(51) International Patent Classification  
A63C 15/05, B63B 3/38

(11) International Publication Number:  WO 90/02589
(43) International Publication Date:  22 March 1990 (22.03.90)

(21) International Application Number:  PCT/AU89/00395
(22) International Filing Date:  12 September 1989 (12.09.89)
(30) Priority data:  
PJ 0423  14 September 1988 (14.09.88)  AU

(71)(72) Applicants and Inventors: BURROWS, Selwyn, Charles [AU/AU]; 25 Lentara Street, Kenmore, QLD 4069 (AU). 
HOPPER, Michael, Charles [AU/AU]; 15 Evalma Drive, Buderim, QLD 4556 (AU).

(74) Agent: ANESE, Claude, Paul; G.R. Cullen & Co., 79 Eagle Street, Brisbane, QLD 4000 (AU).

(81) Designated States: AT (European patent), AU, BE (European patent), BR, CH (European patent), DE (European patent), FR (European patent), GB (European patent), IT (European patent), JP, LU (European patent), NL (European patent), SE (European patent),

(54) Title:  AN IMPROVED FIN FITTING METHOD

An improved method for fitting a fin (35) to a board (31) enables the fin (35) to be fitted simply and quickly after the board (31) has been coated with fibreglass (30) and polished. The fin (35) has a base (36) provided with a flange portion (37). A slot (32) is formed in the board, and adhesive (38) is applied to the slot (32) and/or the base (36). The base (36) is then inserted in the slot (32) such that the flange portion (37) abuts the board surface, and the adhesive (38) is allowed to set. The base may comprise a plurality of tongue-like projections (42) or pins (46) which engage in corresponding slots (41) or holes (47) in the board.
FOR THE PURPOSES OF INFORMATION ONLY

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>AT</td>
<td>Austria</td>
<td>ES</td>
<td>Spain</td>
<td>MG</td>
<td>Madagascar</td>
</tr>
<tr>
<td>AU</td>
<td>Australia</td>
<td>FI</td>
<td>Finland</td>
<td>ML</td>
<td>Mali</td>
</tr>
<tr>
<td>BB</td>
<td>Barbados</td>
<td>FR</td>
<td>France</td>
<td>MR</td>
<td>Mauritania</td>
</tr>
<tr>
<td>BE</td>
<td>Belgium</td>
<td>GA</td>
<td>Gabon</td>
<td>MW</td>
<td>Malawi</td>
</tr>
<tr>
<td>BF</td>
<td>Burkina Faso</td>
<td>GB</td>
<td>United Kingdom</td>
<td>NL</td>
<td>Netherlands</td>
</tr>
<tr>
<td>BG</td>
<td>Bulgaria</td>
<td>HU</td>
<td>Hungary</td>
<td>NO</td>
<td>Norway</td>
</tr>
<tr>
<td>BJ</td>
<td>Benin</td>
<td>IT</td>
<td>Italy</td>
<td>RO</td>
<td>Romania</td>
</tr>
<tr>
<td>BR</td>
<td>Brazil</td>
<td>JP</td>
<td>Japan</td>
<td>SD</td>
<td>Sudan</td>
</tr>
<tr>
<td>CA</td>
<td>Canada</td>
<td>KP</td>
<td>Democratic People's Republic of Korea</td>
<td>SE</td>
<td>Sweden</td>
</tr>
<tr>
<td>CF</td>
<td>Central African Republic</td>
<td>KR</td>
<td>Republic of Korea</td>
<td>SN</td>
<td>Senegal</td>
</tr>
<tr>
<td>CG</td>
<td>Congo</td>
<td>LI</td>
<td>Liechtenstein</td>
<td>SJ</td>
<td>Soviet Union</td>
</tr>
<tr>
<td>CH</td>
<td>Switzerland</td>
<td>LK</td>
<td>Sri Lanka</td>
<td>TD</td>
<td>Chad</td>
</tr>
<tr>
<td>CM</td>
<td>Cameroon</td>
<td>LU</td>
<td>Luxembourg</td>
<td>TG</td>
<td>Togo</td>
</tr>
<tr>
<td>DE</td>
<td>Germany, Federal Republic of</td>
<td>LU</td>
<td>Luxembourg</td>
<td>US</td>
<td>United States of America</td>
</tr>
</tbody>
</table>
"AN IMPROVED FIN FITTING METHOD"

This invention relates to an improved fin fitting method. In particular, the invention is directed to an improved method of fitting fins to surfboards, surf skis, sailboards and the like.

Throughout the specification, the term "board" is used to denote an article such as a surfboard, surf ski, sailboard or the like.

BACKGROUND ART

Fins must be attached to boards with sufficient strength to withstand the forces imparted to the fins in use. In known methods of fin fitting, the fin is typically fixed by adhesion to the bottom face of the board, or located in a fin box fitted in the bottom of the board. Known fin fitting methods are illustrated schematically in Figs. 1 to 4.

In the method illustrated in Figs. 1 and 2a-2d, a fin 10 is adhered to the fibreglass coating 12 on a foam board 11. In the initial step, illustrated in Fig. 2a, adhesive 14 is placed on the base of the fin 10 and the fin is adhered to the unpolished fibreglass surface 12 of the board. Fibreglass rovings or strands and cloth 13 are positioned around the base of the fin as shown in Fig. 2b to provide the required lateral support. The rovings and cloth 13 are then thoroughly wetted with epoxy resin adhering to both the fin 10 and the surface 12, and allowed to set, thereby forming a solid support around the base of the fin as
shown in Fig. 2c. Finally, the surface around the base of the fin 10 is smoothed with abrasive paper and polished to form the finished product shown in Fig. 2d.

In an alternative prior art procedure, illustrated in Figs. 3 and 4a-4c, a fin 20 is held within a fin box or housing which is located within a groove or slot cut into the board. In this procedure, a groove or slot 23 is first cut into the fibreglass coating 22 and foam 21 of the board as shown in Fig. 2a. A fin box or housing 24 is then adhered into the groove (Fig. 4b). A fin 20 having a co-operating base is fitted and held within the fin box or housing 24 with a suitable locking device. Examples of fins mounted in fin boxes can be found in U.S. patents nos. 4,493,665 and 4,379,703.

An inherent disadvantage of the abovedescribed fin fitting procedures is that the fitting procedure occurs before the finishing of the fibreglass surface of the board. In the fin fitting procedure of Figs. 1 and 2a-2d, the fin is adhered to the board after the board is coated with fibreglass but before finishing of the fibreglass surface. With the fin in place, it is thereafter awkward to sand and polish the board around the fin base with power tools. This difficulty or awkwardness is increased when sanding or polishing multiple fin boards. Consequently, these arduous tasks are completed manually. In the procedures of Figs. 3 and 4a-4c, a groove is cut into the board after it has been
glassed and sanded but before finishing. Care must be taken to ensure a neat fit as the join can be seen. The housing or box is then adhered into position. The fin channel in the housing must be packed so it will not close up during subsequent operations and it must be sealed against the incursion of resin during the finishing operation. These additional steps increase the cost and complexity of the procedure.

It is an object of the present invention to overcome or substantially ameliorate the disadvantages of prior art methods by providing an improved fin fitting procedure wherein the fin can be fitted after the fibreglass coating has been completed.

SUMMARY OF THE INVENTION

In one broad form, the present invention provides an improved method of fitting a fin to a board, comprising the steps of:

(a) forming at least one slot or hole in a face of the board,

(b) providing a fin having a flange portion adjacent its base,

(c) applying adhesive to the slot(s) or hole(s) and/or the base of the fin,

(d) inserting the base of the fin into the slot(s) or hole(s) such that the flange abuts the face of the board, and allowing the adhesive to set.
In the fin fitting procedure of the present invention, the fin can be fitted to the board after the fibreglass coating has been applied. Separation of the coating and fin fitting processes reduces the time required for both procedures thereby increasing the efficiency of the whole process. As the fin fitting takes place after the sanding and polishing of the fibreglass, these tedious tasks can be performed beforehand with the full use of power tools. Furthermore, the fin does not require a housing or box and the dimensions of the slot(s) or hole(s) are not critical as they are hidden under the flange of the fin.

Boards can be made, transported and sold without fins, and the fins can be fitted as per customer's requirements.

Typically, a single slot is cut into the fibreglass coated board with a router and the base of the fin is inserted into the slot. However, two or more slots may be formed in the board to receive a corresponding number of tongues formed on the base of the fin. Alternatively, one or more holes may be drilled in the fibreglass coated board to receive respective pins formed on the base of the fin.

In the preferred embodiment, flanges are provided on opposite sides of the fin, the flanges having a flat underside for abutting the face of the board, and a curved topside for forming a smooth transition between the fin sides and the board.
The fin can suitably be made from plastics material, e.g. by injection moulding. However, other materials such as carbon fibre can be used to make the fin.

In order that the invention may be more fully understood and put into effect, preferred embodiments thereof will now be described with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figs. 1 to 4 illustrate prior art fin fitting procedures hereinbefore described;

Figs. 5a to 5c illustrate the fin fitting procedure of the preferred embodiment;

Fig. 6 is a sectional elevational view of a fin fitted in accordance with the preferred embodiment;

Fig. 7 is a perspective view of the fin of the embodiment of Fig. 5;

Fig. 8 is a perspective view of a fin according to another embodiment;

Fig. 9 is a perspective view of a fin according to yet another embodiment of the invention.

DESCRIPTION OF PREFERRED EMBODIMENT

In the fin fitting procedure of the preferred embodiment, the board is first prepared by shaping a foam body into the desired shape. A flat surface corresponding in shape to the fin flanges should preferably be provided on the board to ensure a flush fit between the board and the flanges.
on the fin (as described hereinafter). The desired designs and colours can be applied to the board which is then coated with fibreglass and sanded, typically with a power tool. The finish coat is then applied and polished, typically also with a power tool. When sanding the board, the flat surface should be maintained. Alternatively, the finish coat can be lightly sanded flat in the area where the fin is to be fitted.

To fit a fin, a slot 32 is marked out on the board and cut into the fibreglass coating 30 and foam body 31 of the board as shown in Fig. 5a. The slot 32 is typically cut with a router tool. Adhesive 38 is applied to the slot 32 and/or the base 36 of a fin 35 as shown in Fig. 5b. The fin 35 is typically made of plastics material, and is provided with a pair of lateral flanges 37 having a flat underside for a flush fit with the board. The topsides of the flanges are curved to provide a smooth transition between the fin 35 and the surface of the board. Adhesive may also be applied to the underside of the flanges 37.

The base 36 of the fin is then pushed into position in the groove 32 and excess adhesive is wiped away. The adhesive is allowed to set such that the fin 35 is fixed in position as shown sectionally in Fig. 6. No further sanding or polishing is required as the preformed flanges 37 on the fin 35 provide a smooth transition between fin and board.

The flanged base 36 of the fin is adhered both onto
and into the board, combining the fixing features of the two prior art fin fitting methods hereinbefore described yet allowing the fin to be fitted after polishing.

The adhering of the fin 35 both to the slot and the face of the board gives the fin increased resistance to loads. The tongue or base 36 of the fin anchors the fin against bending and twisting loads applied in the direction A shown in Fig. 6. The flanges 37 also guard against downward loads applied in direction B, especially shock loading incurred when the fin hits obstacles such as rocks, sand, etc.

Comparative tests have shown that the fin fitting procedure of the preferred embodiment requires approximately half the time required for the prior art fin fitting procedures. The saving in process time is due mainly to eliminating the glassing and sanding required in prior art procedures.

Furthermore, the fin fitting procedure of the invention is simple and easy to perform.

The foregoing describes only one embodiment of the invention, and modifications which are obvious to those skilled in the art may be made thereto without departing from the scope of the invention as defined in the following claims. For example, as shown in Fig. 8, a fin 40 may have a base comprising two tongues 42 which are received in respective slots 41 formed in the board. The tongues/slots
are suitably located on either side of the centre strip line of the board. In yet another embodiment of the present invention, a fin 45 may have a base comprising a plurality of pins 46 which are received in respective holes 47 formed in the board.
CLAIMS

1. A method of fitting a fin to a board, comprising the steps of
   forming at least one slot or hole in a face of the board,
   providing a fin having a base and a flange portion adjacent its base,
   applying adhesive to the slot(s) or hole(s) and/or the base of the fin,
   inserting the base of the fin into the slot(s) or hole(s) such that the flange portion abuts the face of the board, and
   allowing the adhesive to set.

2. A method as claimed in claim 1, wherein the fin is fitted to the board after a fibreglass coating has been applied to the board and polished.

3. A method as claimed in claim 1, wherein adhesive is also applied to the side of the flange portion facing the board.

4. A method as claimed in claim 1, including the step of providing a substantially flat surface on the board around the slot(s) or hole(s).

5. A method as claimed in claim 1 wherein a plurality of slots are formed in the board, and the base comprises a corresponding number of elongate projections which are inserted into the respective slots.
6. A method as claimed in claim 1 wherein a plurality of holes are formed in the board, and the base comprises a corresponding number of pins which are inserted into the respective holes.

7. A method as claimed in claim 1 wherein the flange portion has a flat surface on one side, and a curved surface on the opposite side whereby in use, the flat surface abuts the board and the curved surface provides a smooth transition between the fin and the board.

8. A board fitted with a fin according to the method of claim 1.

9. A board as claimed in claim 8, said board being a surfboard.

10. A fin suitable for fitting to a board according to the method of claim 1, the fin comprising a base portion having a flange on both sides thereof, the flange having a flat surface on one side and a curved surface on the other side, whereby in use the flat surface abuts the surface of the board.

11. A fin as claimed in claim 10, wherein the base comprises a plurality of spaced parallel projections each extending longitudinally along the fin.

12. A fin as claimed in claim 10, wherein the base comprises a plurality of pin-like projections for insertion into corresponding holes in the board.
### I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)

According to International Patent Classification (IPC) or to both National Classification and IPC

Int. Cl. 4 A63C 15/05, B63B 3/38

### II. FIELDS SEARCHED

Minimum Documentation Searched

### Classification System | Classification Symbols

| IPC | A63C 15/00, 15/05; B63B 3/38, 35/72, 35/80, 35/82, 35/84 |

Documentation Searched other than Minimum Documentation to the extent that such documents are included in the fields searched

OU: IPC as above

### III. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of Document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to Claim No 13</th>
</tr>
</thead>
<tbody>
<tr>
<td>X, Y</td>
<td>DE, A, 2922860 (SIEFREICH) 18 December 1980 (18.12.80)</td>
<td>(1-12)</td>
</tr>
<tr>
<td>X, Y</td>
<td>US, A, 3965514 (SHAFFER et al) 29 June 1976 (29.06.76) (Note col 4, lines 1-8)</td>
<td>(1-12)</td>
</tr>
<tr>
<td>X, Y</td>
<td>AU, B, 84472/75 (401811) (HANIMEX PTY LTD) 10 March 1977 (10.03.77)</td>
<td>(1-12)</td>
</tr>
<tr>
<td>X, Y</td>
<td>AU, B, 73654/81 (339918) (HANIMEX PTY LTD) 4 February 1982 (04.02.82)</td>
<td>(1-12)</td>
</tr>
<tr>
<td>X, Y</td>
<td>AU, B, 76358/81 (527179) (WOODRIFF) 17 February 1983 (17.02.83)</td>
<td>(1-12)</td>
</tr>
<tr>
<td>X, Y</td>
<td>WO, A, 82/01694 (AKUTEC ANGEBANDTE KUNSTSTOFFTECHNIK GMBH) 27 May 1982 (27.05.82)</td>
<td>(1-12)</td>
</tr>
</tbody>
</table>

* Special categories of cited documents: 10 T:

- *A*: document defining the general state of the art which is not considered to be of particular relevance
- *E*: earlier document but published on or after the international filing date
- *L*: document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- *O*: document referring to an oral disclosure, use, exhibition or other means
- *P*: document published prior to the international filing date but later than the priority date claimed
- *Y*: later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- *X*: document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step
- *S*: document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- *G*: document member of the same patent family

### IV. CERTIFICATION

<table>
<thead>
<tr>
<th>Date of the Actual Completion of the International Search</th>
<th>Date of Mailing of this International Search Report</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 December 1989 (12.12.89)</td>
<td>20.12.89</td>
</tr>
</tbody>
</table>

International Searching Authority

Australian Patent Office

Form PCT/ISA/210 (second sheet) (January 1985)
FURTHER INFORMATION CONTINUED FROM THE SECOND SHEET

| X, Y | US, 3579681 (POPE et al) 25 May 1971 (25.05.71) | (1-12) |
| X, Y | US, 3585663 (JOHNSON) 22 June 1971 (22.06.71) | (1-12) |
| X, Y | US, 3659300 (JOHNSON) 2 May 1972 (02.05.72) | (1-12) |

V. [ ] OBSERVATIONS WHERE CERTAIN CLAIMS WERE FOUND UNSEARCHABLE

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1.[] Claim numbers ..., because they relate to subject matter not required to be searched by this Authority, namely:

2.[] Claim numbers ..., because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:

3.[] Claim numbers ..., because they are dependent claims and are not drafted in accordance with the second and third sentences of PCT Rule 6.4 (a);

VI. [ ] OBSERVATIONS WHERE UNITY OF INVENTION IS LACKING

This International Searching Authority found multiple inventions in this international application as follows:

1.[] As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims of the international application.

2.[] As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims of the international application for which fees were paid, specifically claims:

3.[] No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claim numbers:

4.[] As all searchable claims could be searched without effort justifying an additional fee, the International Searching Authority did not invite payment of any additional fee.

Remark on Protest

[ ] The additional search fees were accompanied by applicant’s protest.

[ ] No protest accompanied the payment of additional search fees.

Form PCT/ISA/210 (supplemental sheet (2)) (January 1985)