June 29, 1926. 1,590,484

W. VÖLKER

DEVICE FOR THE AUGMENTATION OF HUMAN SWIMMING PERFORMANCES

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Fig. 2.

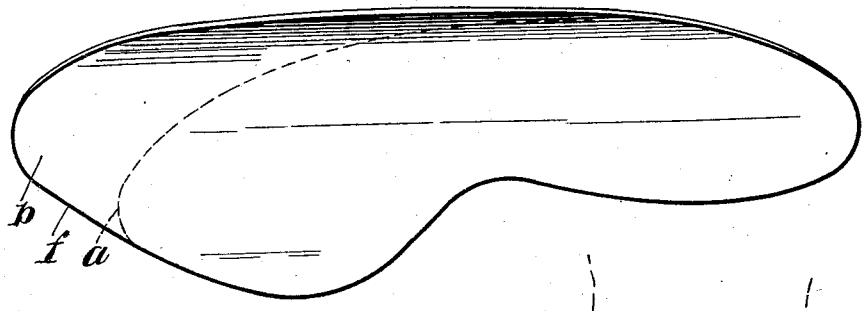


Fig. 1.

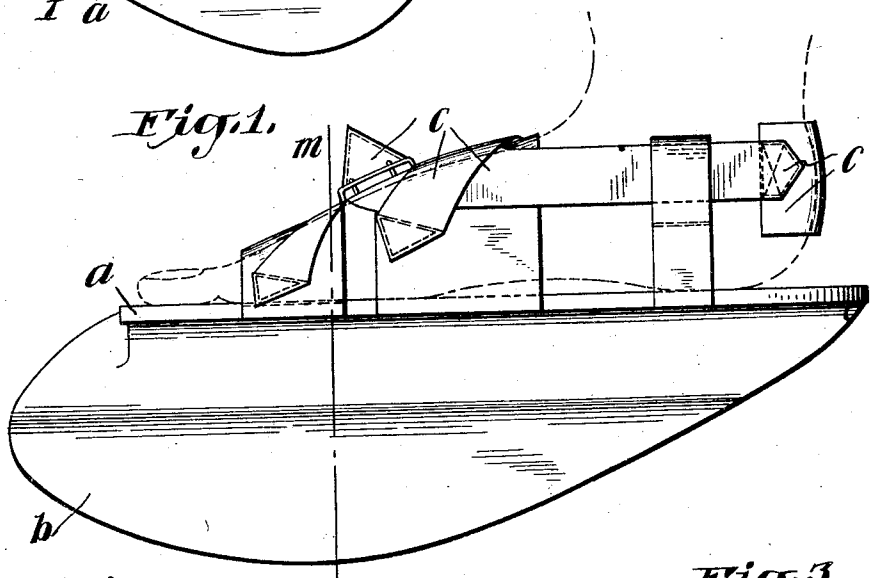


Fig. 4.

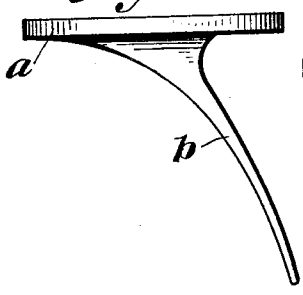


Fig. 5.

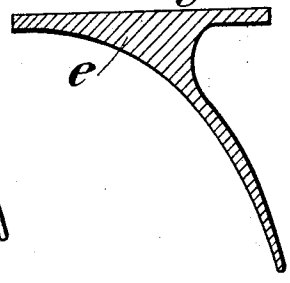
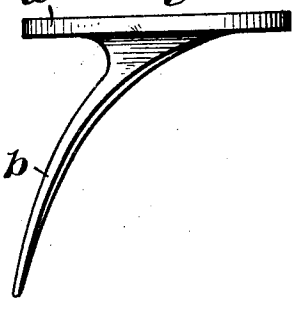


Fig. 3.



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Fig. 6.

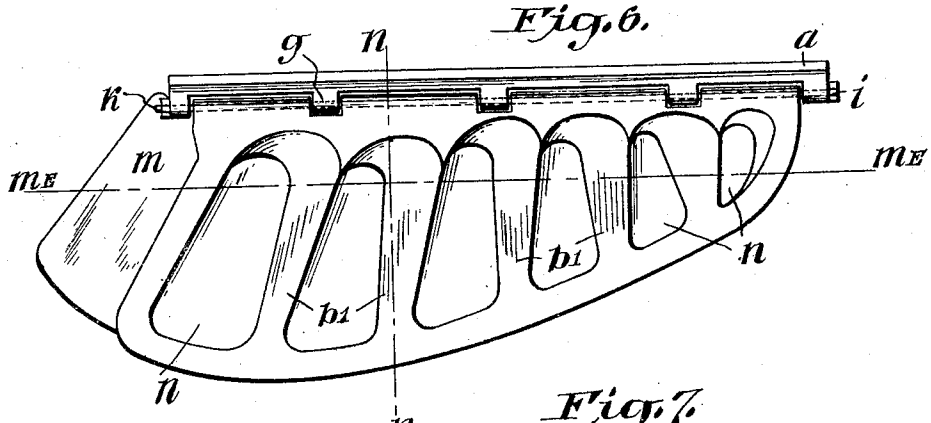


Fig. 7.

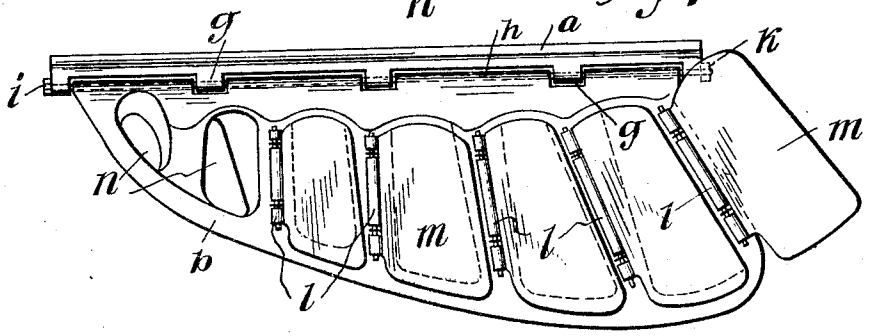


Fig. 8.

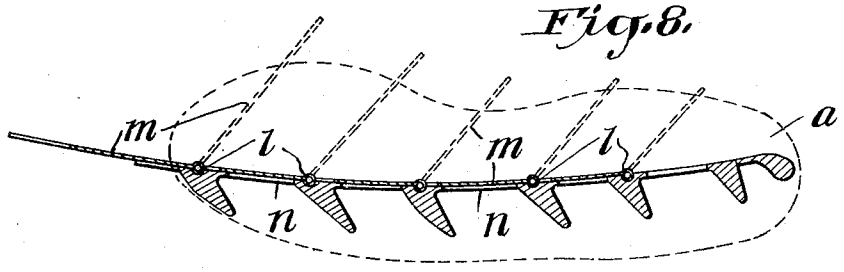
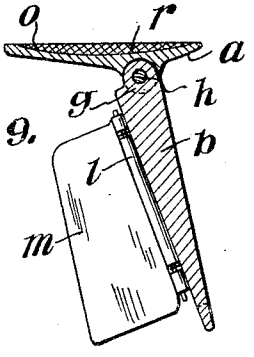


Fig. 9.



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Patented June 29, 1926. 1,590,484

UNITED STATES PATENT OFFICE.

WALDEMAR VÖLKER, OF LEIPZIG, GERMANY.

DEVICE FOR THE AUGMENTATION OF HUMAN SWIMMING PERFORMANCES.

Application filed July 18, 1924, Serial No. 726,796, and in Germany July 27, 1923.

My invention relates to a device by which human swimming performances can be augmented considerably; this device consists of a plate to be affixed to the foot-sole, and of movable fin-like members hinged to this plate, as is more fully described hereinafter.

The device is illustrated by way of example in the accompanying drawing, in which Figure 1 is a side-view, Figure 2 a bottom-view, Figure 3 a rear view, and Figure 4 a frontal view thereof; Figure 5 is a cross-section in the plane M—M of Fig. 1; Figure 6 is an exterior side-view and Figure 7 an interior one of a modification; Figure 8 is a section in the plane M—M, and Figure 9 a section in the plane N—N of Fig. 6.

The device consists, in fact, of two equally devised devices, of which one is intended for the left foot, the other for the right one. Each of these equal devices consists of a sole-plate *a* provided on its lower surface with a rigidly affixed blade *b* arranged in an acute angle with respect to the plate *a*. This latter is also provided with straps *c* or the like with the aid of which the plate *a*, or the entire device respectively, can be securely attached to the respective foot, this latter being then in contact, of course with the flat side or surface of said plate. The blade *b* of each plate is located on the outer side thereof which is intended for the respective foot, and is inclined downwardly, as shown.

The device may consist of wood, metal, or of both materials, and the foot-plate and its blade may be made integral or in parts which then are rigidly connected with each other.

The chief effect of the device is obtained at that swimming phase during breast-swimming and back-swimming at which the legs are moved from the spread position into the closed one. The entire inner surface of the blade then presses against the water, and owing to the inclination of the blade a powerful impact in forward direction is exerted on the body. In order to enable the blades *b* to take up as much water as possible they are shaped somewhat shell-like, or mussel-shell-like, the opening of the cavity being located on the inner side of the blade.

It has been found that the effect is greatest if the blade extends farthest downwards in the zone of the ball of the foot, and if its breadth decreases gradually towards the heel and the point of the foot. The outer side of the blade changes over, or turns, as smoothly as possible into the edge of the base-plate so that no projections offering resistance to the water arise, and the water flows off the inclined outer surface of the blades without any impediment when the legs are drawn towards the body. At the second swimming phase, viz, when the legs are pushed rearwards, the sharp edge of the blades cuts the water. The effect arising at this second phase is increased by the inclined position of the blades, as, in the projection, an enlargement of the base-surface is attained and a pretty great resistance is offered by the shell-shaped cavities in the blades so that the body is pushed forward correspondingly more energetically. The blades are reinforced at their places of junction with the base-plate, as shown at *e* in Fig. 5, the purpose of the reinforcement being to provide for a large bearing surface of the blades on said plate, and to prevent them from being bent through by the high water-pressure they must withstand. The changing over of the blades into the base-plate at their inner sides is devised preferably not in the shape of an angle but in curved shape in order to prevent the arising of eddies in the water.

It is, of course, impossible to walk when the base-plates with the blades are attached to the feet, but it is possible to move forward in kneeling position. For this purpose the front end of each blade is cut off at *f* obliquely forward and downward.

The surprising effect of the device becomes apparent especially when swimming placidly a comparatively long length of way and pushing each leg rearwards at some leisure until it is stretched completely. It has been found that a swimming person can cover at a push about thrice the length of way than when swimming without that device, and it is, in fact, possible to cover by means of the first push a length of way of about 6 meters when moving forward from the position of rest.

As the physical force, the figure or stature, and the kind of the movements made while swimming, are different with different persons, and as the resistance offered by the water must be practically zero while the swimmer is moving forward in stretched-out position and when he, or she, draws his,

or her, legs towards the body, any one distinct device cannot be equally useful for different persons. On the other hand, it is not possible to keep on store such a big number of differentiated devices that every man, or woman, can find one just suited for him, or her, and enabling him, or her, to render therewith the best performances possible for him, or her, with consideration of his, or her, physical force, figure or stature, etc.

Now, the device can be so constructed that the blades *b* can be attached adjustably to the base-plate *a* so that their inclination relatively to the latter can be determined with due consideration to said force, etc., and to this purpose there are provided on the lower side of the base-plate bearing-forming lugs *g* carrying a long pin or bolt *h* to which the respective blade is hinged. The pin or bolt is provided at one end with a head *i* and at the other with a screw-thread upon which a nut *k* is screwed. By drawing the nut strongly home, the blade is forced powerfully against the said lugs whereby it is fixed in its adjusted position and remains immovable with respect to the base-plate. The arrangement just described may be such that the blade can be turned nearly parallelly to the base-plate, or to the plane thereof respectively, whereby it is rendered possible to walk with the devices attached to the feet.

In order to reduce the resistance offered by the water if the position or inclination of the blades is not exactly that which it should be, the blades are provided with openings *n* extending from the base-plate downwards, and besides, flaps *m* are attached to the inner side of the blades by means of hinges *l*. A blade of this kind resembles a grid or grating, but the transverse ribs b^1 are not parallel, but diverge outwardly and their sectional shape resembles a wedge, the edge, which is arranged on the outside of the blade being directed towards the heel portion. The flaps are opened by the water pressure arising at the forward impact of the body though at the drawing in and spreading of the legs the blade *b* does not cut entirely smoothly through the water but partly acts with the surface, in consequence whereof the resistance offered by the water is diminished when the legs are drawn towards the body, and spread at the same time; this reduction is the larger as the transverse ribs b^1 have wedge-shaped sectional shape, as already mentioned, and as their outer edges are directed towards the heel. When the legs are closed, that is to say, at the second swimming-phase, of the entire cycle of movments, the water presses the flaps closely onto the blade which can now be utilized on its whole area.

When the blades are hinged to the base-plates or foot-plates and are provided with openings and with flaps for closing them, the device must be manufactured from a light metal. It is also in this case heavier than if made of wood, but the heavier weight can be compensated by means of an air-filled piece of hose *p* arranged in a recess or cavity *o* of the foot-plate *a*.

The device may be manufactured also in such smaller dimensions, so modified, as to be suited for use, in connection with the hands of the swimming person.

I claim:

1. A device for the augmentation of human swimming performances, comprising, in combination, a plate adapted to be attached to a foot, and means for attaching it thereto; a blade attached to said plate in inclined position and at the outer side relatively to the foot, the inclination being directed outwards and the surface of said blade decreasing gradually in the direction from the ball of the foot to the heel as well as to the toes, substantially as set forth.

2. A device for the augmentation of human swimming performances, comprising, in combination, a plate adapted to be attached to a foot, and means for attaching it thereto; a blade attached said plate in inclined position and at the outer side relatively to the foot, the inclination being directed downwards, and the point of the blade being cut away for the purpose set forth.

3. A device for the augmentation of human swimming performances, comprising, in combination, a plate adapted to be attached to a foot, and means for attaching it thereto; an adjustable blade attached to said plate and being adapted to be adjusted thereat in several degrees of inclination; said blade being attached to said plate at the outer side relatively to the foot, the inclination being directed outwards, substantially as set forth.

4. A device for the augmentation of human swimming performances, comprising, in combination, a plate adapted to be attached to a foot, and means for attaching it thereto; an adjustable blade attached to said plate and being adapted to be adjusted thereat in several degrees of inclination; hinges connecting the said plate and the said blade movably with each other means to fix the blade in its adjusted position; said blade being attached to said plate at the outer side relatively to the foot, the inclination being directed outwards, substantially as set forth.

5. A device for the augmentation of human swimming performances, comprising, in combination, a plate adapted to be attached to a foot, and means for attaching it thereto; a blade attached to said plate in inclined position and at the outer side rela-

tively to the foot, the inclination being directed outwards; said blade having openings, and automatically movable flaps being provided to close and open said apertures, substantially as set forth.

6. A device for the augmentation of human swimming performances, comprising, in combination, a plate adapted to be attached to a foot, and means for attaching it thereto; a blade attached to said plate in inclined position and at the outer side relatively to the foot, the inclination being directed outwards; transverse ribs on said blade; said ribs being wedge-shaped in cross-section and having their free edges directed towards the heel of the foot, substantially as set forth.

7. A device for the augmentation of human swimming performances, comprising, in combination, a plate adapted to be attached to a foot, and means for attaching it thereto; an air-filled hose arranged in a cavity of said plate; a blade attached to said plate in inclined position and at the outer side relatively to the foot, the inclination being directed outwards, substantially as set forth.

In testimony whereof I affix my signature.

WALDEMAR VÖLKER.