

Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 0 884 073 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.12.1998 Bulletin 1998/51

(51) Int. Cl.⁶: **A63B 31/11**

(21) Application number: **98110808.7**

(22) Date of filing: **12.06.1998**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(72) Inventor: **Maggi, Renzo**
27055 Riva Nazzano (PV) (IT)

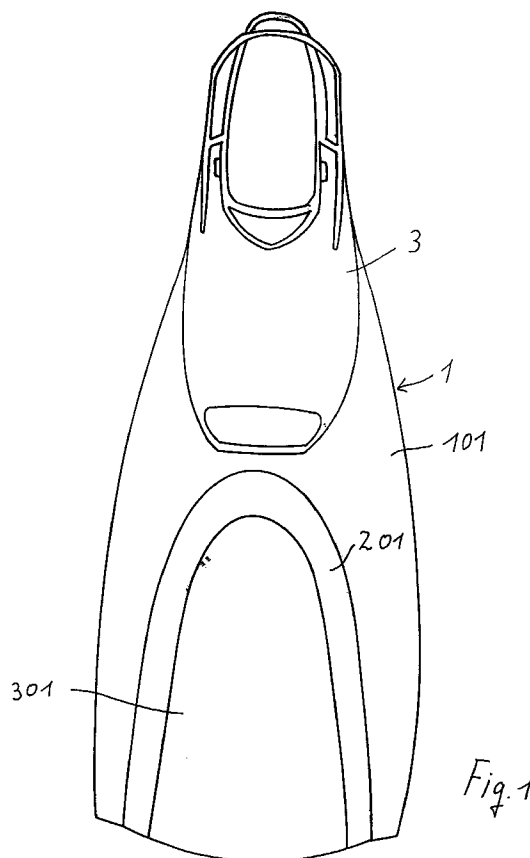
(74) Representative:
Karaghiosoff, Giorgio Alessandro, Dipl.-Phys.
Via Pecorile 27/B
17015 Celle Ligure (Savona) (IT)

(30) Priority: **13.06.1997 IT SV970032**

(71) Applicant: **Salvas Sub spa**
15053 Castelnuovo Scrivia (AL) (IT)

(54) **Swim fin**

(57) Swim fin comprising a blade part (1) and a seat for the foot, the so-called footpocket (2), the blade part (1) consisting of at least two parts, a first and a second part (101, 201) of the blade, made of different materials. According to the invention, the blade has an additional part (301), which is made of a material being different at least from said second part of the blade (201). According to an improvement, the part of the blade (201) is U- or V-shaped and delimits a central area (301) of the blade, separating it from the peripheral areas of the blade (101), said second part (201) of the blade being made of an elastically deforaeable material, such as rubber, or similar.



EP 0 884 073 A2

Description

The invention relates to a swim fin, comprising a blade part and a seat for the foot, the so-called foot-pocket, the blade part consisting of at least two parts, made of different materials.

Swim fins with blades made of two different materials are already known. According to a first embodiment thereof, the blade, made of a substantially stiff material has longitudinal slits, widening towards the free end, which are filled with a generally elastic linking material, such as rubber or similar.

According to a further well-known fin, the two materials forming the blade are both relatively stiff, though having a different stiffness and/or color. A first part of the blade, directly connected to the footpocket, has a generally central recess, and a relatively large size with respect to the total surface of the blade. The second part of the blade is complementary in shape to the recess in the first part of the blade and is housed in said recess, while being connected to the first part of the blade by chemical-thermal adhesion.

However, these well-known fins, though having blades of a composite construction, operating better than traditional fins, cannot provide a perfect hydrodynamic behavior.

The blades are too flexible and deformable, or not enough flexible and deformable, or the deformations follow directions which are unfavorable or non-optimal for a correct hydrodynamic behavior.

The invention has the object to improve a fin of the type described hereinbefore, in a simple and cheap manner, and such as to obtain a better hydrodynamic behavior, closer to perfection.

The invention achieves the above purposes by providing a fin of the type described hereinbefore, in which the blade has an additional part, which is made of a material being different at least from said second part of the blade.

According to a preferred embodiment, the second part of the blade is U- or V-shaped, and delimits a central area of the blade, separating it from the peripheral areas thereof, said second part of the blade being made of an elastically deformable material, such as rubber, or similar.

The second part of the blade V-shaped insert, which surrounds the central area of the blade, may have different widths and is usually a few centimeters large.

The V shape may be more or less pointed and rounded, from a round arched shape, through an arched spindle-like shape, to a V shape with straight arms, or similar.

The second part of the blade may be extended up to the end of the blade, thus completely separating the central part of the blade from the first peripheral part, or may terminate at a certain distance from the end of the blade, so that the central area of the blade is connected to the first peripheral part, by two strips of material along

the free edge of the blade.

The second part of the blade and the central part thereof may be made of materials being different from each other and from the first peripheral part of the blade. Particularly, advantages are obtained from combinations, wherein the second part of the blade is different both from the first and from the central one, whereas the central part is made of the same material as the first part of the blade, or of a different material therefrom.

The second part of the blade has an accordion, i.e. corrugated cross section.

In the embodiment in which the central part, delimited by the second V-shaped part of the blade, is made of the same material as the first peripheral part of the blade, the blade consists of two different materials, which may be both different from the materials forming the footpocket or the second V-shaped part of the blade may be made of a material which is substantially identical to that of the footpocket. The fin obtained therefrom would be composed of a minimum of two and a maximum of three different materials.

When the central part is also made of a different material from that of the other parts of the blade and of the footpocket, the fin obtained therefrom will be formed by a minimum of three, and a maximum of four different materials.

When the central part of the blade is connected to the first peripheral part of the blade, advantages will be obtained from providing a V-shaped second part with such a shape that the central part is substantially T-shaped.

Thanks to the above arrangements, the flexibility and deformability properties of the fin are considerably improved, thereby providing an operating behavior which is as close as possible to perfection.

By providing a second part connecting the central part to the peripheral part of the blade, and by using an elastic material therefor, particularly even accordion-folded, the blade according to the invention provides optimal hydrodynamic characteristics. The whole involving low costs, slightly higher than those required for fabricating traditional fins.

The fin according to the invention may be fabricated by a multi-injection process, or by inserting preformed members of the first peripheral part of the blade and of the central part thereof in a bi-injection mold, for the footpocket part and for the second part of the blade respectively.

The invention relates to further characteristics, which form the subject of the dependent claims.

The characteristics of the invention and the advantages derived therefrom will appear more clearly from the following description of a few embodiments, illustrated in the accompanying drawings, in which:

Fig. 1 is a top plan view of a first embodiment of the fin according to the present invention.

Fig. 2 is a view as shown in fig. 1, of a second

embodiment of the fin according to the invention.

Fig. 3 is a plan view of the rear side of the fin as shown in fig. 2.

Fig. 4 is a cross sectional view of the fin blade as shown in figures 2 and 3.

The fin, as shown in fig. 1, may be composed of a foot seat, the so-called footpocket 3, and of a blade part 1, having in its central part a U-shaped insert 201, made of a soft material, which has divergent arms, reaching the end of the blade.

The footpocket 3 is made of a soft material, such as rubber or similar, whereas the blade part 1, connected to the footpocket 3 is of a relatively stiff material, particularly of plastic.

The U-shaped insert 201 is one to a few centimeters wide, and is made of a material which is different from that of the blade 1, and particularly of the same material as the footpocket 3, such as rubber or similar.

Said U-shaped insert 201 is connected through chemical-thermal adhesion, from one side to the peripheral part of the blade 101 and from the other side to a stiffer central area 301.

The stiffer central area 301 may be made of the same material as the peripheral part 101 or in any other material having stiffness or color characteristics differing from those of the peripheral part 101 of the blade and of the U-shaped insert 201.

This construction allows a perfect deformation of the blade 1: under water thrust, the central part 301, thanks to the higher deformability of the material forming the U-shaped insert 201 is moved and deformed, providing the blade 1 with a spoon shape in both directions, at least as seen in cross section and at least in its central area.

The fin may be fabricated by multi-injection molding, with the nozzles for the different materials being provided in the different corresponding areas of the mold.

Alternatively, the single central part 301 and/or the peripheral part 101 of the blade may be made in separate molds, whereon said parts are properly positioned in the injection mold for the molding material/s of the footpocket 3 and/or of the insert 201.

The U-shaped insert 201 has the additional advantage that it allows higher tolerances in mutually positioning the peripheral part 101 and the central part 301 of the blade, often made of a stiffer material.

Especially, it allows not to account for the considerable shrinkage of the materials during molding due to the heating temperatures required in the molding process. The need to account for these size changes is one of the greatest difficulties arising from the fabrication of fins with blades consisting of two different materials, both relatively stiff and covering wide surfaces of the blade.

In the second illustrated embodiment, referring to fig. 2, the fin differs from the one shown in fig. 1 in that it

has, in its central part, a pointed V-shaped insert 201, which does not reach the end of the blade 1. The central part 301 is connected to the peripheral part 101 by two lateral strips 501, made of the same material as the peripheral part 101. Hence, the central part 301 is substantially T-shaped.

Between the peripheral part 101 of the fin and the insert 201, there is provided a hollow 2, having a corresponding projection 2' on the rear side, as shown in fig. 3. The hollow and the corresponding projection also have a pointed V shape, which is substantially similar to that of the part 201 of the blade. The hollow 2 is connected in decreasing depth to the end of the blade 1.

The central area 301 of the blade has a slightly arched longitudinal projection 401 therein, having a substantially elongated shape in the axial direction of the blade, which has a corresponding step-like recess 401' on the rear side.

In the rear part, the two lateral ribs 4 and the wide central projection 2' delimit two longitudinal side grooves 5 therein, which terminate at the point of the footpocket in a very deep notch 6.

Figure 4 is a cross sectional view of the blade 1, at about the middle of its length, with the two lateral ribs 4, the two downflow grooves 5, the second accordion-folded part 201 of the blade made of soft material, the central part of the blade 301, there being emphasized the longitudinal fore projection 401 and the corresponding step-like rear recess 401'.

These arrangements have the advantage to improve the dynamic deformability properties of the fin inside water, while ensuring a better thrust, thanks to the spoon-shaped deformation and to the greater amount of water collected.

The invention is not limited to the embodiments described and illustrated herein, but may be greatly varied, especially as regards construction. So, for example, the different shapes of the second part 201 of the blade may be provided in combination with the example shown in fig. 1 and with that shown in fig. 2. The accordion cross section may be also provided in combination with the embodiment shown in fig. 1. The whole without departure from the guiding principle disclosed above and claimed below.

Claims

1. A swim fin comprising a blade part (1) and a seat for the foot, the so-called footpocket (2), the blade part (1) consisting of at least two parts, a first and a second part of the blade (101, 201), made of different materials, characterized in that the blade (1) has an additional part (301), which is made of a material being different at least from said second part of the blade (201).

2. A fin as claimed in claim 1, characterized in that the second part of the blade (201) is U- or V-shaped

and delimits a central area (301) of the blade, separating it from the peripheral areas of the blade (101), said second part of the blade (201) being made of an elastically deformable material, such as rubber, or similar.

5

3. A fin as claimed in claims 1 or 2, characterized in that the second part of the blade (201), a V-shaped insert, which surrounds the central area (301) of the blade, may have different widths and is generally a few centimeters large.

10

4. A fin as claimed in claims 2 or 3, characterized in that the V or U shape of the second part (201) of the blade may be more or less pointed and rounded, from a round arched shape, through an arched spindle-like shape, to a V shape with straight arms.

15

5. A fin as claimed in one or more of the preceding claims, characterized in that the second part (201) of the blade may be extended up to the end of the blade, thus completely separating the central part (301) of the blade from the first peripheral part (101), or may terminate at a certain distance from the end of the blade, so that the central area of the blade is connected to the first peripheral part, by two strips of material (501) along the free edge of the blade.

20

25

6. A fin as claimed in one or more of the preceding claims, characterized in that the second part (201) of the blade and the central part (301) thereof may be made of materials being different from each other and from the first peripheral part (101) of the blade both as regards typology and, individually or in combination, as regards stiffness, flexibility, extensibility, color.

30

35

7. A fin as claimed in claim 6, characterized in that the second part (201) of the blade is different both from the first (101) and from the central one (301) as regards typology and/or technical characteristics of the material and/or color, whereas the central part (301) may be identical as regards typology and/or technical characteristics of the material and/or color of the material to the first part of the blade, or of a different material therefrom, and whereas the second part of the blade (201) may be made of the same type of material as the footpocket, or of a different material, the fin being composed of a minimum of two and a maximum of four different materials, and the blade (1) being composed of a minimum of two and a maximum of three different materials.

40

45

50

55

8. A fin as claimed in one or more of the preceding claims, characterized in that the second part (201) of the blade has an accordion cross section.

9. A fin as claimed in claim 8, characterized in that the second part of the blade (201), has a corrugated cross section, all along its longitudinal extension, there being provided at least one, particularly two, preferably three or more corrugations.

10. A fin as claimed in one or more of the preceding claims, characterized in that the central part (301) of the blade has a plan T-shape, the transverse arm of the T being at the free end edge of the blade (1), whereas the ends of the transverse arms of the T may or may not be connected to the corresponding peripheral part (101) of the blade.

11. A fin as claimed in one or more of the preceding claims, characterized in that the first peripheral part (101) of the blade has a hollow (2) in the central area of the upper face, outwardly surrounding the second part (201) of the blade, which is provided on the bottom area of the hollow (2).

12. A fin as claimed in claim 11, characterized in that the hollow (2) on the upper face of the fin corresponds to a projection (2') on the lower face of the blade (1), which is substantially complementary to the hollow (2) in shape.

13. A fin as claimed in claim 12, characterized in that the hollow (2) and the complementary projection (2') have a relatively prominent step-like connection rim along the rest of the peripheral part (101) of the blade, but degrade in a rounded profile towards the outer edge of the second part (201) of the blade, following its outer peripheral shape in a substantially corresponding way.

13. A fin as claimed in one or more of the preceding claims, characterized in that the projection (2') in the central area of the blade (1) forms two longitudinal side downflow grooves (5) on the lower face of the blade between the peripheral walls of said projection (2') and the lateral ribs (4) of the blade (1), which grooves (5) discharge together into a notch (6) in the area connecting the footpocket (3) to the blade (1) and at the top of the projection (2').

15. A fin as claimed in claim 14, characterized in that the blade (1) and the footpocket (3) have slanting lower or rear faces which form a predetermined angle, whereas the lateral ribs get higher in the area connecting the blade (1) to the footpocket (3), and form the lateral boundary of the discharge notch (6) for the longitudinal side grooves (5) on the rear face of the blade (1).

16. A fin as claimed in one or more of the preceding claims, characterized in that the top of the projection (2') on the footpocket (3) side does not project

beyond the plane defined by the edges of the lateral ribs.

17. A fin as claimed in one or more of the preceding claims, characterized in that the footpocket (3) ⁵ forms a projection on the rear side of the fin, with respect to the rear or lower face of the peripheral part (101) of the blade (1), which delimits the notch (6) on the footpocket (3) side, and which projecting footpocket (3) has a rounded profile, with a projec- ¹⁰ tion substantially comparable to that of the projection (2') and of the lateral ribs (4).

18. A fin as claimed in one or more of the preceding claims, characterized in that the central part (301) ¹⁵ has, on its upper face, at least one longitudinal projection (401), which is slightly arched and corresponds to a longitudinal step-like recess (401') on the rear face.

19. A fin as claimed in claim 18, characterized in ²⁰ that the longitudinal projection/s (401) are of a substantially elongated shape, extending in the axial direction of the blade.

20. A swim fin, wholly or partially as described, ²⁵ illustrated and for the purposes stated herein.

³⁰

³⁵

⁴⁰

⁴⁵

⁵⁰

⁵⁵

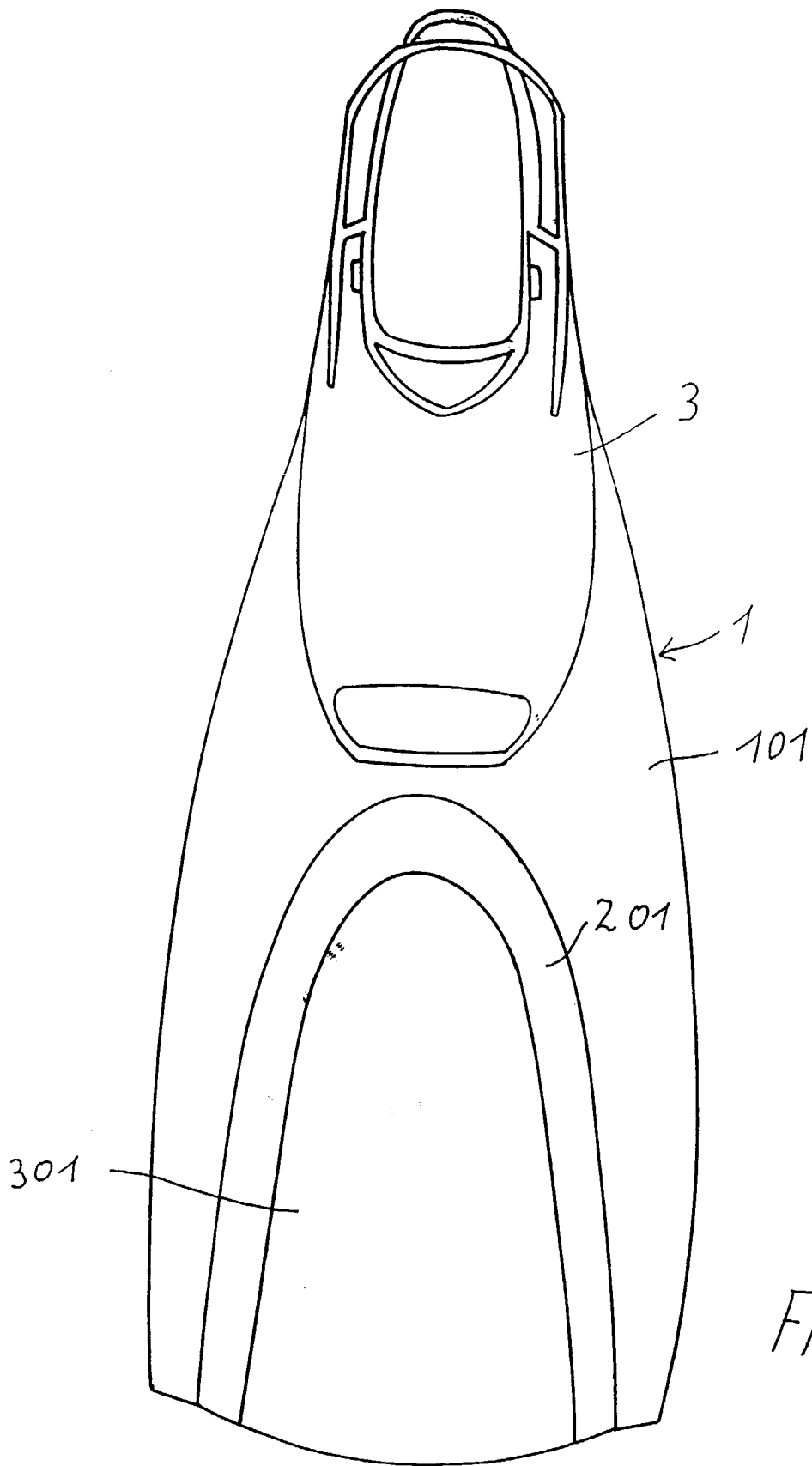
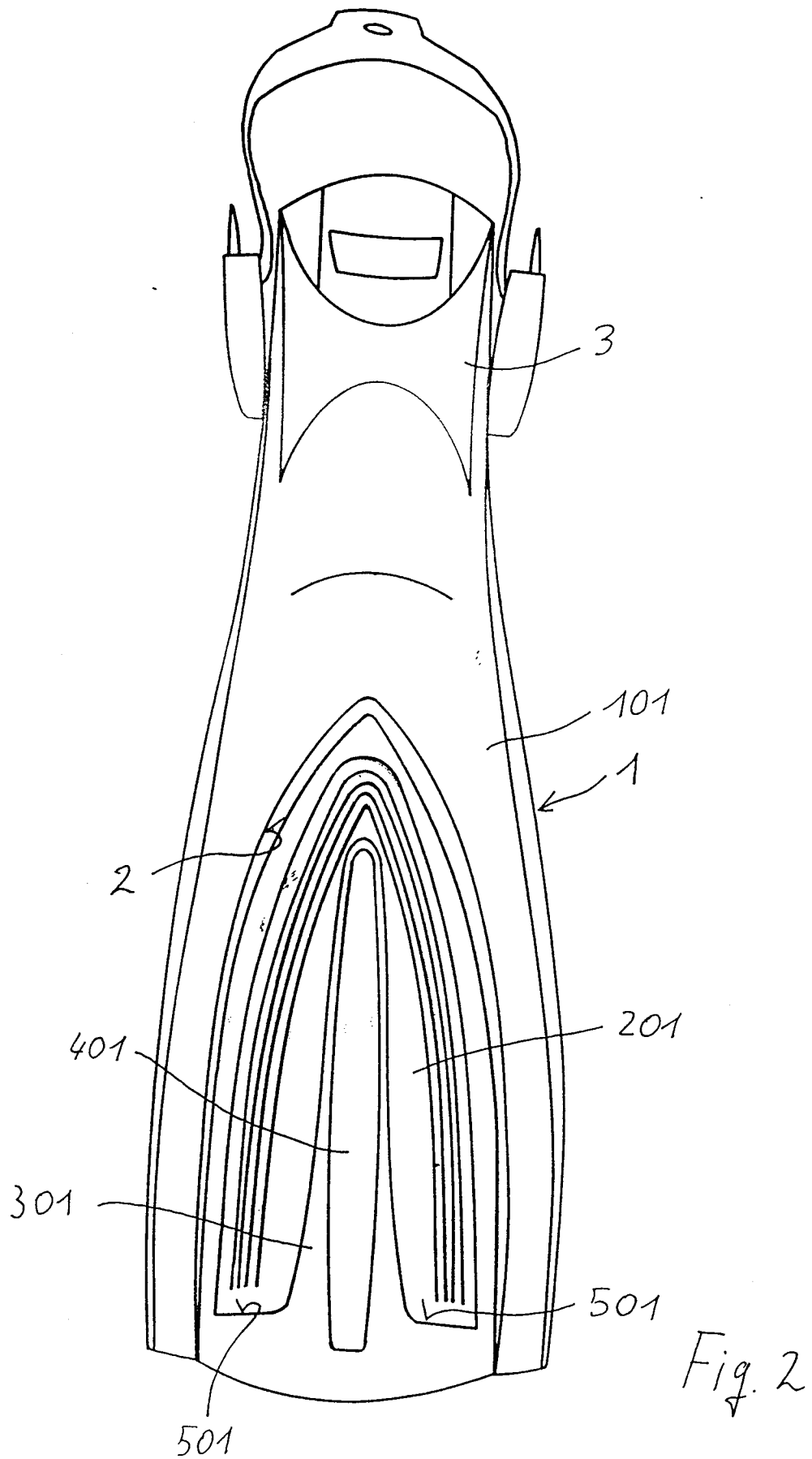
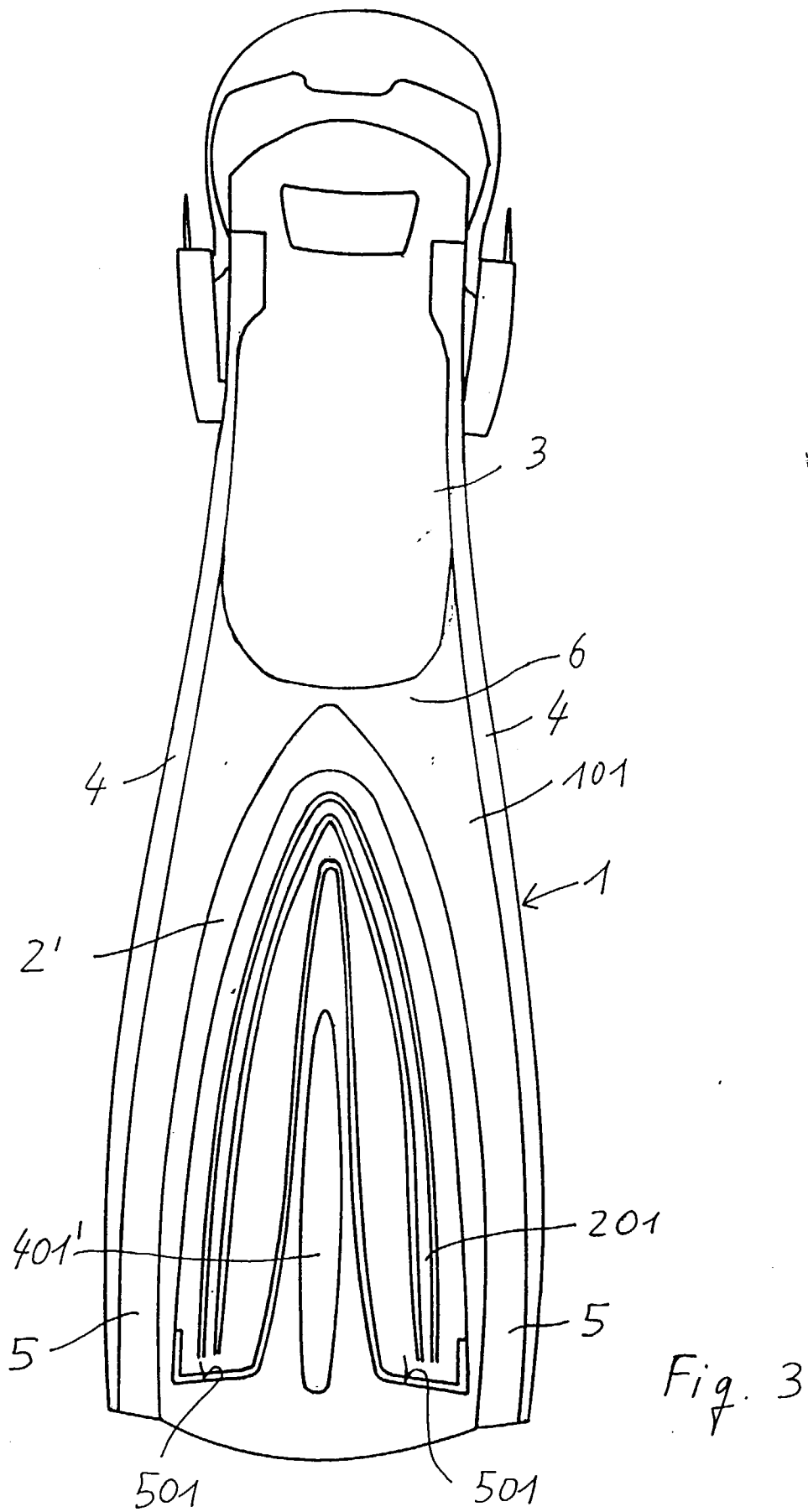


Fig. 1





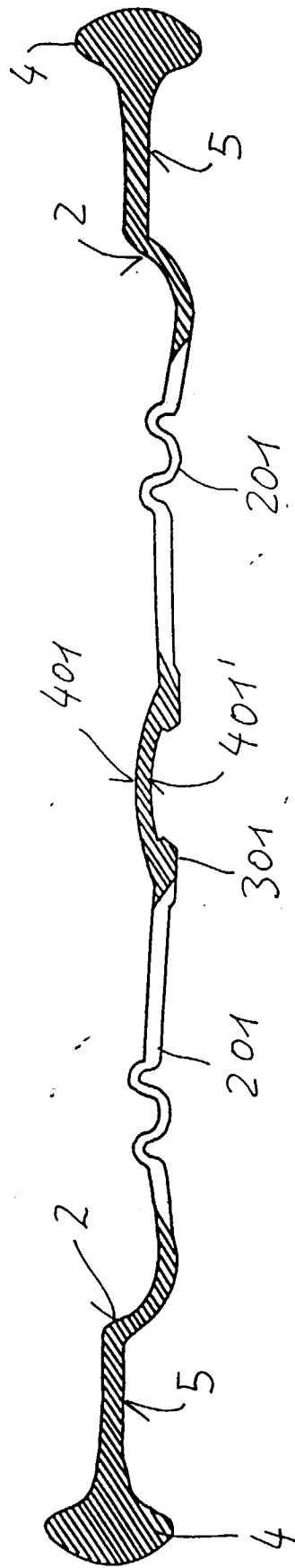


Fig. 4