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SWIMMER'S PROPULSION DEVICE

2 Sheets-Sheet 1

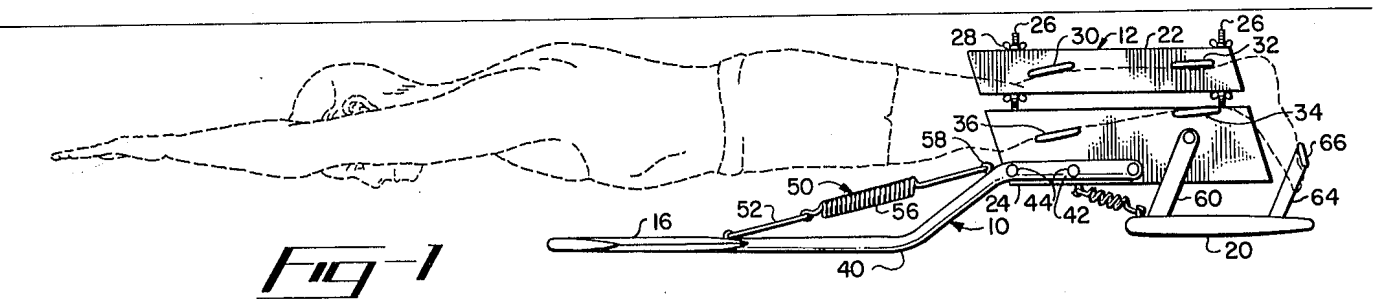


Fig-1

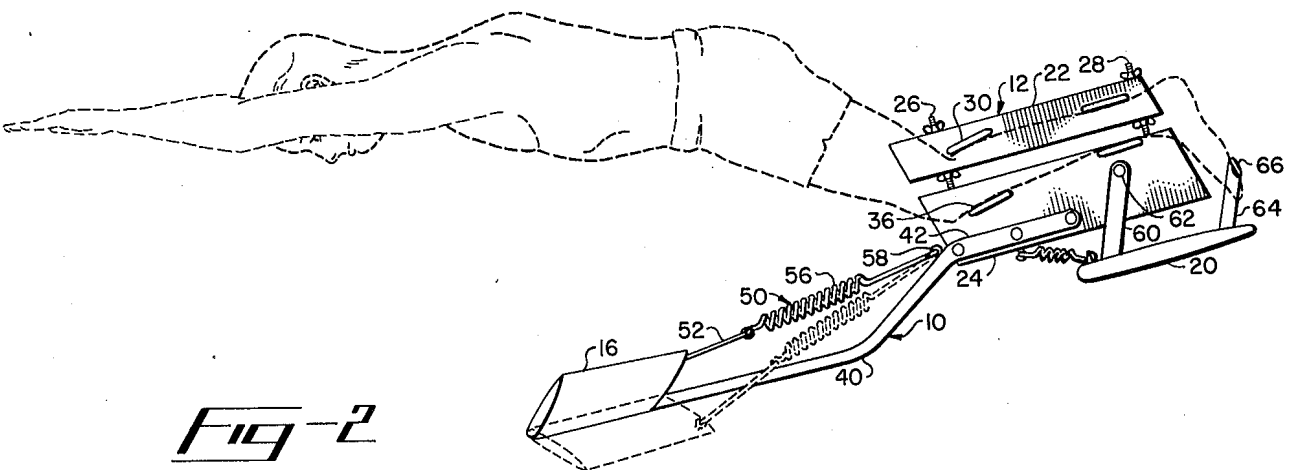


Fig-2

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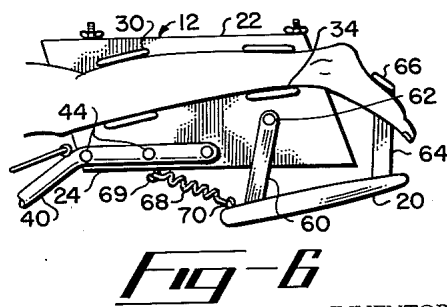
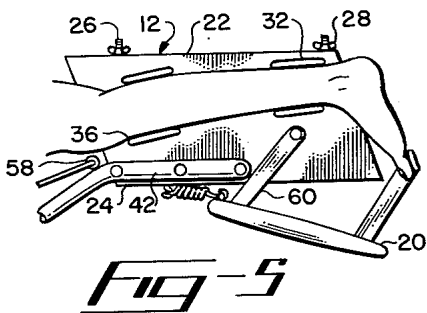
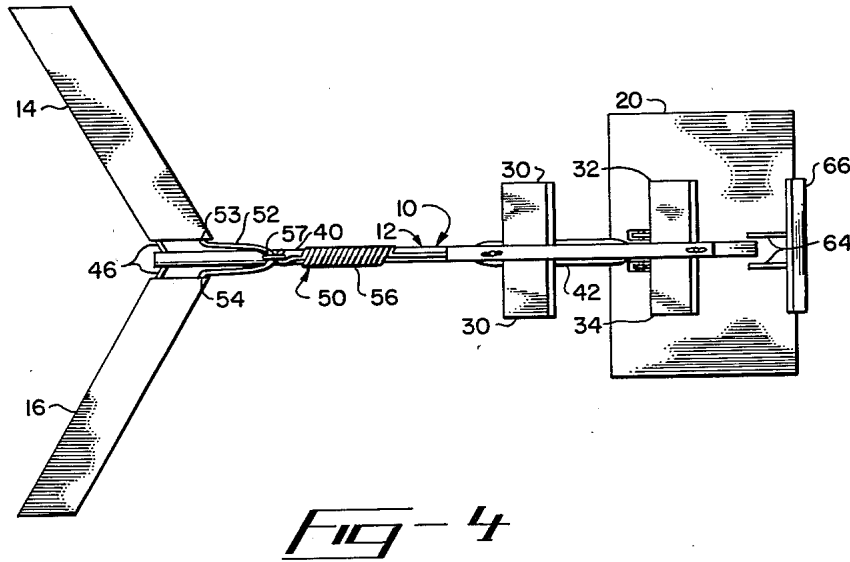
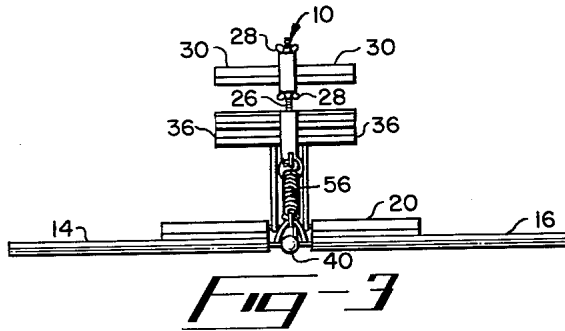
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SWIMMER'S PROPULSION DEVICE

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2 Sheets-Sheet 2



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SWIMMER'S PROPULSION DEVICE

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6 Claims. (Cl. 9-303)

This invention relates to swimmer propulsion devices and has for its object to provide a swimming device operating on a fishtail-like propulsion principle.

Heretofore, swimmer's aids have primarily been based upon the principle of enlarging the effective area of the hands and feet. It has been noted that the Australian crawl flutter kick is used by most swimmers, and it tends to be quite similar to the action of a fishtail. However, the swimmer is limited upon the endurance of the individual muscles used in this swimming stroke. Fin systems previously known in the art were adapted to be located and were operable at or near the feet of the swimmer. A principal objection of former devices was the unsatisfactory oscillations of the body, that is, the body "wagged," rather than the fins.

The present invention however eliminates this objectionable oscillation of the body by virtue of its novel construction. In its broadest aspect, the present invention comprises a plate adapted to be engaged to legs of a swimmer below the knee. A pair of fins are pivotally attached to an extension of the plate.

A principal feature of the present invention is the transverse reactions, of the fins which are perpendicular to the propulsive reactions, are directed through the approximate center of gravity of the body since the fins are positioned immediately adjacent to the torso. Therefore the body maintains its attitude despite these transverse forces.

Another feature resides in the stabilizing wing that can be adjusted by the swimmer during use to aid in diving or surfacing.

Another feature resides in the provision of a swimming device operable by the lower body, leaving the arms free to perform work while underwater.

Other features and advantages not specifically enumerated above will be apparent after consideration of the following detailed description and the appended claims. The preferred form which the invention may assume is illustrated in the accompanying drawings in which:

FIGURE 1 is a side elevation of the present invention in use by a swimmer in a relaxed position;

FIGURE 2 is a side elevation of the present invention similar to FIGURE 1 with the swimmer in a kick position;

FIGURE 3 is a front elevation of the present invention;

FIGURE 4 is a plan view of the present invention;

FIGURE 5 is a partial side elevation of the present invention shown with a swimmer's foot holding the rear stabilizing wing in a diving attitude; and

FIGURE 6 is a partial side elevation of the present invention, similar to FIGURE 5, shown with the swimmer's foot holding the rear stabilizing wing in a surfacing attitude.

A swimming device 10 incorporating the present invention is shown in FIGURES 1-4. Three principal elements form the swimming device 10 and constitute: the leg plate 12 straddled by the swimmer, the forward oscillating fins 14, 16 and a rear stabilizing wing 20.

The plate 12 is generally flat and oblong in configuration and constructed from an upper portion 22 and a lower portion 24. A plurality of bolts 25 are fixedly attached to the lower portion 24 of plate 12 and pass through a plurality of passageways (not shown) in the upper portion

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22. Wing nuts 28 are threadedly received by the bolts 25 and are positioned on opposite sides of the upper portion 22. Adjustment of the wing nuts 28 allow the upper portion 22 to be adjusted in relation to the lower portion 24.

The plate 12 has a plurality of projections 30, 32, 34, 36 extending laterally therefrom the projections 30, 32 lying in one row and projections 34, 36 lying in a second row, thus providing a pair of rows of such projections. The position of the projections 30-36, as shown in FIGURES 1 and 2, illustrate the support around the leg and calf of a swimmer. Padding may be provided around the projections 30-36 to avoid possible discomfort to the legs of the swimmer while in use. The projections 30-36 are adjustable by the wing nuts 28 to allow swimmers of different leg sizes to use the same swimming device.

A curved rod 40 having a bifurcated end portion 42 is fixedly attached to the plate 12 by a plurality of rivets 44, or the like and extends forwardly of the plate and lies in the plane of the plate 12. A pair of vanes 14, 16 are pivotally mounted on the forward portion of the curved rod 40 on the stub shaft 46 which extends in generally opposite directions from the rod as seen in FIGURE 4. Stub shaft 46 is fixedly attached to the rod 40 and rotatively received by the vanes 14, 16. The plate 12 straddled by the swimmer, the projections 30, 36 on the plate and rod 40 constitute means for transmitting motion from the swimmer to the oscillating fins 14, 16.

In the embodiment shown in FIGURES 1 and 2, a harness and coil spring arrangement is used to center the fins 14, 16. The fins are near the center of gravity of the swimmer's body in FIG. 1 to reduce to a minimum the waggle or other movement of the swimmer's body in response to a component of force incident to oscillatory motion of the fins. The direction of this component is traverse or lateral to the direction of motion of the swimmer through the water. Although a spring is shown as a centering device in this embodiment, other components may be used, such as torsional springs acting on the fins 14, 16 and positioned between the fins 14, 16 and the rod 40. A U shaped harness 52 is pivotally attached to the fins 14, 16 at pivot points 53, 54 respectively. A coil spring 56 engages the U shaped harness 52 at point 57 (FIGURE 4) and the eye bolt 58 that is fixedly attached to the rod 40. Adjustment in tension of this spring to suit the strength and speed of a swimmer by varying the amount of feathering action may be provided by a turnbuckle or the like (not shown).

A stabilizing fin or wing 20 is provided in the rear-most portion of the plate 12. A link 60 is pivotally mounted on the plate 12 by a rivet, and is fixedly mounted to the wing. The link 64 is fixedly attached to the wing 20 and terminates in a pedal-like projection 66 which can be used by the swimmer to adjust the position of the wing 20. FIGURES 5 and 6 show the movement of the wing 20 from the diving to the surfacing position when manipulated by the swimmer's toes or foot. A spring 68 engages the eye bolt 69 which is attached to the plate 12 and the eye bolt 70 which is attached to the wing. It is within the scope of the present invention to use either a stabilizing wing 20 which is stationary or to use a wing which may be adjusted prior to putting the device in water. The purpose of the stabilizing wing is to hold the swimmer's body in a level attitude. It is also conceivable that the wing may be completely removed and that the swimmer use his arms to stabilize the attitude of the body while swimming. Stabilization may also be achieved by conventional swim fins attached to the feet which may be tilted in much the same manner.

In operation, the swimmer straddles the device 10 by placing a leg on each side of the plate 12 and inserting the

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lower leg and calf between the plurality of projections 30-36. The device is usually mounted while the swimmer is within the water of such a depth so that the device may be immediately used. The swimmer assumes the prone position as illustrated in FIGURES 1 and 2 and begins the swimming stroke which is as follows: the knees are dropped in relation to the torso forcing the fins 14, 16 downwardly in the water to the position seen in FIGURE 2. The forward edges of the pivoted fins 14, 16 lead the rear edges during downward movement thereof since the downward force exerted by the swimmer is transferred directly to the forward edges of the fins and the water resistance underneath the fins retards downward movement of the rear edges. This movement of the fins 14, 16 starts their feathering or oscillating stroke. When the swimmer's legs are thereafter straightened causing the fins 14, 16 to move upwardly to the position in FIGURE 1, the fins will be pivoted about the stub shaft 46 to a position as shown in phantom lines in FIGURE 2, the water above the fins resisting upward movement of the rear edges of the fins. The spring 56 constantly urges the fins 14, 16 to the center position and aids in causing the fishtail or oscillating motion to reoccur and propel the body through the water. The arms of the swimmer may be held directly in front of the head with the hands extended to aid in directing the swimmer. The hands may be manipulated to act as vanes to cause yaw or roll. The feet may also manipulate the stabilizing wing 20, FIGURES 5 and 6, to cause the swimmer to dive or surface upon the will of the swimmer. The swimmer thereafter repeats the knee action stroke to cause the fishtail motion thereby propelling the body through the water.

It will be recognized that modifications may be made within the scope of this invention. For example, the device may be operated by using the hands rather than the legs to cause the oscillating fishtail motion of the fins. It is also possible to adjust the tension of the springs on the propulsive fins to gain maximum efficiency. It is also possible to remove the stabilizing fin or wing entirely and allow the manipulation of the swimmer's arms to hold the body in a level attitude. My invention is not to be limited to the single embodiment illustrated, which is given for illustration rather than limitation, and is limited only by the scope of the appended claims.

I claim:

1. A device for providing fin propulsion to utilize a swimmer's power comprising engaging means adapted for engagement with the lower leg portions of a swimmer, power transfer means attached to and operative with said engaging means, fin means pivotally attached to said

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power transfer means and positioned substantially opposite the center of gravity of the swimmer's body, and resilient means connecting said fin means to said power transfer means.

2. The device claimed in claim 1 wherein said engaging means engage the front and back surfaces only of the lower leg portions of the swimmer thereby permitting the swimmer to disengage the device as desired by moving his legs apart laterally.

3. The device claimed in claim 1 wherein said fin means include two fins symmetrically disposed with respect to said swimmer's body and extending substantially transversely thereto.

4. The device claimed in claim 1 wherein said engaging means include stabilizing means to provide stability in the horizontal plane.

5. The device claimed in claim 4 including operating means attached to said engaging means, said operating means operable by foot motion of the swimmer to actuate said stabilizing means whereby the swimmer may effect changes in his direction of travel through the water.

6. A swimming device comprising: a plate means adapted for positioning in a vertical direction between the legs of a swimmer, means on said plate means for supporting the swimmer's legs, a rod having one of its ends fixedly attached to said plate means, said rod extending forwardly of said plate means and lying substantially in the plane of said plate means, a shaft having portions extending outwardly in generally opposite directions from the other end of said rod, said shaft lying in substantially a transverse position with respect to said vertical plate means, and a pair of fins pivotally mounted on said portions of said shaft.

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