

Invention Disclosure

Inventors: John C. Ratliff and Brian L. Ratliff
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Address: 855 NW Winged Foot Terrace
Beaverton, OR 97006

Title of Invention: Hammerhead Swimming Unit

Swimming underwater has always been dependent upon special swimming techniques. With the invention of the swim fin, divers were able to efficiently swim underwater both with and without scuba. Usually this involved using the “flutter kick” for balance, whereby as one foot went down, the other went up. Usually this swimming technique also involved only the diver’s legs, allowing the arms to trail or be held in front of the diver. While this technique has worked well for decades, it limits the diver’s ability to provide propulsion with his or her arms and the rest of the diver’s body.

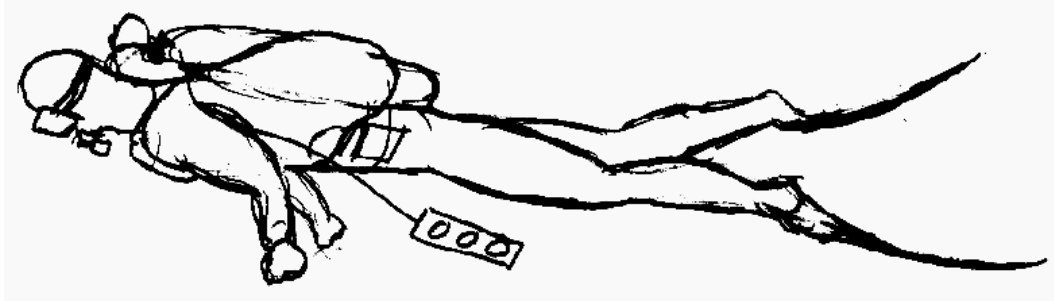
More recently, a new underwater sport called finswimming incorporated new techniques for underwater swimming. This involved using a “monofin,” or one fin for both feet, to provide a greater surface area for propulsion. Because both legs were held together by the monofin, the technique used for swimming was what is known as the “dolphin kick.” This kick involved using the up and down motion of both legs together to provide propulsion, with the upper body being held as straight as possible with the arms held in front of the finswimmer/diver. For competition, a small scuba bottle and regulator are held in front of the diver for streamlining.

This current invention has been under development by the senior inventor for twenty years, in incorporates the dolphin kick along with a fin or wing design to stabilize the dolphin kick. It works for the finswimmer/diver in a similar manner as a bicycle’s handlebars provide torque to a bicyclist’s ability to apply force to the pedals by providing a handle and fin against which the finswimmer/diver can push to gain more torque for the dolphin kick. In addition, because of the fluid dynamics of the fin/wing, there is forward propulsive force provided from this “hammerhead swimming unit” itself. Whereas the finfinswimmer tries to hold his or her body rigid, the finswimmer/diver with the hammerhead unit actively moves the unit up and down in a wave motion with his/her body and fin(s). This unit works with any combination of fins, e.i. monofins or “bi-fins” (one fin for each foot) when using the dolphin kick. Because of the additional surface area for propulsion, there should be a corresponding increase in the finswimmer’s or diver’s velocity.

The device has four parts. The first is the two wings/fins, which are independent of each other. They are connected by a metal rod and a spacer, and attached to each other by any arrangement which allows the two to rotate independently of each other. This allows easy turns, loops, or movement side-to-side of the unit. The handles are angled up from the fin in such a way as to keep the finswimmer/diver’s hands in a neutral, thumb-up position. The finswimmer/

diver “flys” the unit. By angling the hammerhead unit up, down, or in opposition to each other for turns, the finswimmer/diver can swim in and direction easily in three dimensions.

Drawing of the Hammerhead Unit

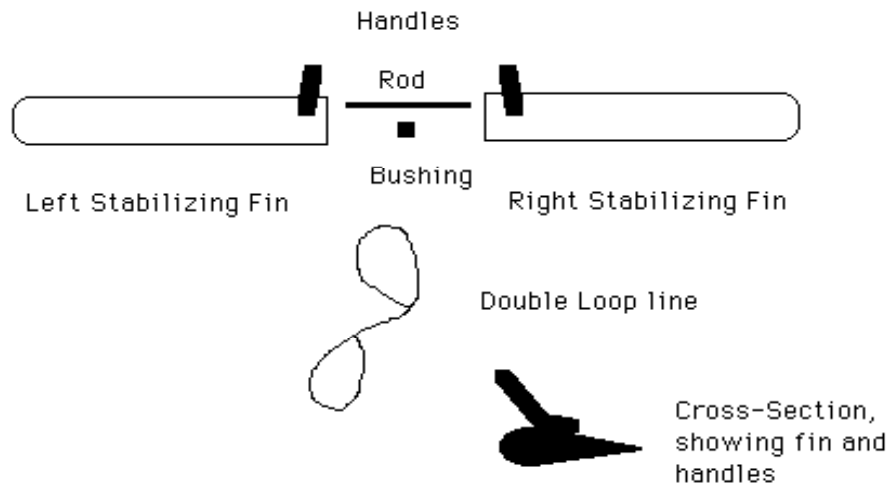


Today's diver

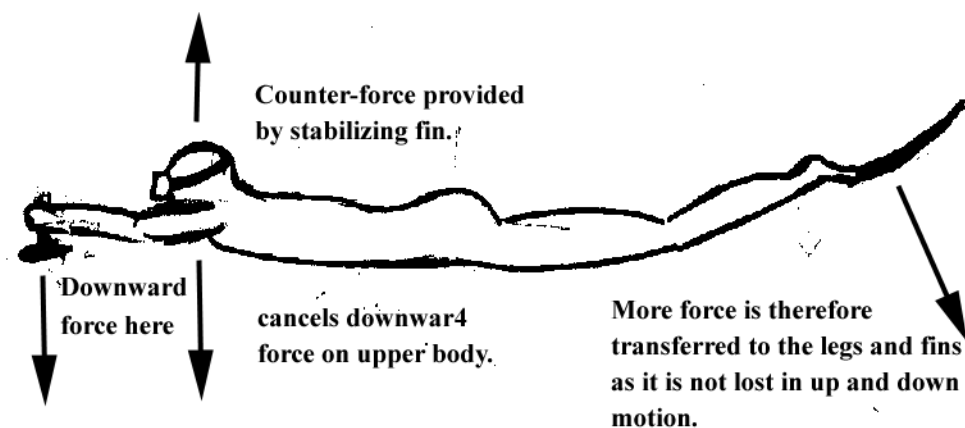


Diver with the Hammerhead Unit

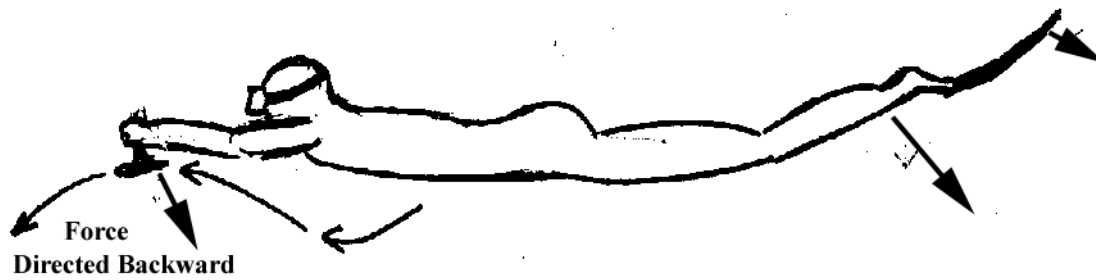
This shows the advantages of using the Hammerhead Unit as a streamlining device. The arms extended in front lengthen the diver's profile, and by removing the trailing arms the diver has less drag too.



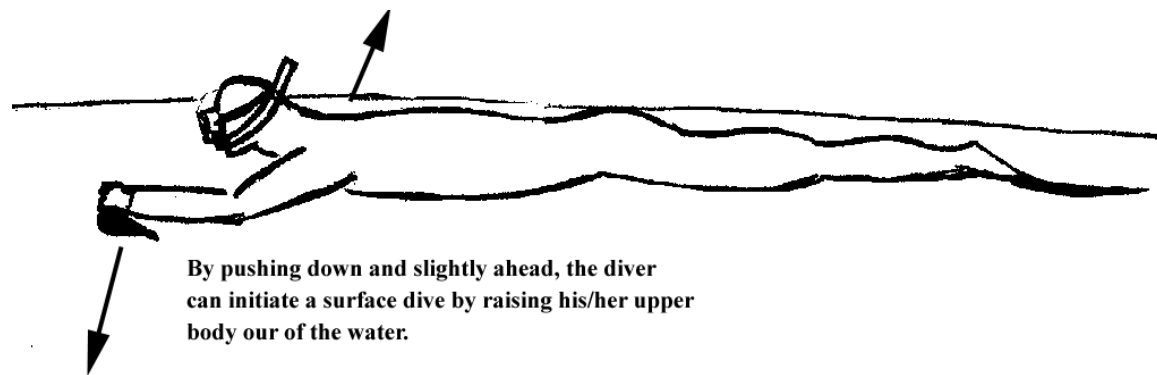
The above diagram shows the simplicity of the Hammerhead Unit.



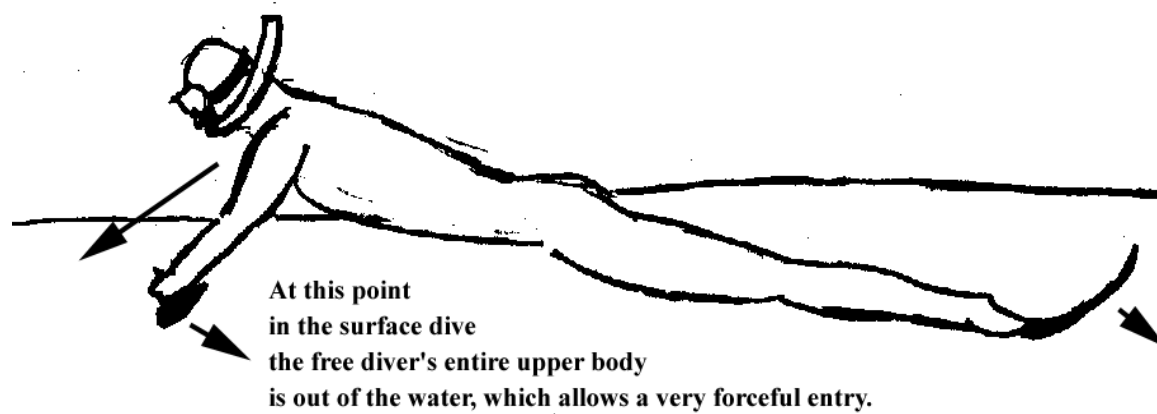
Swimming with the Hammerhead Unit is easy, and allows the unit to cancel out the forces created by the dolphin kick.

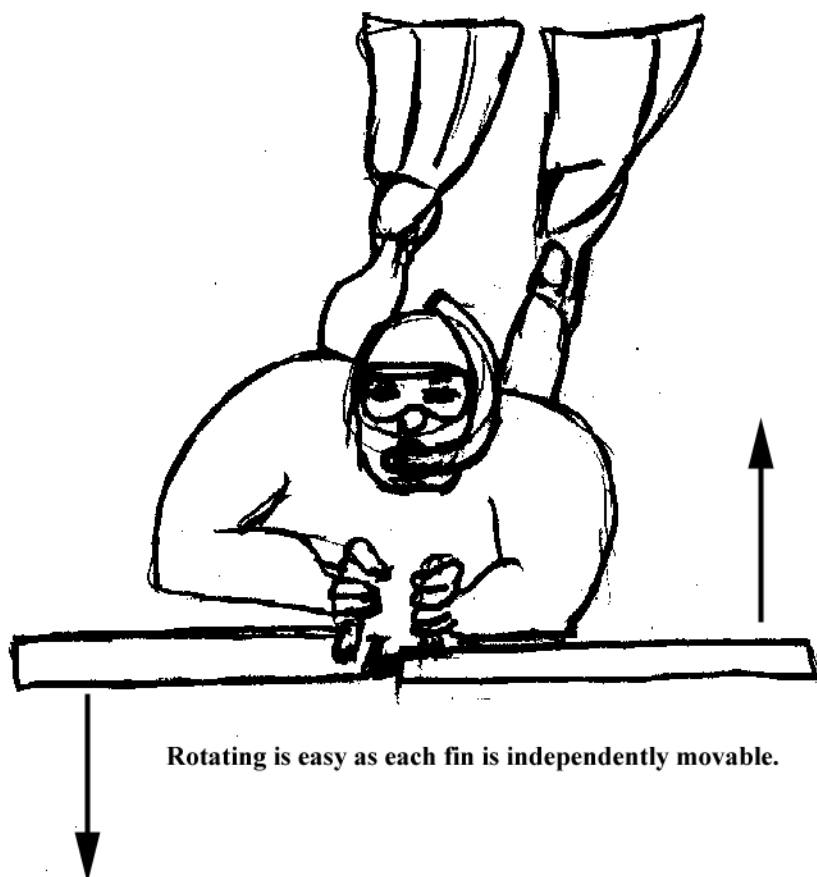


The Hammerhead Unit itself provides forward force using the wing design.



By pushing down, an upward force is also created on the surface for a very effective surface dive.





Rotating is easy as each fin is independently movable.

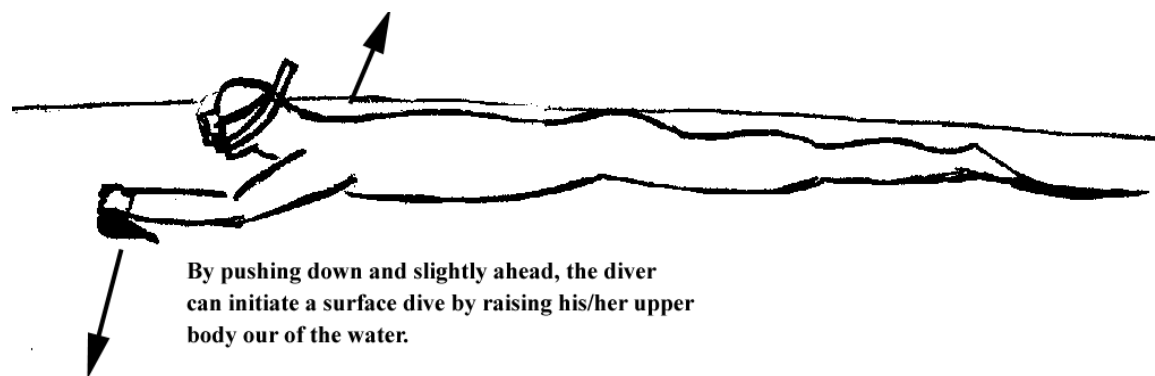
Because each wing is independently rotated, the Hammerhead Unit design will allow the diver to turn easily in the water.

Additional Claims

In addition to these advantages, the Hammerhead Unit can be used to effectively swim by persons with physical handicaps which either limit their ability to use their legs, or for those with amputations of the legs (symmetrical amputations would be best served by the Hammerhead Unit).

Paraplegic Swimmer

For those individuals who have limited to no use of their legs, the Hammerhead unit can provide the ability to move efficiently forward in the water. By using only the Hammerhead unit, instead of a dolphin kick (undulating the body to provide for the dolphin kick), the finswimmer/diver actually moves the legs up and down independent of effort by the individual. Longer fins, or fins with a "scoop" design, will benefit most from this motion, but all fins will work to some extent. Pushing the Hammerhead Unit down (toward the bottom) results in an equal and opposite movement of the upper torso, but also a movement down of the legs. Pulling the Hammerhead Unit up also results in an equal and opposite movement of the torso, which results in movement up of the legs. In combination, once a rhythm is established, there will be movement up and down of the legs in response to the movement of the Hammerhead Unit. Thus the use of the Hammerhead Unit will provide a swimming "stroke," even without muscular control of the legs. This would enable a paraplegic to have a swimming stroke in the water. It is not as efficient as a person with the use of his/her legs, but it does occur and allow forward progress. The following drawings will illustrate this effect.

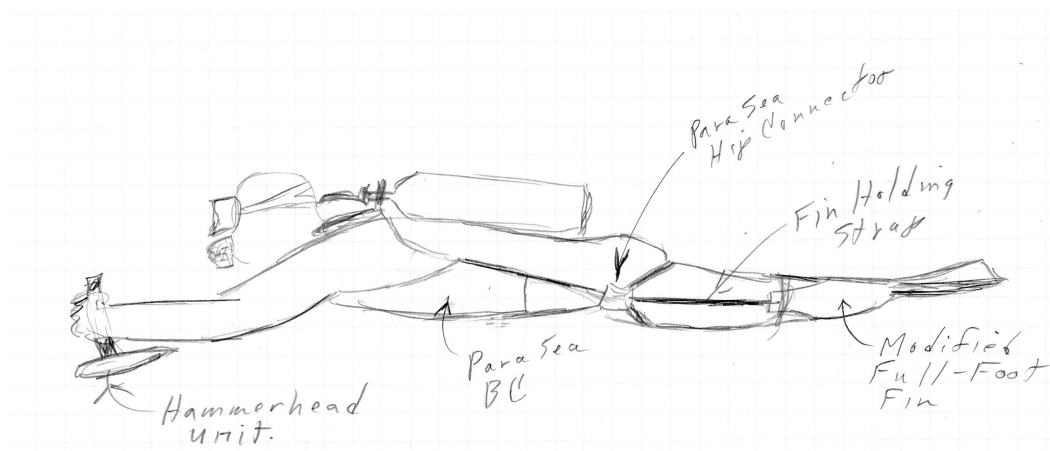


For a handicapped diver who has no movement below the waist, the push down can also translate into a push up of the feet. This is independent of conscious movement of the handicapped swimmer/diver. This is simple physics of equal and opposite direction movements. This movement is also somewhat magnified by the length of the legs. It will be different on each person, and affected by whether the legs are straight or bent. The type and length of fins on the feet also influence this effect.

Double Amputee

The double amputee can theoretically achieve great swimming velocity underwater with the Hammerhead Unit. Because the amputee swimmer would retain muscular control of the lower part of his or her body, the dolphin kick could be efficiently employed, and the amputee finswimmer/diver could theoretically obtain velocities in the water equivalent of non-amputee finswimmers/divers.

The Para-Sea BC concept can be modified to provide attachment points for a set of fins on the amputee finswimmer/diver. These would be attachments to the leg and/or cross strap on the inside, and the hip connector on the outside of each upper leg. Longer fins would allow for a more efficient dolphin kick, and the use of the Hammerhead Unit would give great streamlining as well as control over the underwater "flight" experience. The following are drawings of this concept for the double amputee finswimmer/diver.



Inventor(s)

John C. Ratliff

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John C. Ratliff