view of the latching mechanism of FIGURE 2, but showing the various parts latched together.

FIGURE 4 is an enlarged sectional view taken along line 4—4 of FIGURE 1.

FIGURE 5 is an enlarged view of the means used to attach and vary the angle of the hydro-foil assemblies.

Referring to the drawing and to FIGURE 1 in particular, shown therein is a rear hydro-foil member or assembly which includes hydro-foil sections 1, 4, 6 and 7. The hydro-foil sections may be suitably formed from almost any light weight, relatively rigid material. The preferred materials are plastic, wood, or aluminum. The foils are to be shaped as shown in FIGURE 4, at least as to surfaces 35 and 36. If plastic or aluminum is used and the foils are extruded or cast, then they should be formed with a center rib 38 for strength and with voids 39 and 40 for buoyancy.

Foil sections 1 and 4 are joined to an upstanding tubular member 27 as illustrated in FIGURE 5. Actually, FIGURE 5, is typical of the means used to attach the foils to the apparatus. Welded or otherwise rigidly attached to member 27 is a bifurcated member 29 which extends downwardly over a member 1a fixed to foil sec-

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tion 1. A plurality of set screws 40 and 41 are threaded into bifurcations 29a. As is readily apparent, the screws are tightened against the member 1a to retain the foil section 1 in the desired position. The member 28 and bifurcations 28a are similar to 29 and 29a and serve the same purpose with respect to foil 4.

A connecting member 21 extends from a removable latching mechanism at its front end into tubular member 27 where it is removably fastened by screws 26. Member 21 is formed with a 90° bend at 24 and reinforced at that point by gusset 25.

A seat 23 is mounted on the horizontal portion of member 21. It is adjustable thereon whereby proper weight distribution can be attained. The seat 23 is preferably formed of a rigid material covered with a foam plastic for comfort and for additional buoyancy.

A cross-brace 30 extends from a T-lock member 31a which is fixed to member 21 to foil mounting bracket 28. It is provided with screws 30a and 30b so that it can be easily removed when the apparatus is dismantled.

Member 22a is fixed perpendicularly across the end of lock member 31a thus forming with member 31a a T-shaped assembly as viewed from above. The outer edges of the member 22a are tapered downwardly and inwardly in such a manner that it is wedge-like in form and suitable to cooperate with the interior of member 22. The member 22a is provided with a pair of holes matching holes 32 and 33 of member 22. The members 22 and 22a are so constructed that insertion of member 22a into member 22 and installation of pins 32a results in a rigid yet easily disassembled joint between the connecting member 21 and the front vertical member 16.

Member 22 is a tapered rectangular member (shown in detail in FIGURES 2 and 3) having a slot 31 extending down one side. It is welded to a front vertical member 16. The interior and slot of member 22 is adapted to receive the T-latching mechanism including lock member 31a and member 22a.

Front vertical member 16 is adapted to provide a pivot for member 14 which extends therethrough. The upper portion of member 14 is provided with "goose-neck" type clamp 17 for attaching a pair of handle bars 19. Screw 18 provides a means of adjusting the position of the handle bars. Plastic grips 20 are provided to prevent the rider's hands from slipping off the handle bars and to seal ends of tube to provide additional buoyancy.

Attached to the lower portion of member 14 is a hydro-foil member which includes foil sections 2, 3, and 5. Tow rope attachment 12 also provides a lower pivot point at 14a for the hydro-foil member. The attachment by member 15 and screws 15a is similar to that previously described with reference to FIGURE 5.

Floats 10 and 11 are provided for extra buoyancy and to help stabilize the apparatus while a rider is attempting to mount the apparatus in the water.

It should be pointed out that the members 14, 21, 27 and 30 are tubular and are sealed, thus providing buoyancy sufficient to keep the apparatus from sinking. Each is preferably constructed of aluminum, thus providing light weight in addition to its excellent corrosion characteristics.

To use the apparatus constructed in accordance with the invention, a tow rope with one end attached to a motor boat is attached at 13. While the apparatus, when not being towed, has sufficient buoyancy to float itself it will sink into the water when the rider sits on it.

As the motor boat moves through the water, the apparatus, due to the reaction between the hydro-foils and the water, begins to rise until only the foil 1 and the lower portion of foils 2, 3, 6 and 7 are below the surface of the water. The height to which the apparatus will rise in the water depends on several factors, e.g., the weight

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of the rider, the speed at which it is being towed, and the attitude 37 of the foils with respect to the water. Due to these factors, the apparatus has been provided with several adjustments to compensate for them.

The seat 23 is adjustable along the member 21 to compensate for both the weight and the size of the rider. The means for accomplishing this adjustment should be readily apparent to those skilled in the art.

The foils are adjustable to change the attitude 37 at which they move through the water to provide more or less lift as desired. While not individually adjustable, the front foil assembly (foils 2, 3, and 5) is adjustable independently of the rear foil assembly (foils 1, 4, 6 and 7). Adjustment of the front assembly is accomplished by loosening the set screws in bifurcations 15a, rotating the assembly about the pivot 14a, and tightening the set screws. Adjustment of the rear foil assembly is accomplished by loosening the set screws in bifurcations 28a and 29a, moving the foil assembly to the desired angle, and tightening the set screws.

As the apparatus is being towed through the water, the pivoted relationship between members 16 and 17 permits the rider to change the direction in which he is moving by rotating the front foil assembly. This may be necessary in order to avoid an obstruction in the water or simply for the enjoyment of maneuvering in the water or passing through the wake of the boat.

Another advantage of the invention, not previously pointed out, is that the apparatus may be easily dismantled for storage or transporting when not in use. It may be broken down to four parts, by removing the cross brace 30, removing member 21 from the T-lock at the front and from the vertical member 27 at the rear.

It is believed that apparatus constructed in accordance with the invention provides a new and novel hydro-foil craft for use by persons engaging in water sports.

It should be apparent that the foregoing is by way of illustration only and that many variations may be made thereto without departing from the spirit of the invention or from the scope of the annexed claim.

I claim:

In a hydro-foil apparatus adapted to be ridden while being towed through the water, the invention comprising,

(1) a first hydro-foil member including

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- (a) a horizontal section and
- (b) a pair of downwardly inclined sections forming a triangle with said horizontal section,
- (2) a second hydro-foil member including
 - (a) an upper horizontal section,
 - (b) a lower horizontal section, and
 - (c) a pair of downwardly and inwardly inclined sections holding said horizontal sections in spaced-apart relationship,
- (3) connecting means holding said hydro-foil members in spaced-apart relationship,
- (4) a seat member on said connecting means,
- (5) a handle bar member connected with said first hydro-foil member,
- (6) pivot means operably associated with said first hydro-foil member and said connecting means whereby said handle bar member and first hydro-foil member are adapted to pivot with respect to said connecting means and second hydro-foil member,
- (7) adjusting means on said first and second hydro-foil members arranged and constructed whereby the attitude of said hydro-foil members can be varied with respect to the water,
- (8) first releasable means joining said connecting means and said pivot means, and
- (9) second releasable means joining said connecting means and said second hydro-foil member, the arrangement and construction of said first and second releasable means being such that when engaged said hydro-foil apparatus is adapted for riding and when released said apparatus is adapted to be divided into at least three parts for ease in transportation.

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