

Nov. 22, 1966

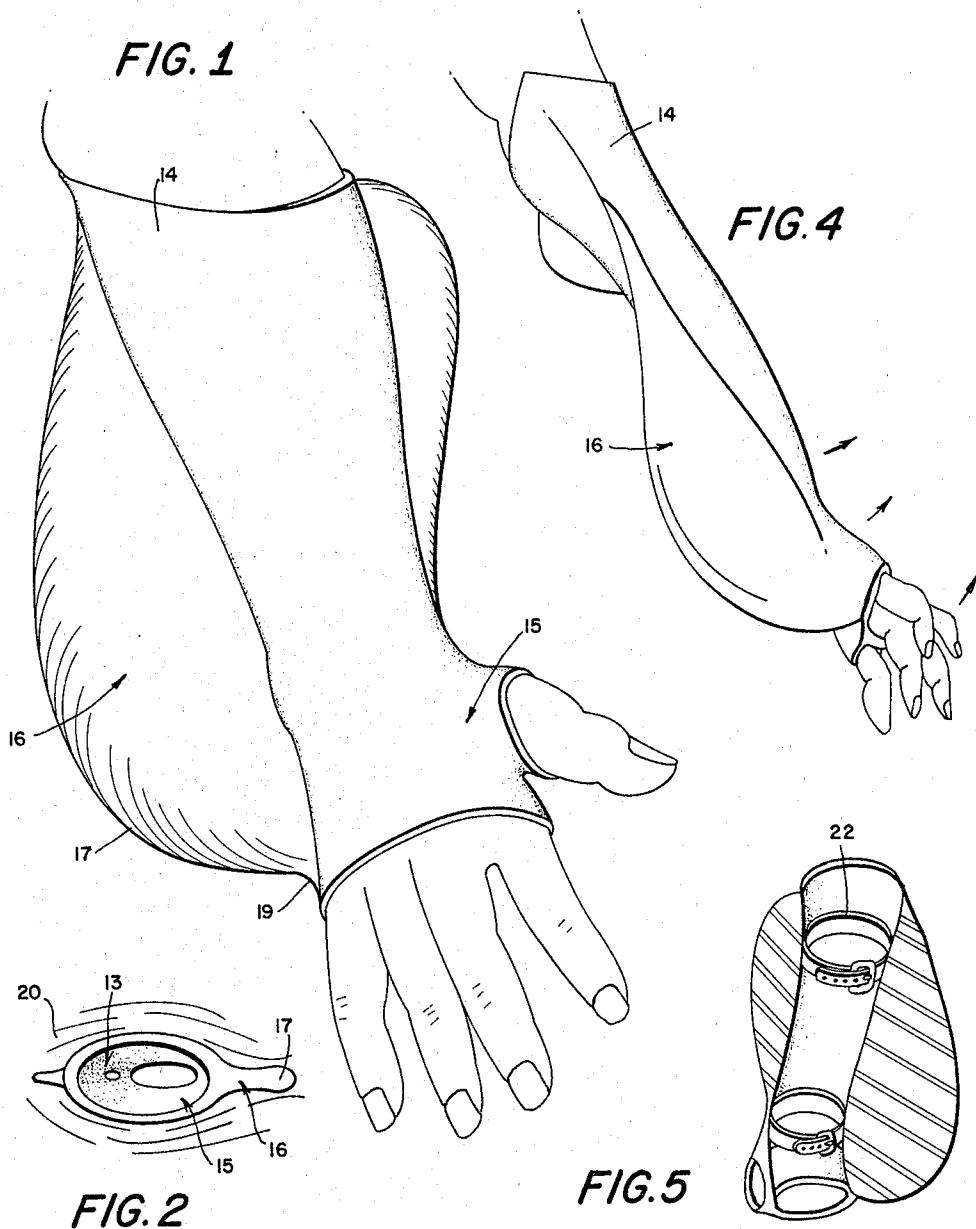
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3,286,287

BODY FINS FOR SWIMMERS

Filed Aug. 27, 1964

3 Sheets-Sheet 1



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FIG. 3

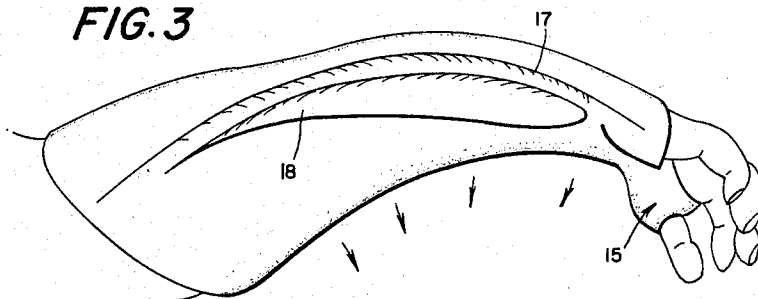


FIG. 6

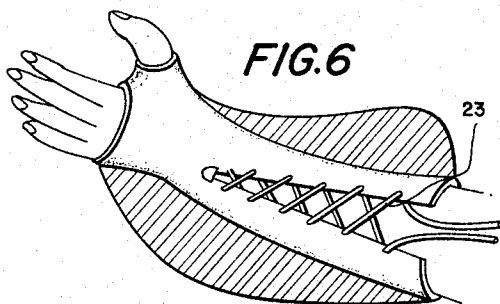


FIG. 7

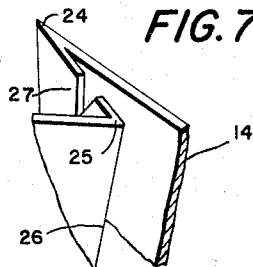


FIG. 8

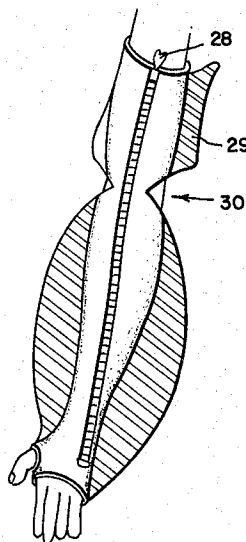
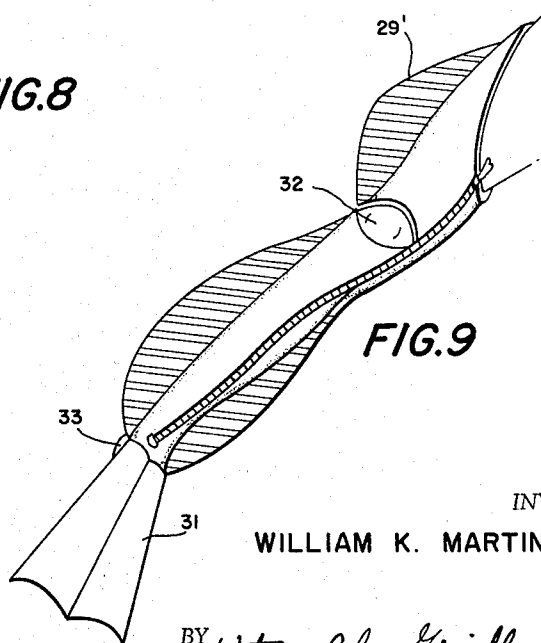


FIG. 9



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FIG. 10

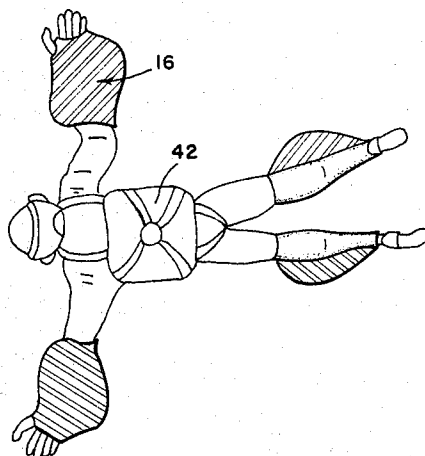
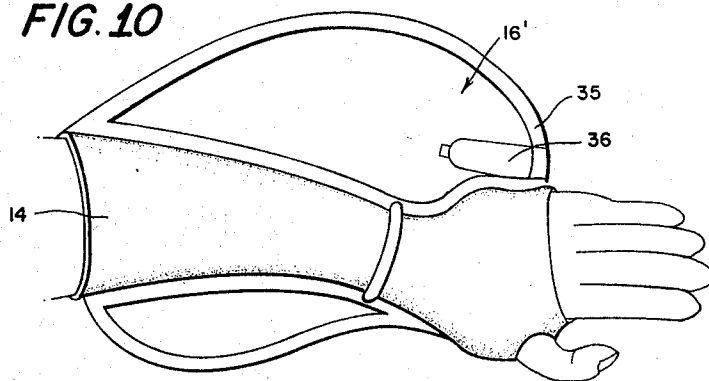


FIG. 12

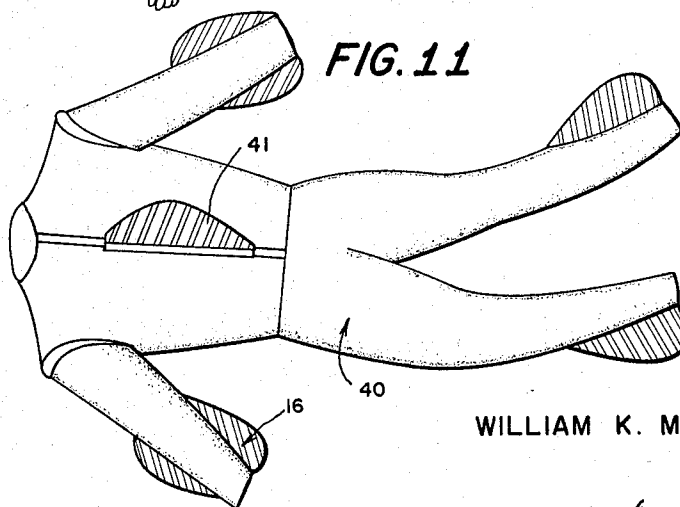


FIG. 11

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BODY FINS FOR SWIMMERS
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7 Claims. (Cl. 9—308)

This invention relates to swimming aids and more specifically it relates to construction features on fins or flippers for attaching to members of the human body, such as, the arm or leg.

In the art of underwater propulsion, either related to sports, such as, scuba diving, or related to military maneuvers, such as, frogman operations, it is desirable to use swimming aids to enhance the ability of a person to swim under water. Thus, it has long been customary to wear feet flippers for this purpose; and certain proposals have been made to supplement these with attachments for fitting upon the arm.

In such prior art developments, however, there have been many shortcomings which detract from ease and maneuverability in swimming. One of the most significant disadvantages encountered in prior art devices is the encumbrance to the swimmer of artificial fins or flippers. For example, a webbed glove which fits over the hand to increase the stroking surface does not permit normal use of the hand in grasping weapons or tools while swimming under water.

Furthermore, many sorts of attachments require introduction of unnatural motions in swimming in order to take advantage of use of flippers or fins. For example, a rigid fin attached to the arm can provide a large surface for stroking the water on a down stroke or swimming power-stroke. However, upon the return stroke, much of the advantage may be lost in that the fin has to be maneuvered in such a way that it will not interfere with swimming progress by twisting the arm in an unnatural manner or otherwise taking a stroke of abnormal character so that the swimming aid may be returned for a further power stroke.

Further disadvantages in swimming aids are encountered where substantial air pockets are provided to introduce buoyancy, since this makes it difficult to swim and dive under water.

Accordingly, it is a principal object of the present invention to correct such deficiencies in the prior art and to provide improved attachments for the human body to aid in underwater swimming and the like.

Another object of the invention is to provide body fins for swimmers which may be used with conventional, natural swimming strokes and which provide for a wide range of motion and maneuverability, such as, quickly stopping, banking, turning, and looping as well as providing greater swimming speed than heretofore possible.

A still further object of the invention is to provide swimming aids which may be attached to various body members, such as, the arms and legs.

Thus, in accordance with the invention, there is provided a swimming aid adapted to protrude from the human body which comprises a flexible or drooping member presenting a fin or flipper surface of greater area than the body member. One of the significant features of the invention is the provision of maneuverable control means for selectively manipulating the swimming aid to cause it alternately to become rigid or relaxed, thus providing for a natural power-swimming stroke where the swimming aid is rigid and a feathered return stroke where the swimming aid is drooping or flexible. This feature is provided by the inclusion of a rigidizing, muscular rib portion, generally about the outer edge of the fin or flipper, which may be flexed, as by stretching, to cause the flipper to attain its rigid configuration. The flippers themselves may be

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fashioned in various forms, which will be discussed in particularity following the specification, to permit mounting on various body members in different manners and to utilize various modes of construction.

Accordingly, the invention is described with reference to the accompanying drawing, wherein:

FIGURE 1 is a top plan view of an arm fin constructed in accordance with the invention;

FIGURE 2 is an end view looking down from the elbow of the flipper shown in FIGURE 1;

FIGURE 3 is a side view showing the flipper in rigid cupped position as used in a downward power-swimming stroke;

FIGURE 4 is a side view showing the relaxed position of the arm fin when encountering the upward return stroke;

FIGURES 5-7 are detailed views indicating alternative manners of attaching the arm fins;

FIGURE 8 is a plan view of a further arm fin embodiment which has a portion extending above the elbow;

FIGURE 9 is a plan view of a leg fin embodiment;

FIGURE 10 is a plan view of an alternative form of construction of the rigidizing member;

FIGURE 11 is a perspective view of a swimming suit encompassing various body fins; and

FIGURE 12 is a plan view depicting the use of the fins for control in air flight.

FIGURES 1-4 depict the basic nature of a body fin constructed in accordance with the teachings of this invention. The fin may be constructed of a soft, elastic, rubber-like material which is stretched about a central aperture 13 to form a bodice section 14 to fit upon the forearm of the swimmer in the fashion shown in FIGURE 1. At one extremity, there is a semi-glovelike hand-grasp portion 15 which permits the thumb and fingers to extend freely through the end to leave them free for grasping any desired object.

Attached to the bodice section 14 is the major fin-like surface 16 which has a ribbed outer edge 17 and which over the greater part of the surface is substantially a flexible membrane member which will droop about the arm on an upward movement in a feathered condition or return stroke in the manner shown in FIGURE 4. The outer rim 17 is attached at the handgrasp section 15 near the curved file 19 so that the hand when arched to provide a downward power-swimming stroke as depicted in FIGURE 3 will stretch the outer rim 17 into a taut position and cause the entire rib protrusion to become rigid with the remainder of the flexible membrane 16 forming a cup-like interior surface 18 for scooping the water on a power-stroke. Thus, it may be seen that the hand when attaining a normal downward swimming power-stroke will selectively manipulate the rib portion by stretching it to cause the fin to become rigid, and when the arm is relaxed in the return stroke it will permit the fin member to droop and pass through the water with little resistance.

To aid in reducing the water resistance, the cross-section of the fin member is designed as shown in FIGURE 2 which looks into the aperture 13 toward the hand grasp 15. As may be seen, the general shape of the article from this end view is streamlined like the airfoil of an airplane extending from a rounded leading edge to a feathered trailing edge such that when the thumb is directed upward through the water it may be moved with least resistance to the water, as shown by the flow lines 20.

The entire swimming aid is molded of a resilient rubber or plastic material in one piece to produce fin sections on opposite sides of the arm entry aperture.

It may be recognized that this sort of construction of the fins, by proper reaction of the arms and hands may be used for swimming strokes or braking and for turning or banking through the water, with simple stroke

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variations that are easily learned and which are essentially natural movements.

As may be seen from FIGURES 5-7, the elastic bodice member 14 may be replaced by alternative mounting means, such as the strap member 22, the laces 23, or special interlocking flaps 24-25. The interlocking structure of FIGURE 7 is defined by flaps 24-25 extending along two split edges 26-27 which would fit along the surface of the forearm. Thus, the general bodice portion 14' may be stretched enough to permit the interlocking folds to be engaged, and held in place in interfolded position by the internal pressure of the arm against the elasticity of the bodice section to present a smooth outer seam. Other forms of mounting means may be used, but it is important to cause the member to be closely wrapped about the body member in form-fitting fashion to exclude possible loosely fitting pockets which would permit entry of water to weigh the swimming aid down and cause inferior performance.

As shown in FIGURE 8, the arm fin attachment may also be closed by a zipper 28 and it may additionally have a section 29 extending above the elbow which protrudes through an opening 30 to prevent interference of the swimming aid with the flexing of the arm.

A similar swimming aid attachment may be mounted upon the leg of a swimmer to supplement the webbed-foot extension 31. This also would permit normal use of the leg by provision of aperture 32 for flexing the knee and has section 29' which extends above the knee. This leg attachment can operate in the same general manner shown in the arm attachment embodiment by using the foot and ankle 33 to selectively manipulate the swimming aid into rigid or drooping position.

An alternative form of construction of the rib member is shown in the embodiment of FIGURE 10 wherein a thin membrane 16' is provided with an inflatable edge portion 35 formed along the outer edges and adjacent to the bodice section 14. This may be inflated, for example, by the carbon dioxide bottle 36 in order to provide the rigidizing muscular rib portion of the swimming aid and to permit the aforescribed stroking action when the hand is in a normal cupped position.

The fins may be attached to other body members, such as, the back, and perform similar results; or they may be attached in general to a body garment as shown in FIGURE 11 which is donned by a swimmer. In this manner, individual fins 16, etc., may be glued, vulcanized, or otherwise affixed to the body portion 40 of an underwater swimming outfit. As shown in this embodiment, a back fin 41 is mounted to provide body stabilization whereas the remaining fins on the arms and legs are used for maneuvering and locomotion.

It may be understood from the foregoing construction that the same principles embodied in swimming are useful also in the air during parachuting operations. Thus, as shown in FIGURE 12, a pilot has a parachute 42 attached but may want to maneuver himself into a preferred position before opening the chute by using the fins 16, etc., for gliding or maneuvering through the air,

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Thus, although the members afforded by this invention were primarily developed as swimming aids, they are not restricted to such use.

Having described my invention, those novel features which are believed descriptive thereof are set forth with particularity in the following claims.

What is claimed is:

1. A member adapted to be attached across a joint of the human body for aiding in maneuvering the same through fluids comprising a flexible fin extending from the surface of the body and a continuous rigidizing muscular rib portion of said fin, the ends of said rib portion terminating substantially at the surface of said body on opposite sides of said joint, said rib portion being curved outwardly so as to become rigid by stretching in a first position of said joint and to recede into a relaxed position in a second position of said joint.

2. A member as defined in claim 1 fashioned to fit upon an arm to extend across the wrist and including an open hand grasp permitting the thumb and fingers to extend freely through one end and for selectively manipulating said rib portion by positioning of the hand.

3. A member as defined in claim 1 fashioned for mounting upon a leg to extend across the ankle and including a portion from which the foot protrudes for selectively manipulating said rib portion by positioning of the foot.

4. A member as defined in claim 1 wherein the rib portion forms the outer rim about the edge of said member.

5. A member as defined in claim 1 wherein the member comprises a thin membrane having an inflatable outer ridge forming said rib portion.

6. A swimming aid mounted about a swimmer's hand and comprising a flexible fin extending from the arm surface, wherein a rigidizing muscular rib section is provided with a hand grip portion positioned for manipulation by the hand to a stretched position to set the flexible fin into a rigid position, and to provide a flexible fin surface when the hand permits the rib section to recede into a relaxed position.

7. A swimming aid comprising a flexible fin mountable upon a body member of a swimmer and including a rigidizing muscular rib section for retaining said fin in a rigid extended position when the rib section is stretched and a control member positioned for manipulation by a portion of the body member to which the fin is mounted for selectively stretching the rib section upon command.

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