

Dec. 10, 1957

O. L. KUEHN  
WATER VEHICLE

2,815,518

Filed Nov. 23, 1956

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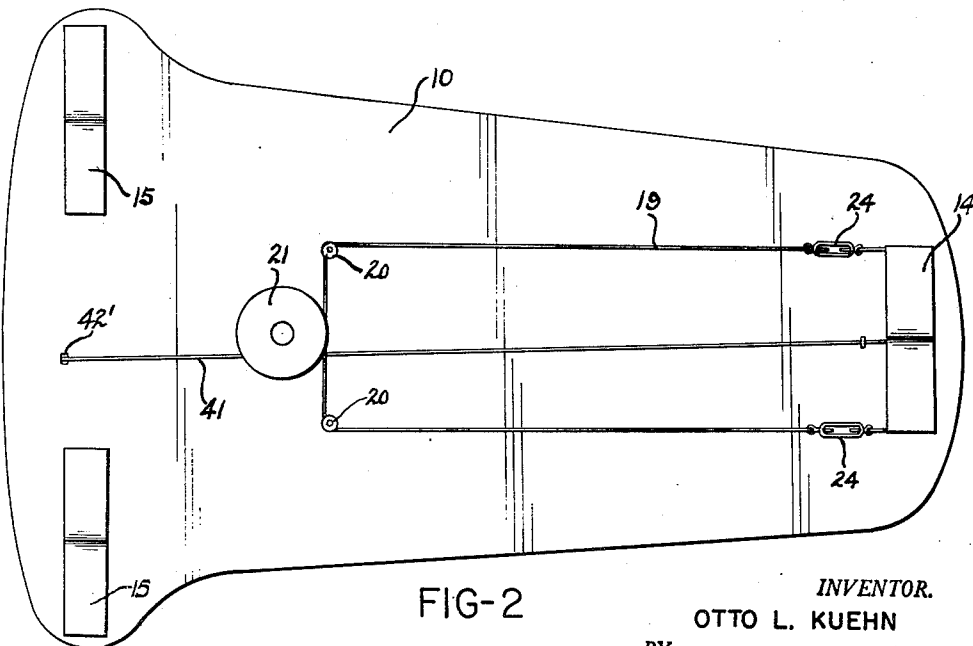
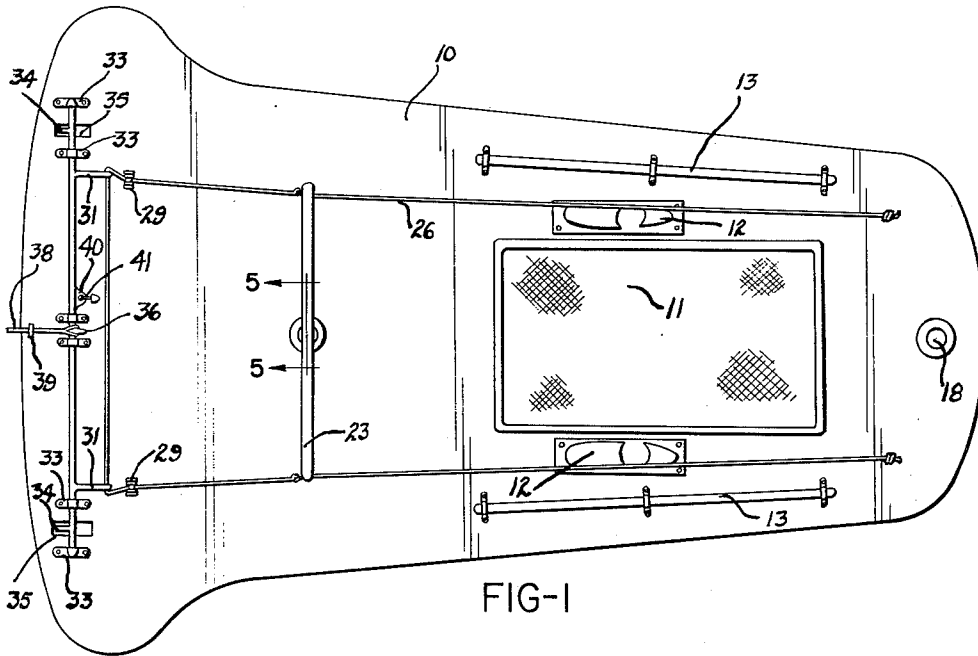


FIG-2

INVENTOR.  
OTTO L. KUEHN  
BY *Morsell & Morsell*  
ATTORNEYS

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3 Sheets-Sheet 2

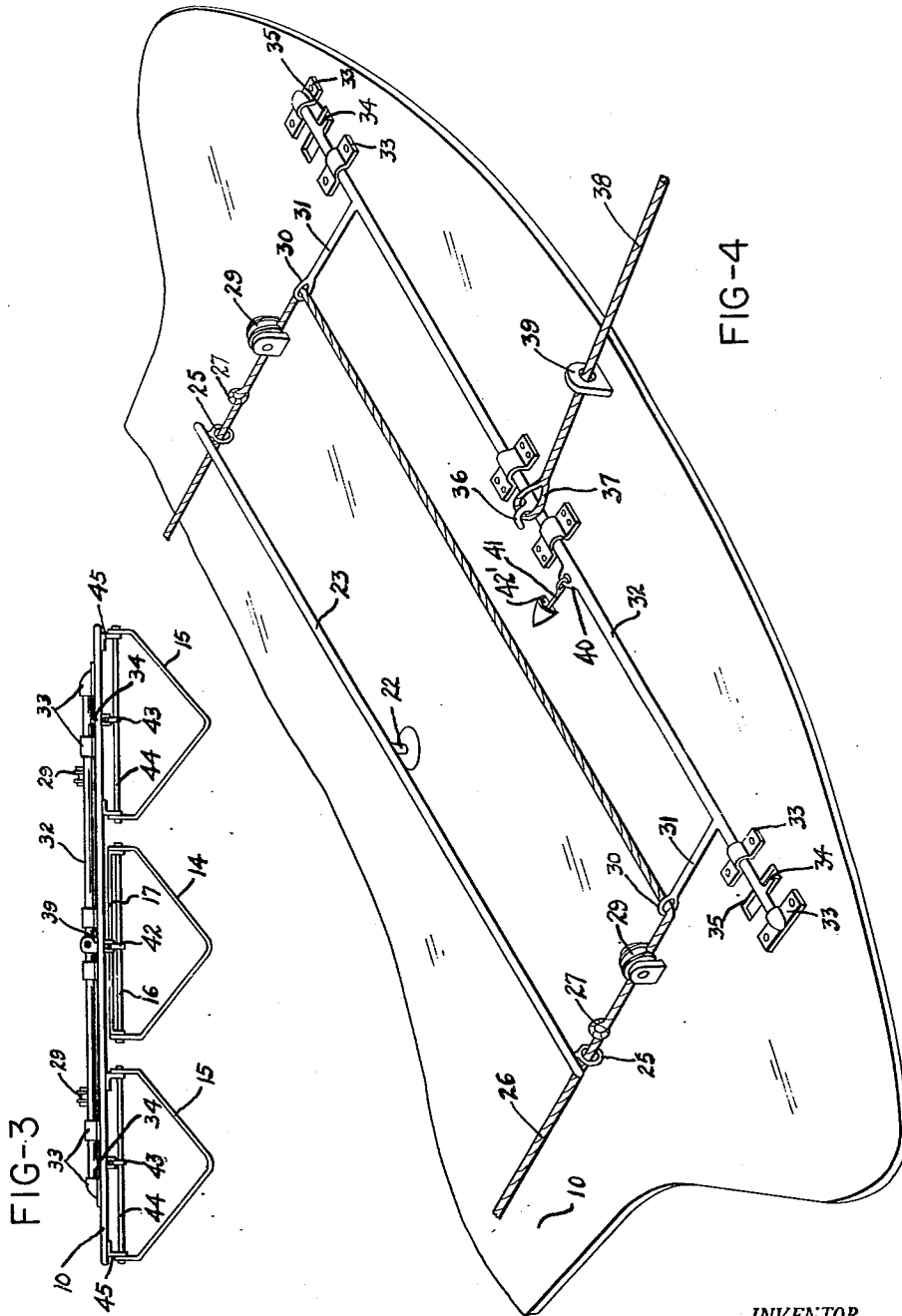


FIG-4

FIG-3

INVENTOR.  
OTTO L. KUEHN  
BY  
*Morsell + Morsell*  
ATTORNEYS

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O. L. KUEHN  
WATER VEHICLE

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3 Sheets-Sheet 3

FIG-6

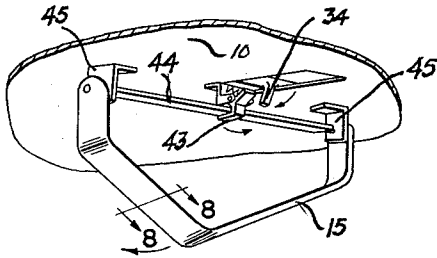


FIG-7

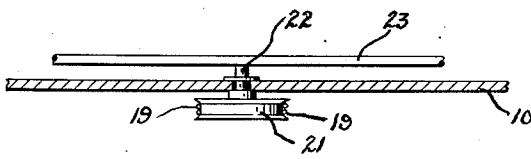
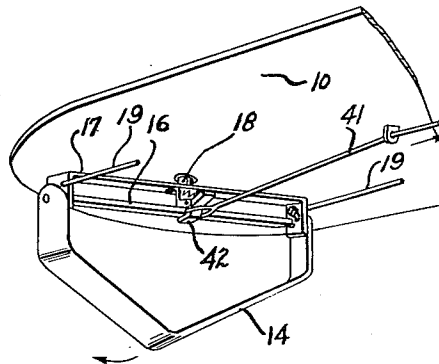


FIG-5

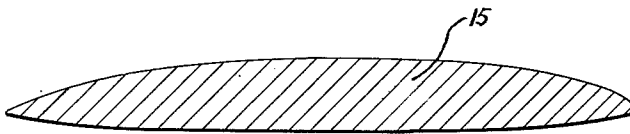


FIG-8

INVENTOR.  
OTTO L. KUEHN  
BY *Morsell & Morsell*  
ATTORNEYS

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2,815,518

**WATER VEHICLE**

Otto L. Kuehn, Hartland, Wis.

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11 Claims. (Cl. 9—21)

This invention relates to improvements in water vehicles, and more particularly to a surf board adapted to be ridden by a person while the surf board is being towed by a motorboat.

For aquatic sports and recreation, motorboat towed devices and vehicles such as water skis and surf boards have become increasingly popular and the same require a high degree of skill and dexterity on the part of the riders. The present invention aims generally at the provision of a novel type of water vehicle adapted to be towed at a moderate rate of speed by a motor-boat and to be ridden by a person in a standing, sitting or kneeling position while requiring skill, dexterity and alertness in the manipulation of the improved surf board.

A more specific object of the invention is to provide a towable water vehicle in the nature of a surf board equipped with hydro-foils which, depending upon the weight of the person riding the surf board and the rate of speed at which it is being towed, will permit the surf board to move a certain distance above the surface of the water, with only the hydro-foils gliding through the water, with the result that the rider receives a sensation of flying.

A further, more specific object of the invention is to provide a towable water vehicle which is equipped with means to permit its being maneuvered and steered while being towed, and which is equipped with release mechanism which will automatically disengage the surf board from the tow rope should the rider release a hand rope either voluntarily or accidentally as the result of a fall or capsizing.

A further object of the invention is to provide in a hydro-foil equipped surf board, operative connections between the tow rope release mechanism and the hydro-foils so that said hydro-foils will automatically swing to an out-of-the-way position against the bottom of the surf board when the release mechanism disengages the surf board from the tow rope.

A further, more specific object of the invention is to provide a towable water vehicle which may be steered by manually engaging hand ropes along the sides of the surf board when the rider is in a kneeling or standing position or which may be steered by means of a foot-operated tiller bar when the rider is in a sitting position.

A further object of the invention is to provide a towable water vehicle of a very novel character providing sport for the rider thereof, which has a unique action and rides substantially out of the water, which can be controlled and otherwise manipulated by the rider, and which is well adapted for the purposes described.

With the above and other objects in view, the invention consists of the improved towable water vehicle, and its parts and combinations as set forth in the claims, and all equivalents thereof.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views:

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Fig. 1 is a plan view of the improved surf board type of towable water vehicle;

Fig. 2 is an inverted plan view thereof;

Fig. 3 is a front view of the surf board on a reduced scale showing the positions of the hydro-foils;

Fig. 4 is an enlarged fragmentary perspective view of the front end of the surf board showing the release mechanism for the tow rope and the steering hand ropes and foot tiller;

Fig. 5 is a fragmentary sectional view taken approximately along the line 5—5 of Fig. 1 and showing the tiller and its sheave;

Fig. 6 is a fragmentary perspective view of a portion of the under surface of the surf board showing one of the front hydro-foils and the release mechanism therefor;

Fig. 7 is a fragmentary perspective view of the under surface of the rear end of the surf board showing the rear hydro-foil and its release mechanism; and

Fig. 8 is an enlarged sectional view through one of the foils, the view being taken approximately along the line 8—8 of Fig. 6.

Referring now more particularly to the drawings, it will appear that the improved water vehicle, in the nature of a towable surf board, consists of a relatively thin elongated board or panel member 10 formed of wood or other suitable material and shaped as shown in Figs. 1 and 2, being slightly tapered toward the rear end with an enlarged rounded front end portion.

Secured to the top surface of the surf board 10 rearwardly of the transverse median is a soft rubber pad 11 for the rider in a sitting or kneeling position to prevent slipping and to add to the comfort of the ride. If the rider is in a standing position his feet may be engaged by conventional water ski bindings 12 on opposite sides of the pad 11. Secured to the top surface of the board 10 on opposite sides of the pad 11 and ski bindings 12 are hand rails 13 which may be grasped when the rider is in a sitting position.

The under surface of the surf board 10 carries three hydro-foils which include a centrally located hydro-foil 14 at the rear under surface of the surf board, and two hydro-foils 15 which are mounted on the under surface of the surf board adjacent opposite margins of the enlarged front end of the surf board. Each hydro-foil is in the form of a V-shaped stirrup, as best shown in Figs. 3, 6 and 7, and Fig. 8 shows a sectional view through an arm portion of a hydro-foil, disclosing that the hydro-foil arms in cross section are somewhat pillow-shaped and are tapered toward their side margins.

The manner in which the rear hydro-foil 14 is mounted is shown most clearly in Fig. 7. There, it will be observed, that the opposite upper end portions of the hydro-foil arms are mounted on a pivot rod 16 which at its ends is journaled through the down-turned ends of an elongated U-bracket 17. The U-bracket 17 is centrally pivotally depended from the under surface of the rear of the surf board 10 by a pivot stud 18. The pivotal mounting of the rear hydro-foil 14 permits the surf board to be steered and maneuvered while it is being towed rearwardly of the motorboat. The rear end portions of extents of a steering cable 19 are anchored to opposite arm portions of the U-bracket 17, as shown in Figs. 2 and 7. From the U-bracket 17 these extents of the steering cable 19 extend forwardly along the under side of the surf board 10 and are guided about a pair of small pulleys 20 mounted on the under surface of the surf board forwardly of its transverse median. The cable is then wrapped several times about a large sheave 21 carried by a stub shaft 22 journaled through the surf board, and whose outer end portion, above the top sur-

face of the surf board, is secured to an intermediate portion of a transverse tiller bar 23 (see Figs. 1 and 4). Turnbuckles 24 in the extents of the steering cable 19 adjacent the under surface of the surf board, permit the steering cable to be tightened if necessary. The extreme outer ends of the tiller bar 23 carry integral depending eyed members 25 through which are passed opposite longitudinal extents of a hand rope 26 which extents are knotted forwardly of the eyed members 25, as at 27, so that a manual pull on either longitudinal extent of the hand rope 26 will bring a knotted portion 27 into impingement with the adjacent eyed member 25 to pivotally move the tiller bar 23 in a clockwise or counterclockwise direction. The rear ends of the side longitudinal extents of the hand ropes 26 are entirely free of the surf board and are grasped by the rider either singly or in conjunction with the hand-rails 13. Forwardly of the tiller bar 23 the side extents of the hand rope 26 engage pulleys 29 and then are threaded through the eyed extremities 30 of rearwardly projecting arms 31 which are integral with and carried by opposite end portions of a forward transverse rock bar 32. There is, therefore, a forward transverse extent of the hand rope 26 between the eyed extremities 30 of the rock bar arms 31.

Opposite end portions of the rock bar 32 are journalled in bearing brackets 33 which are spacedly mounted on the top front surface portion of the surf board 10. Opposite outer end portions of the rock bar 32 carry fingers 34 which, when the rock bar 32 is oscillated in a certain direction, are adapted to swing downwardly through openings 35 therefor in opposite sides of the forward end of the surf board for the purpose of operating certain front hydro-foil controlling mechanism shown in Fig. 6 and which will be explained more fully hereinafter.

The rock bar 32, intermediate its ends, is formed with a hook 36 which is normally rearwardly directed and which is engaged by the looped rear end portion 37 of an elongated releasable tow rope 38. The latter extends forwardly to the stern portion of a towing motor-boat to which the forward end of the tow rope 38 is attached. An upstanding apertured bracket plate 39 adjacent the front end of the surf board 10 guides the tow rope 38 and prevents the tow rope from pulling at an angle relative to the hook 36 as the surf board swings back and forth from side to side while being towed behind the motor-boat. When the looped portion 37 of the tow rope is disengaged from the rock bar hook 36, it will pass freely through the apertured bracket 39 to completely detach the surf board from the tow rope which is desirable should the surf board capsize or spill the rider who, in such an event, will manually release the hand rope 26 and thereby permit rocking movement of the rock bar 32, as will hereinafter be described.

An intermediate portion of the rock bar 32 also has formed thereon an eyed lug 40 to which is anchored the forward end of the rear hydro-foil operating cable 41. The latter extends slidably through a covered aperture 42' in the forward end of the surf board and said rear hydro-foil operating cable 41 then continues longitudinally of the under surface of the surf board (see Fig. 2) to a tripping latch 42 which is operatively associated with the rear hydro-foil 14. As will appear from Fig. 7, the tripping latch 42 is depended from the bracket 17 which pivotally carries the rear hydro-foil 14. The latch 42, which is spring loaded, normally engages the bar 16 so that under normal operating conditions said hydro-foil is retained in the position illustrated. When the hand rope 26 is released by the surf board operator, either intentionally or through a fall or capsize, the pull exerted by the tow rope 38 on the rocking bar 32 will then cause said bar 32 to rock forwardly through an angle of 180° because of the release of the rope 26 which normally holds the rocking bar in the position of Fig. 4. With the forward oscillation of

the rocking bar 32 and the disengagement of the tow rope from the hook 36 there will be a forward pull on the rear hydro-foil operating cable 41 which releases the spring loaded tripping latch 42 for the rear hydro-foil. The water pressure against the rear hydro-foil will then cause it to fold back against the under-surface of the surf board so as not to form an objectionable protuberance.

Similarly, the front hydro-foils 15 may be released so as to fold back against the under surface of the surf board when the hand rope 26 is manually released to permit a forward oscillation of the rocking bar 32 and a release of the tow rope 38. In this event, the two fingers 34 which are carried by the rock bar 32 immediately above the front hydro-foils swing downwardly through the openings 35 and press and manipulate the tongue portions of spring loaded latches 43 best shown in Fig. 6. These latches then disengage transverse pivotal bars 44 whose end portions are journalled in brackets 45 on the forward under-surface of the surf board. Said end portions of the pivotal bars 44 carry the opposite ends of the arms of the hydro-foils 15.

The legs defining the V-shape of each hydro-foil are at an angle of approximately 42° from horizontal in order that the lifting surface of the hydro-foils is gradually reduced as the entire surf board slowly rises out of the water while being towed by a motor-boat. Depending upon the weight of the person riding the surf board and the rate of speed at which it is being towed, the hydro-foils serve to substantially elevate the surf board relative to the surface of the water and in practice there may be only several inches at the bottom of the V-portion of each hydro-foil gliding through the water. The surf board proper and the upper portions of the hydro-foils will project above the surface of the water so that the rider of the surf board is actually gliding quite freely and receives the sensation of flying over the surface of the water.

If the rider of the surf board is in a standing position he will, of course, hold in his hands the opposite longitudinal extents of the hand rope 26. Through the knots 27 therein which engage the eyed extremities of the tiller bar 23, by pulling on one or the other extents of the hand rope the tiller bar is turned and through the engagement of the same with the large sheave 31 on which the steering cable 19 is wound, the rear U-bracket 17 to which the rear extremities of the steering cable 19 are attached and thus the rear hydro-foil 14 may be turned or pivoted in a horizontal plane to steer or otherwise maneuver the surf board. The rearward pull which the rider normally exerts on the hand rope 16 also serves to hold the rock bar 32 in its rearward position wherein the tow rope is maintained in an engaged position and the hydro-foil releasing members are held in normal position. There is sufficient slack in the rear hydro-foil operating cable 41 that it will not trip and release the latch 42 during steering pivotal movements of the rear hydro-foil.

To operate the surf board in a sitting position it is preferable to remove the hand rope 26 from the eyed extremities 25 of the tiller bar 23. The operator simply holds the side extents of the hand rope 26 tightly in his hands which also grasp the hand rails 13. The operator's feet engage opposite sides of the tiller bar 23 and thus the surf board may be steered or maneuvered by turning the rear hydro-foil through foot movement of the tiller bar. Should the operator, either in a standing, sitting or kneeling position, release the hand rope 26, then the rearward restraint on the rock bar 32 will be overcome and the pull on the tow rope 38 will cause the rock bar to oscillate forwardly as above described, releasing the tow rope so that the surf board will not be further towed by the motor-boat and at the same time the various latches for the hydro-foils will be released

so that the hydro-foils may fold back against the under-surface of the surf board. This is a very advantageous safety factor which is desirable should the rider fall off of the surf board or otherwise lose control thereof.

The improved towable water vehicle, in the nature of a surf board, is unique, eliminates hazards to the rider while affording amusement, and is otherwise well adapted for the purposes set forth.

What is claimed as the invention is:

1. A towable water vehicle, comprising a flat board member, hydro-foils operatively mounted on undersurface portions of the board and steering control members for said hydro-foils located on the front portion of the board.

2. A towable water vehicle, comprising a flat board member, a hydro-foil secured to and underlying the front end portion of the board member, a hydro-foil pivotally mounted on the rear undersurface portion of the board, and a steering tiller bar located on the top surface of the front portion of the board, and means extending along the undersurface to the rear hydro-foil to pivotally move the same.

3. A towable water vehicle, comprising a flat board member, hydro-foils movably mounted on the undersurface of the board member, a tow rope engaging and releasing member operatively mounted on the forward end portion of the board, and means accessible from the top surface of the board for releasably maintaining the tow rope engaging and releasing member in its engaging condition.

4. A towable water vehicle, comprising a flat board member, hydro-foils movably mounted on the undersurface of the board member, a tow rope catch mounted on the forward end portion of the board for fore and aft movement, a tow rope engaged at its rear end by said catch and exerting a forward pull on the catch to urge it toward its releasing position, and a manually engageable member extending rearwardly of said tow rope catch which when pulled rearwardly overcomes the forward pull by the tow rope on the catch to thereby releasably maintain the catch in its aft, tow rope engaging position.

5. A towable water vehicle, comprising a flat board member adapted to receive a rider, a movable tow rope catch operatively mounted on the forward end portion of the board member, said catch being adapted to releasably receive the looped rear end portion of a tow rope which, when the pull thereon is unrestrained moves the catch to tow rope releasing position, and a control member connected to the catch and extending therefrom opposite to the direction of extent of the tow rope to be engaged by the rider of the board to restrain the catch against being pulled to releasing position by the tow rope.

6. A towable water vehicle, comprising a board member adapted to hold a rider, a transverse rod oscillatably mounted on the front end portion of the board and being formed with an integral hook to engage the looped rear end of a forwardly extended tow rope when the rod is turned and held in a position wherein the hook is rearwardly directed, an unrestrained forward pull on the hook by the tow rope causing the rod to oscillate to direct the hook forwardly to a tow rope releasing position, and a hand rope connected to the bar and extending rearwardly to be releasably engaged by the rider of the board to hold the rod in a position with the hook directed rearwardly against the forward pull exerted by the tow rope.

7. A towable water vehicle, comprising a flat board member, a pair of laterally spaced front hydro-foils movably mounted on the front undersurface of the board to swing in a plane perpendicular to the plane of the board, a rear hydro-foil movably mounted on a rear undersurface portion of the board to pivot in a plane parallel to the plane of the board and to swing in a plane perpendicular

to the plane of the board, steering mechanism extending from the top of the board to said rear hydro-foil to pivot the same, a tow rope catch mounted on the forward end portion of the board for fore and aft movement, said catch being releasably engageable with a tow rope which when exerting a forward unrestrained pull on the catch urges it toward its forward tow rope releasing position, means operatively connected with said catch and controlled by forward movements thereof for swinging said hydro-foils in a plane perpendicular to the plane of the board, and a manually engageable member extending rearwardly of the tow rope catch to restrain forward movement of the latter.

8. In a water vehicle of the surf board type, a board member for a rider, a tow rope catch operatively mounted on the front end portion of the board member and normally urged to tow rope releasing position by an unrestrained pull thereon exerted by an engaged tow rope, and manual means extending to the rider's station on the board to hold the tow rope catch in tow rope retaining position against the pull exerted by the tow rope.

9. In a water vehicle of the surf board type, a board member for a rider, hydro-foils underlying portions of the board member, one of said hydro-foils being turnable for steering purposes, a steering cable extended to said turnable hydro-foil, a tow rope catch operatively mounted on the front end portion of the board member and normally urged to tow rope releasing position by an unrestrained pull thereon exerted by an engaged tow rope, and a control rope connected to said catch and extending to the rider's station on the board to hold the tow rope catch in tow rope retaining position against the pull exerted by the tow rope, said control rope being connected with the steering cable.

10. A towable water vehicle, comprising a board member adapted to hold a rider, hydro-foils swingably mounted on the undersurface of the board, spring loaded latches releasably engageable with said hydro-foils to normally hold the same substantially perpendicular to the plane of the board, a tow rope catch movably mounted on the front end portion of the board having a tow rope engaging position and a tow rope releasing position, said catch being adapted to be engaged by the rear end of a tow rope which when the forward pull exerted thereby is unrestrained moves said catch to tow rope releasing position, a hand rope connected to the catch and extending rearwardly to be releasably engaged by the rider of the board to hold the catch in tow rope retaining position against the forward pull exerted by the tow rope, and means operatively connected with the hand rope and extending to the hydro-foil spring loaded latches to release the same from the hydro-foils when the pull exerted by the tow rope on its catch is unrestrained by the hand rope.

11. A towable water vehicle, comprising a board member adapted to hold a rider, hydro-foils vertically swingably mounted on the undersurface of the board, one of said hydro-foils also being horizontally turnable for steering purposes, spring loaded latches releasably engageable with said hydro-foils to normally hold the same substantially perpendicular to the plane of the board, a tow rope catch oscillatably mounted for fore and aft movement on the front end portion of the board having a rear tow rope engaging position and a forward tow rope releasing position, said catch being adapted to be engaged by the rear end of a tow rope which when the forward pull exerted thereby is unrestrained moves said catch to its forward tow rope releasing position, a hand rope connected to the catch and extending rearwardly to be releasably engaged by the rider of the board to hold the catch in its rear tow rope retaining position against the forward pull exerted by the tow rope, means operatively connected with the hand rope and extending to the hydro-foil spring loaded latches to release the same from the hydro-foils when the pull exerted by the tow rope on its

catch is unrestrained by the hand rope, and steering mechanism connected with said horizontally turnable hydro-foil.

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