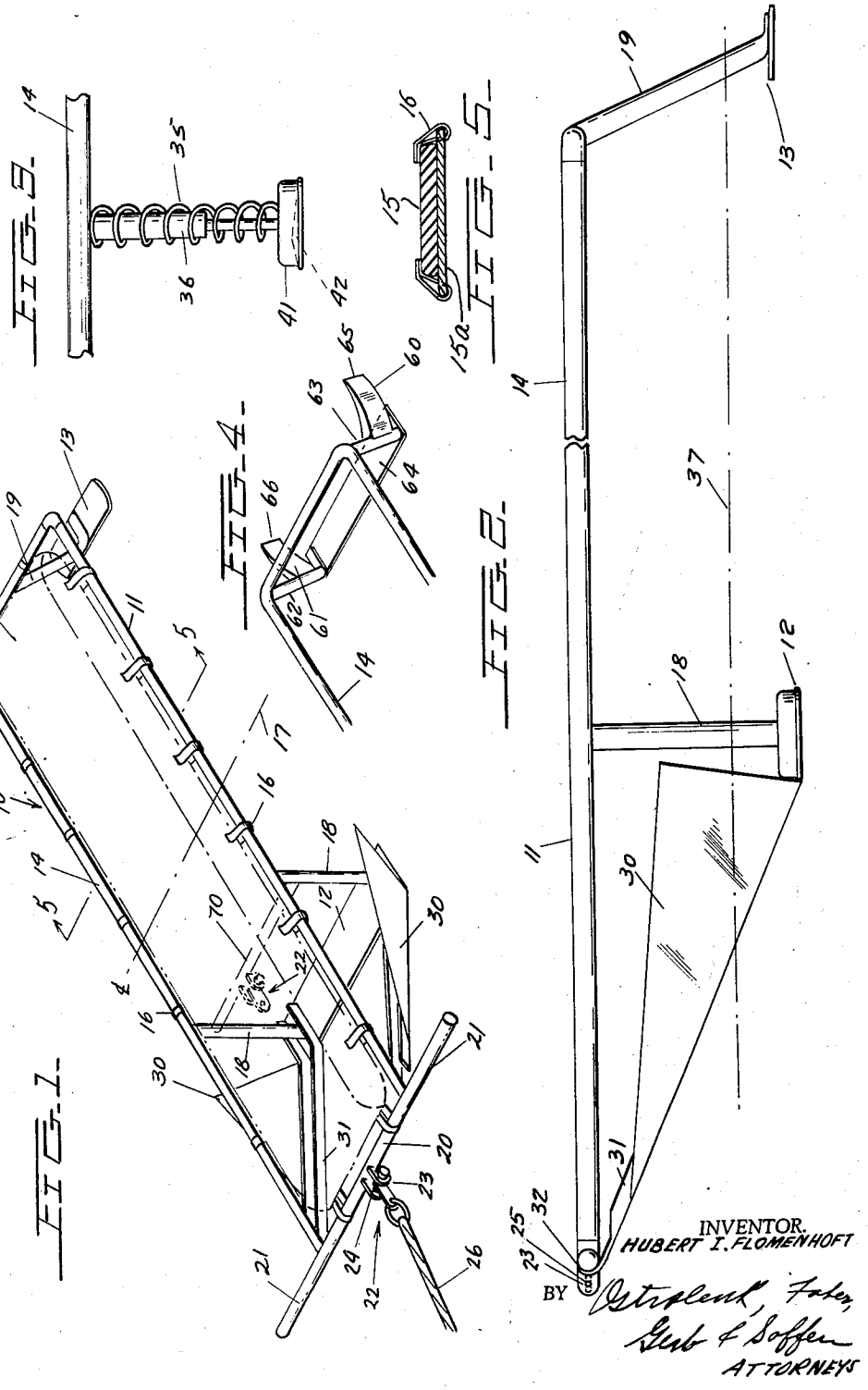
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HYDROFOIL CRAFT

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HYDROFOIL CRAFT

Hubert I. Flomenhoft, Massapequa Park, N.Y.

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This invention relates to a hydrofoil craft and more particularly to a hydrofoil craft that is adapted for the high-speed towing of human beings above the water's surface by carrying the body on a platform supported on hydrofoils.

The instant invention is useful as a sporting device which will provide the rider with many thrills. Even persons who have had no previous experience with aquatic sporting devices will readily adapt to the use of my hydrofoil craft without the extensive instructions and practice required before most other aquatic devices may be used with confidence.

Furthermore, my hydrofoil craft is particularly useful in high-speed dropoffs and pickups of the Navy's underwater-demolition-team swimmers.

The hydrofoil craft comprises a substantially flat body support having a main and a secondary hydrofoil depending therefrom with the main hydrofoil being positioned forward of center and the secondary hydrofoil being positioned near the stern. A cross-bar is positioned at the forward end of the body support with the ends of the cross-bar extending beyond both sides of the body support to provide hand grips for the rider who rides grasping the handgrips, while his chest rests on the support much in the manner of a person riding a sled. The rider may also attach ropes to the handgrips, and, holding these ropes, may learn to ride on my hydrofoil craft in a kneeling or standing position.

When the craft is being towed, the motion of the hydrofoils through the water causes the water to exert an upward force on the hydrofoils, thereby raising the hull out of the water to reduce drag and water impact loads, thus reducing the required towing force and enabling the rider to be towed at high speed. The rider may maneuver the craft by leaning toward the desired direction of turn.

Outwardly extending and upwardly inclined stabilizers, extend from the forward end of the body support to the main hydrofoil to provide stability against roll and pitch and also to deflect spray away from the rider's head.

In order to reduce the shock forces of the bumps from being transmitted undiminished to the rider, the body support may include an inflatable mat or the main hydrofoil may be connected to the body support by means of flexible struts. More elaborate designs would replace the struts by springs or a spring, shock-absorber combination.

The body support of the hydrofoil craft having two hydrofoils is usually substantially the length of a human body. However, the construction of the hydrofoil craft is such that for light loads, or where lessened stability can be tolerated, the secondary hydrofoil may be eliminated. A further modification may be made by shortening the body support to less than half the length previously noted so that only the rider's chest rests thereon. Still further modifications are possible so that ultimately the hydrofoils will be all but secured directly to the human body.

Accordingly, a primary object of my invention is to provide a hydrofoil craft for the high-speed towing of humans to be used as an aquatic sporting device.

Another object is to provide a hydrofoil craft having handgrips which enable the rider to ride with his chest in contact with the body support.

Still another object is to provide a shock-absorbing mounting for the hydrofoil.

A further object is to provide pitch and roll stabilizers which also act as spray deflectors.

A still further object is to provide a body support comprising an inflatable mat supported by a tubular framework.

Yet another object is to provide a hydrofoil craft having a quick-release tow-line connector.

Still another object is to provide turning means whereby a hydrofoil craft may be steered by merely rolling the frame thereof.

These and other objects of my invention will become more apparent after reading the description of the accompanying drawings in which:

Figure 1 is a perspective view of my hydrofoil craft with the riding surface shown in phantom.

Figure 2 is a side elevation of my hydrofoil craft with the riding surface detached.

Figure 3 is a fragmentary view of a resilient mounting for a hydrofoil.

Figure 4 is a fragmentary view of my hydrofoil craft having a turning means secured at the stern thereof.

Figure 5 is a cross-sectional view taken from line 5—5 of Figure 1 showing a modified form of cushion support.

Referring to the figures, hydrofoil craft **10** comprises a thin, platform-like body support **11** having a main hydrofoil **12** and a secondary hydrofoil **13** both depending from body support **11** which is approximately as long as the average human body. Body support **11** includes a rectangular framework **14** which is preferably formed of aluminum tubing. Riding surface **15**, comprising an inflatable mat or foam-rubber type cushion, is secured within framework **14** by means of straps **16** so as to provide a soft surface to contact the rider's chest. However, riding surface **15** may comprise a canvas or synthetic fabric in the form of a single sheet or in the form of criss-crossed strips. Also, as seen in the cross-sectional view of Figure 5 riding surface **15** may be mounted on a rectangular wood or metal sheet **15***a* instead of within a framework. If the rider's comfort is not of particular concern the body support may comprise a wood or metal sheet without a cushion.

The main hydrofoil **12** is positioned forward of the transverse center line **17** of body support **11** and is positioned with respect to framework **14** and secured thereto by means of struts **18** which are secured to both of the long sides of framework **14**. Secondary hydrofoil **13** is positioned at the stern and is secured to framework **14** by means of strut **19**. Cross-bar **20** is positioned at the bow with the ends thereof extending beyond the long sides of body support **11** to provide grips **21** which are grasped by the rider of hydrofoil craft **10**.

Tow-line connection **22** is secured to cross-bar **20** and includes a U-shaped bracket **23**. Quick-release pin **24** is removably inserted through openings **25** located near the free ends of the U-arms and is adapted to readily disconnect hydrofoil craft **10** from tow line **26** should the rider be confronted by an emergency. Tow-line connection **22** may also be attached to the struts **18** by means of another cross-bar **70** in order to position the point of pull closer to the center of gravity of the system to increase maneuverability.

Stabilizers **30** extend from the bow of body support **11** downward to main hydrofoil **12** and are used to reduce pitch and roll as well as deflect water spray away

from the rider's head. Each stabilizer 30 comprises a substantially flat triangular member which is secured to a support runner 31 and posiitoned to extend outwardly of framework 14 and upwardly from main hydrofoil 12 and preferably not any higher than framework 14.

A turning means comprising rudders 60, 61 is illustrated (Figure 4) as being mounted to struts 62, 63 respectively which secure secondary hydrofoil 64 at the stern of framework 14. Rudders 60, 61 are positioned so that their trailing edges 65, 66 respectively diverge so that hydrofoil craft 10 may readily be turned either to the left or right. Rolling hydrofoil craft 10 to one side submerges one rudder and lifts the other out of the water, thereby creating a net turning force.

Rudders 60, 61 may also be mounted to support runners 31 extending to main hydrofoil 12 or to struts 18 which secure main hydrofoil 12 to framework 14.

Support runner 31 is secured to framework 14 by a non-rigid connection 32 in order to accommodate flexing of main hydrofoil struts 18 when they are constructed as flexible members so as to absorb shocks. As seen in Figure 3, main hydrofoil struts 18 may be replaced by springs 35 to provide for better cushioning. In more refined models shock absorbers 36 may also be interposed between framework 14 and end members 41 secured to each end of hydrofoil 42. It is to be noted that hydrofoils 12 and 13 may have curved upper surfaces, as does hydrofoil 42, rather than being flat members as illustrated.

When tow line 26 is secured to a towing vessel and the hydrofoil craft 10 is moving along at a high speed, which may be in the order of 20 to 40 knots or above, the rapid flow of water past the hydrofoils 12, 13 will cause an upward force thereon of sufficient magnitude so as to lift body support 11 above the water's surface 37. With the body support 11 out of the water, drag is considerably reduced so that the towing force may also be reduced.

The inclusion of hydrofoils both fore and aft is especially effective in reducing pitch while the stabilizers 30 are most effective in reducing roll but also contribute a great deal toward reducing pitch. Since stabilizers 30 are outwardly inclined they will deflect spray away from the rider's head toward the stern.

Secondary hydrofoil 13 may be eliminated and body support 11 will still ride above the water's surface 37. However, the skill required of the rider is increased as will be the thrills experienced by him. With the elimination of the secondary hydrofoil body support 11 may be reduced to approximately half body length.

In the foregoing, I have described my invention only in connection with preferred embodiments thereof. Many variations and modifications of the principles of my invention within the scope of the description herein are obvious. Accordingly, I prefer to be bound not by the specific disclosure herein but by the appending claims.

I claim:

1. A hydrofoil craft comprising a thin platform-like body support and a main hydrofoil secured to said body support in spaced relationship and positioned forward of the transverse centerline of said body support, said body support comprising a frame and a riding surface secured within said frame, a pair of stabilizers having one side extending from each side of said main hydrofoil to each side of said frame at the bow, said stabilizers being inclined upwardly from said main hydrofoil and outwardly inclined from the sides of said frame, said hydrofoil craft being adapted to be towed through the water at high speed while carrying a human being with the water exerting an upward force on said main hydrofoil sufficient to cause the body support and the rider's body to ride clear of the water's surface.

2. The hydrofoil craft as set forth in claim 1 in which the frame comprises a tubular member formed to a substantially rectangular shape with the longer dimension of the rectangle being substantially equal to the length of the human body.

3. The hydrofoil craft as set forth in claim 1 also including a secondary hydrofoil secured in spaced relationship to the body support at the stern.

4. A hydrofoil craft comprising a thin platform-like body support and a main hydrofoil secured to said body support in spaced relationship and positioned forward of the transverse centerline of said body support, said body support comprising a frame and a riding surface secured within said frame, said hydrofoil craft being adapted to be towed through the water at high speed with the water exerting an upward force on said main hydrofoil sufficient to cause the body support and a rider carried thereon to ride clear of the water's surface, grips extending outwardly from the sides of the hull at the bow to provide handgrips for the rider, a pair of stabilizers comprising substantially flat triangular members having one side extending from each side of said main hydrofoil to each side of said frame at the bow, said stabilizers being inclined upwardly from said main hydrofoil and outwardly inclined from the sides of said frame.

5. The hydrofoil craft as set forth in claim 4 which also includes a tow-line connecting means, having a quick-release means, secured to the hull at the bow.

6. A hydrofoil craft comprising a thin, platform-like body support and a main hydrofoil secured to said body support in spaced relationship and positioned forward of the transverse centerline of said hull, said body support comprising a frame and a riding surface secured within said frame, said hydrofoil craft being adapted to be towed through the water at high speed with the water exerting an upward force on said main hydrofoil sufficient to cause the hull to ride clear of the water's surface, a pair of stabilizers comprising substantially flat triangular members having one side extending from each side of said main hydrofoil to each side of said frame at the bow, said stabilizers being inclined upwardly from said main hydrofoil and outwardly inclined from the sides of said frame.

7. A hydrofoil craft comprising a thin, platform-like body support, a main hydrofoil, a secondary hydrofoil, a pair of stabilizers; said body support comprising a frame and a riding surface secured within said frame; said frame comprising a tubular member formed to a substantially rectangular shape; said main and said secondary hydrofoil being secured to said frame in spaced relationship thereto; said main hydrofoil being operatively positioned forward of the transverse centerline of said body support and said secondary hydrofoil being operatively positioned at the stern so that the body support will ride clear of the water's surface when said hydrofoil craft is moving through the water at high speed; said stabilizers being positioned at each end of said main hydrofoil and extending toward the bow; said stabilizers being inclined upwardly from the main hydrofoil and outwardly from each long side of said frame to provide stability against pitch and roll; grips extending from each of said long sides and positioned at the bow; a towline connecting device including a quick-release means secured to said bow, a turning means comprising a pair of rudders depending from said body support, said rudders being positioned with their trailing edges diverging so that a steering force will be exerted on said hydrofoil craft when one of said rudders is clear of the water and the other is submerged therein.

8. A hydrofoil craft comprising a platform-like body support and at least one hydrofoil depending therefrom so that said body support will ride clear of the water's surface when said hydrofoil craft is towed through the water, a turning means comprising a pair of rudders depending from said body support, said rudders being positioned with their trailing edges diverging so that a steering force will be exerted on said hydrofoil craft when

one of said rudders is clear of the water and the other is submerged therein.

9. The hydrofoil craft as set forth in claim 8 in which the body support comprises a sheet member.

10. The hydrofoil craft as set forth in claim 8 in which the body support includes a cushion.

11. The hydrofoil craft as set forth in claim 10 in which the body support includes a sheet member with the cushion being supported thereon.

12. A hydrofoil craft comprising a platform-like body support and at least one hydrofoil depending therefrom so that said body support will ride clear of the water's surface when said hydrofoil craft is towed through the water, a tow line connecting means secured to said body support and operatively positioned near the center of gravity of a system comprising said hydrofoil craft and a load being carried thereon, and a turning means comprising a pair of rudders depending from said body support, said rudders being positioned with their trailing edges diverging so that a steering force will be exerted on said hydrofoil craft when one of said rudders is clear of the water and the other is submerged therein.

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