Feb. 7, 1967 S. S. CICCOTELLI 3,302,223

SWIM-FIN

Filed March 26, 1965 2 Sheets-Sheet 1

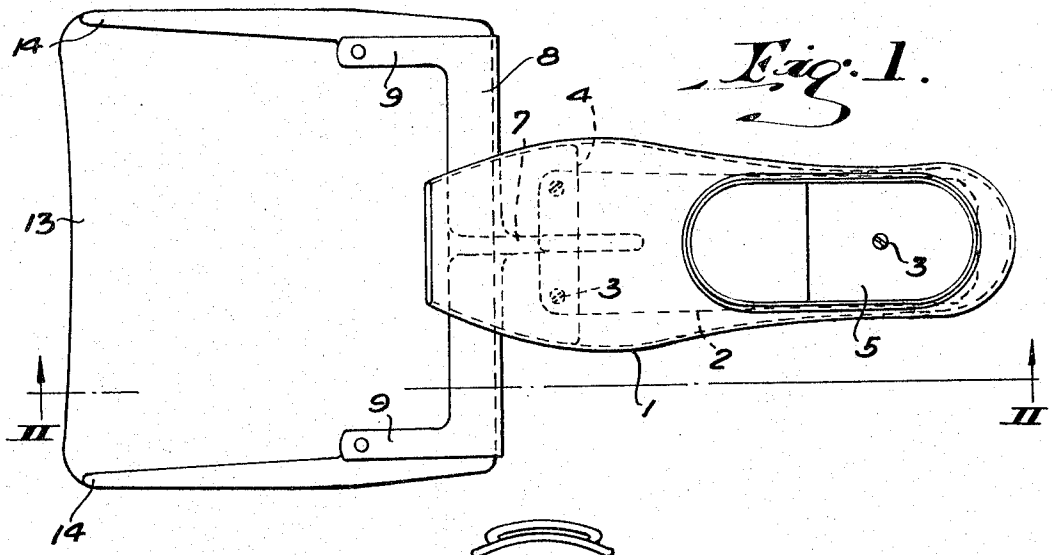


Fig. 1.

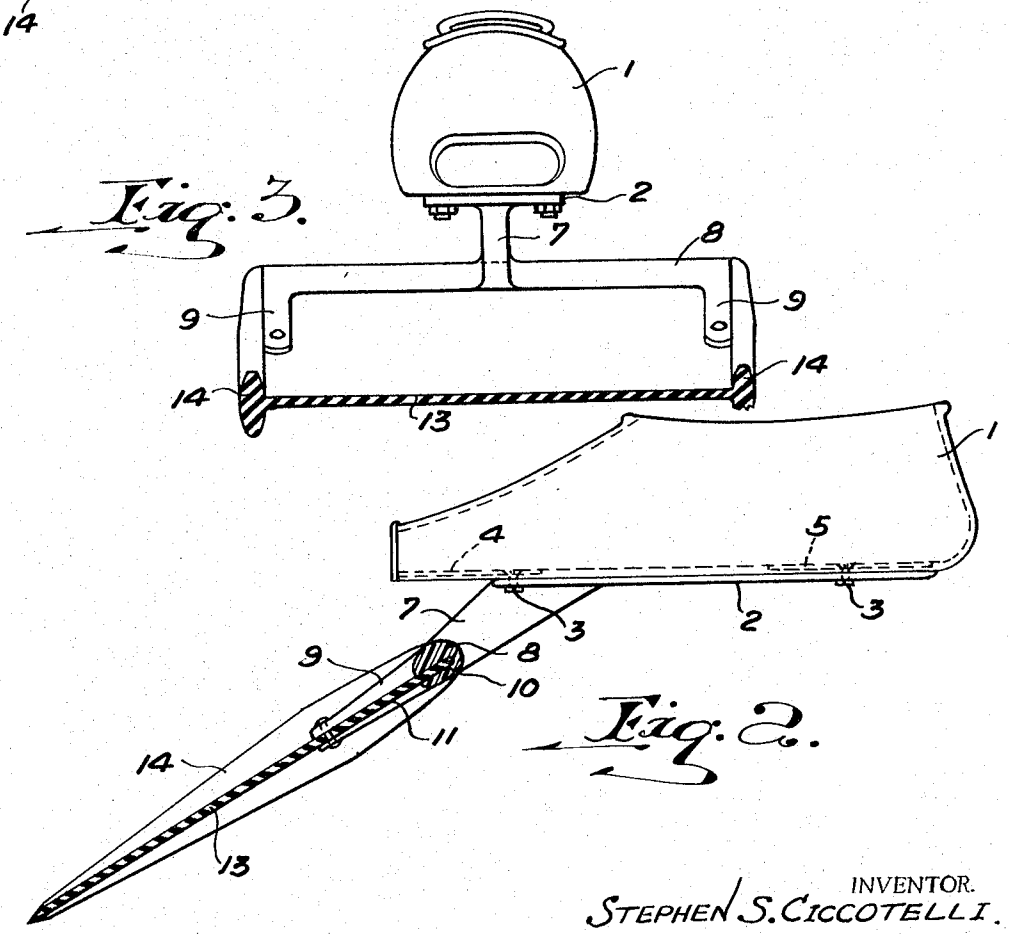


Fig. 3.

Fig. 2.

INVENTOR.
STEPHEN S. CICCOTELLI.

BY
Brown, Critchlow, Flick & Peckham
his ATTORNEYS

Feb. 7, 1967 S. S. CICCOTELLI 3,302,223

SWIM-FIN

Filed March 26, 1965 2 Sheets-Sheet 2

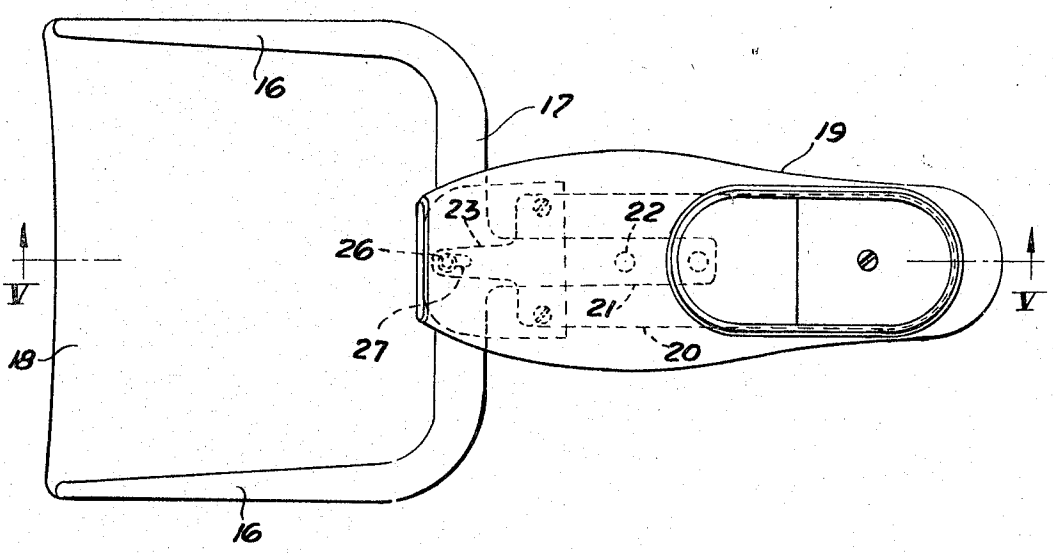


Fig. 4.

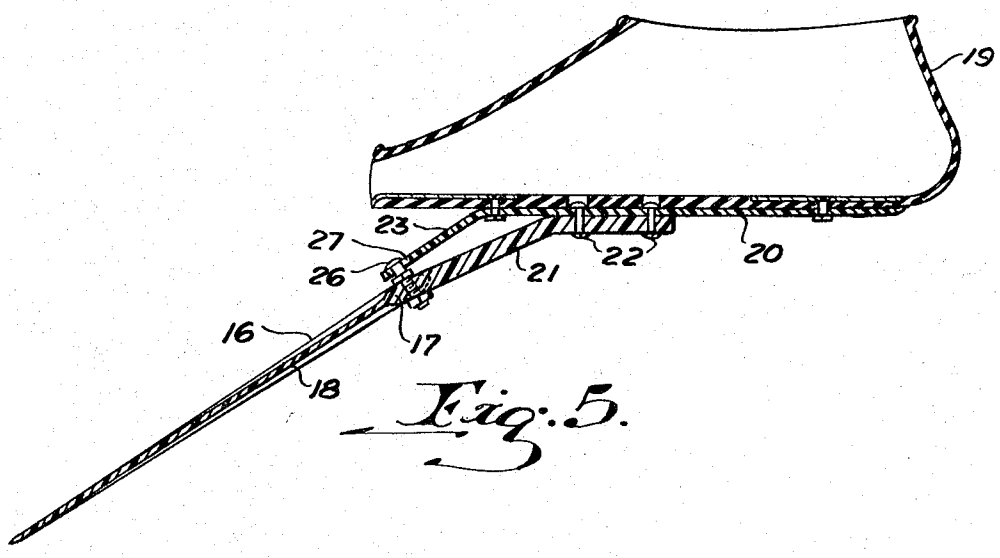


Fig. 5.

INVENTOR.
STEPHEN S. CICCOTELLI.

BY
Brown, Critchlow, Flick & Peckham
his
ATTORNEYS

United States Patent Office

3,302,223

Patented Feb. 7, 1967

3,302,223

SWIM-FIN

Stephen Samuel Ciccotelli, 745 10th St., Pitcairn, Pa. 15140

Filed Mar. 26, 1965, Ser. No. 442,989
11 Claims. (Cl. 9—309)

This invention relates to swim-fins that are worn on the feet of swimmers to aid them in propelling themselves through the water.

It is among the objects of this invention to provide a swim-fin which is simple in construction, which is highly effective in use, which is not unduly tiring to the swimmer, which is very durable, and which in one form is fairly comfortable to walk upon on land.

The invention is illustrated in the accompanying drawings, in which

FIG. 1 is a plan view of one embodiment of my swim-fin;

FIG. 2 is a combination side view and section taken on the line II—II of FIG. 1;

FIG. 3 is a front view with the blade shown in cross section;

FIG. 4 is a plan view of a modification; and

FIG. 5 is a longitudinal section taken on the line V—V of FIG. 4.

Referring to FIGS. 1, 2 and 3 of the drawings, a typical swim-fin boot **1** is provided that fits the foot snugly. A flat sole plate **2** engages the sole of the boot, to which it is fastened by bolts **3** extending through the boot sole and thin metal plates **4** and **5** embedded in the inner surface of the sole. This sole plate is made of a lightweight strong material, preferably a high strength plastic. For the purpose of this description, the toe of the boot will be considered to be its front end, even though during swimming the heel of the boot forms the leading end.

Joined to the front end of the sole plate is a rigid vane **7** that extends at an inclination forward and away from the sole. The vane may be integral with the sole plate. At the front end of the vane a torsion bar **8** extends across the boot and vane and may be integral with the latter. The bar extends outwardly from opposite sides of the boot and has forwardly extending stiff side members **9** joined to its opposite ends, preferably integrally. These side members will generally extend away from the boot at about the same angle as vane **7**. The bar and side members form a U-shape element as shown in FIG. 1. The side members are bifurcated and the torsion bar is provided with a longitudinal slot **10** opening into the rear ends of the slots **11** formed by the bifurcations.

Rigidly secured in these three slots in any suitable manner is the rear portion of a generally rectangular flexible web **13** that forms a propelling blade for the swimmer. To stiffen the sides of the web so that it normally will form a flat blade, the opposite side edges of the web are provided with integral stiffening flanges **14** that project above and below the web. The rear portions of the flanges extend along the outer surfaces of the sides of the U-shape element. These flanges do not prevent the blade from flexing and cupping to some extent during swimming, but when it is not under stress they hold it flat. It will be noted that the blade is spaced from the boot, which results in greater efficiency during swimming.

When a swimmer, wearing a pair of these swim-fins, uses them to propel himself through the water, the resistance of the water causes the blades to swing up and down relative to the boots. In doing this, each blade, through the side members **9** of the U-shape element, twists the adjoining torsion bar **8** on a longitudinal axis back and forth relative to its central part held by the vane

7. The moment that pressure on the blade is relieved, the torsion bar will untwist to its normal unstressed position to return the blade to normal position, whereby the bar acts like a spring-loaded hinge that allows the pitch angle of the blade to adjust to speed and load. During swimming, the flanges **14** at the sides of the blade allow the web to cup between them so that there is little tendency for the blade to slip sideways through the water. The cupping of the web also increases the propelling force of the blade. By not extending vane **7** past the toe of the boot, the blade is kept closer to the foot, which reduces the strain placed on the foot during swimming, with less likelihood of the foot becoming cramped.

If desired, instead of fastening the blade to a separate U-shape element, that element and the web can be made in one piece as shown in FIGS. 4 and 5, preferably from high strength plastic. In such a case the side members **16** of the U-shape element that are joined at their rear ends to the ends of the torsion bar **17** may extend the full length of the flexible web **18** and serve as the stiffening flanges also.

Another way of supporting the blade from the boot **19** also is illustrated in the same figures. Although the boot again is provided with a sole plate **20**, the place of the vane is taken by a separate, relatively stiff, cantilever bar **21** that is anchored at its rear end to the sole plate by means of rivets **22** or the like. This bar extends forward and away from the wall at an inclination, but preferably not past the toe of the boot. Its front end may be made integral with the central part of the torsion bar **17**. Although the cantilever bar is relatively stiff, unlike the vane in FIG. 2, it can flex or bend under pressure toward and away from the boot. Flexing toward the boot is a desirable feature because it makes it easier for the wearer to walk with the swim-fins on his feet and he is less likely to trip. However, to prevent the cantilever bar from flexing toward the boot very much during swimming, which would reduce the effectiveness of the swim-fin, a relatively stiff deflection-limiting tongue **23** is inclined forward and away from the boot between it and the cantilever bar. The tongue may be integral with the front end of sole plate **20**. During swimming the combined stiffness of the tongue and cantilever bar is sufficient to prevent deflection of the bar toward the boot to any appreciable extent, but under walking pressure the tongue can bend so that it will not prevent the cantilever bar from more or less flattening out during walking.

The tongue **23** also prevents the cantilever bar **21** from bending away from the boot during swimming. This is accomplished by rigidly mounting a stop member, such as a bolt **26**, in the central part of torsion bar **17** and extending one end of it through a slot **27** in the end of the tongue. The head of the bolt substantially engages the sole side of the tongue to prevent the cantilever bar from bending away from the tongue, and the resistance of the tongue to bending under swimming pressure helps the cantilever bar to remain in its normal unstressed position. The slot in the tongue allows the bolt to swing forward and backward in the tongue as the cantilever bar is flexed during walking.

According to the provisions of the patent statutes, I have explained the principle of my invention and have illustrated and described what I now consider to represent its best embodiment. However, I desire to have it understood that, within the scope of the appended claims, the invention may be practiced otherwise than as specifically illustrated and described.

I claim:

1. A swim-fin comprising a boot, a generally rectangular propelling blade in the form of a flexible web, and means to support the blade from the boot, said supporting means including a torsion bar extending transversely of

the boot and joined to the rear end of the blade, means firmly connecting to the boot the central portion only of the bar, and a pair of stiff side members joined to the opposite ends of the bar and extending forward along the blade, the blade being joined to said members, said stiff side members being adapted to be swung up and down by the blade during swimming to thereby twist said bar on a longitudinal axis back and forth relative to said central part of the bar.

2. A swim-fin as recited in claim 1, in which said blade and bar and side members are integral, and the side members extend substantially the full length of the blade and project above and below it.

3. A swim-fin as recited in claim 1, including side flanges integral with the side edges of the blade and extending substantially the full length thereof, said stiff side members being shorter than said flanges and disposed adjacent their inner surfaces.

4. A swim-fin comprising a boot, a generally rectangular propelling blade in the form of a flexible web, a torsion bar extending transversely of the boot and joined to the rear end of the blade, a connecting member anchored at one end to the boot and rigidly secured at its other end to the central part of said bar to support the bar, and a pair of stiff side members joined to the opposite ends of the bar and extending forward along the blade, the blade being joined to said members, and said stiff side members being adapted to be swung up and down by the blade during swimming to thereby twist said bar on a longitudinal axis back and forth relative to said central part of the bar.

5. A swim-fin comprising a boot, a supporting member anchored at one end to the sole of the boot and inclined forward away from it, a torsion bar extending transversely of the boot with the central part of the bar rigidly secured to the front end of said supporting member, a generally rectangular propelling blade in the form of a flexible web extending forward from the torsion bar at an inclination to the boot sole, the rear end of the blade being joined to the torsion bar, and a pair of stiff side members joined to the opposite ends of the bar and extending forward along the blade, the blade being joined to said members to swing them up and down during swimming and thereby twist the torsion bar on a longitudinal axis back and forth relative to said central part of the bar.

6. A swim-fin as recited in claim 5, in which said supporting member and torsion bar and side members are integral.

7. A swim-fin as recited in claim 5, in which said supporting member is rigid.

8. A swim-fin as recited in claim 5, in which said supporting member is relatively stiff but adapted to be flexed toward the boot under walking pressure.

9. A swim-fin as recited in claim 8, including means attached to the boot for limiting flexing of said supporting member.

10. A swim-fin comprising a boot, a relatively stiff cantilever bar anchored at one end to the sole of the boot and inclined forward away from it, a torsion bar extending transversely of the boot with the central part of the torsion bar rigidly secured to the front end of the cantilever bar, a generally rectangular propelling blade in the form of a flexible web extending forward from the torsion bar at substantially the same inclination as the cantilever bar, the rear end of the blade being joined to the torsion bar, a pair of stiff side members joined to the ends of the torsion bar and extending forward along the blade, the blade being joined to said members to swing them up and down during swimming and thereby twist the torsion bar on a longitudinal axis back and forth relative to said central part of that bar, a relatively stiff tongue attached to the boot sole and inclined forward away from it between the sole and said cantilever bar to limit flexing of that bar toward the sole, the tongue being provided with a hole opposite said central part of the torsion bar, and a stop member mounted in said central part and extending loosely through said tongue hole, the stop member having a tongue-engaging head on the sole side of the tongue for limiting movement of the cantilever bar away from the boot.

11. A swim-fin as recited in claim 10, in which said tongue is adapted to be flexed toward the boot under walking pressure.

References Cited by the Examiner

FOREIGN PATENTS

502,065 11/1954 Italy.

MILTON BUCHLER, *Primary Examiner.*

FERGUS S. MIDDLETON, *Examiner.*

P. E. SAUBERER, *Assistant Examiner.*