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⑤⁴ **A sail batten.**

⑤⁷ The invention relates to a hollow non cylindrical batten (10) for a sailboard formed from plastics material with a body (12) having a cross-sectional profile that varies along its length.

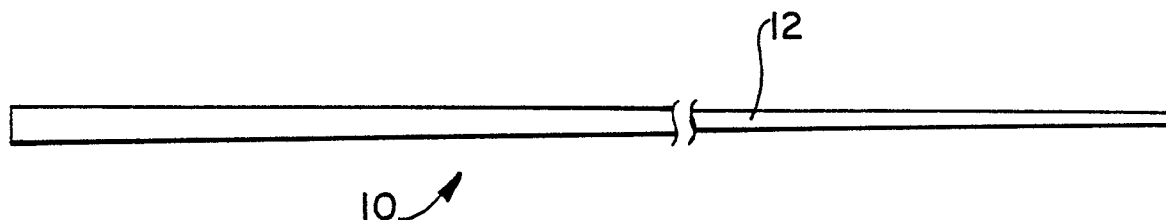


FIG 1

EP 0 300 714 A1

A Sail Batten

THIS INVENTION relates to a sail batten. More particularly, the invention relates to a batten for a sailboard sail.

Sailboards are watercrafts meant for sailboarding or wind surfing, which essentially include a streamlined base on which is mounted a mast to which a sail is attached, a boom being provided for manipulating the mast and the sail and thus for navigating the sailboard. Since the early eighties, the sails of sailboards are increasingly being provided with battens for stiffening, supporting or reinforcing the sails and ensuring that the sails are in a desired manoeuvrable position in relation to wind direction in order that the sailboard is navigable at optimum speeds with optimum efficiency.

In designing such battens for crafts such as sailboards, some factors are important, i.e. the compression pressure of the batten, its draught which is the percentage distribution of a minor axis in its curved state to its major axis, its weight and its inherent resistance to breaking apart as well as the actual cost of the battens.

Sail battens of the prior art generally apply to yachts, and the like, but when applied to sailboards generally comprise flat strips of uniform or tapering width and of uniform or tapering thickness made of wood, or plastics. Whilst these sail battens claim to be extremely successful, their construction is labour intensive and involves a considerable wastage of material. These battens are also relatively heavy.

It is an object of this invention to provide a sail batten that is lighter in weight and cheaper to produce than known battens.

According to the invention there is provided a sail batten which includes a formed, hollow, non cylindrical elongate element defining a varying cross-sectional profile along its length.

The elongate element may typically taper from one end of the element to the other.

According to one embodiment of this aspect of the invention, the elongate, hollow element may have a constant thickness wall along the length thereof. Alternatively, the wall thickness of the elongate element may vary between opposite ends of the element.

As such, the wall thickness of the elongate element may taper in the same direction as does the cross-sectional profile of the element.

A second aspect of the invention accordingly provides for a sail batten which includes an elongate hollow non-cylindrical element defining a varying cross-sectional profile and having a tapered bore.

Once again, the wall thickness of the element may be substantially constant but, alternatively, the

wall thickness of the elongate element may taper from one end of the element to the other end. In addition, the varying cross-sectional profile of the element may taper from one end of the elongate element to the other and, typically, may taper in the same direction as does the wall thickness of the element.

In general, the degree of taper of the wall thickness and/or the cross-sectional profile of the elongate element, forming a batten in accordance with both aspects of the invention, may determine the required bending or flexing properties of the batten and also its compression pressure and draught percentage, it being well known that different battens require different properties and that sail board battens do not define a regular arcuate profile when bent into its normal operational mode.

The degree of taper can therefore be variable and may particularly be determined by specific batten requirements. The degree of taper of the cross-sectional profile of the element may generally determine the bending properties of a batten whereas wall thickness tapering can provide for exact properties.

The profile of a batten, in accordance with the invention, may be variable, the typical ratio of major axis length to minor axis length of the cross-section being between 4:1 and 2.5:1.

As such, the inner and outer cross-sectional profile of battens in accordance with both aspects of the invention may be elliptical, polygonal, substantially rectangular with round ends, or the like.

Furthermore, battens, in accordance with both aspects of the invention, may be of fibreglass being a composition including glass fibres and a thermosetting resin. The glass fibres may be provided in sheet form, so that they can be wound onto a mandril for forming a batten. As such, the glass fibre content may comprise unidirectional glass fibre sheeting of approximately 0.25mm thickness.

The thermosetting resin may be an isothalic resin such as a polyester resin, or the like. The typical ratio of glass fibre to resin may be in the region of 60:40.

Battens, in accordance with both aspects of the invention, may further include a filler material, inserted into the hollow element. The filler material may be specifically adapted to prevent wall collapse of the elongate element when bent and, as such, may comprise glass microspheres, a suitable foam material, or the like.

Still further, a batten, in accordance with the invention, may include end caps for closing-off opposite ends of the hollow element forming the

batten.

The invention is now described, by way of an example, with reference to the accompanying diagrammatic drawings, in which:

Figure 1 shows a side view of a batten for a sailboard sail, in accordance with the invention;

Figure 2 shows a cross-sectional end view of the batten of Figure 1;

Figure 3 shows a partially sectioned end view of one end portion of the batten of Figure 1, on an enlarged scale; and

Figures 4 a, b and c show possible configurations of portions of battens, according to this invention, on an enlarged scale.

Referring to Figures 1 to 3 of the drawings, a batten for a sailboard sail, in accordance with the invention, is generally indicated by the reference numeral 10. The batten 10 comprises an elongate, hollow element 12 defining a non cylindrical cross-sectional profile that varies from one end of the element to the other.

The particular element 12 as shown tapers from one end to the other and has a constant wall thickness. However, the wall thickness of the element 12 may also taper, from one end of the element to the other (not shown), the direction of taper of the wall thickness in such a case conveniently being the same as the direction of taper of the overall cross-sectional profile of the element.

The exact profile of the element 12 may be variable for different battens and it is particularly anticipated that the element will define a flat rectangular shaped profile having curved ends and having a major axis to minor axis ratio of between 4:1 and 2,5:1. The said profile may also be elliptical, oval, polygonal, or the like.

It will be appreciated, as seen in Figures 4 a, b, c, that different wall configurations can be provided. It will also be appreciated that the degree of taper of the cross-sectional profile of the element 12 and/or of the wall thickness of the element 12 will determine the bending or flexing properties of the batten, it being anticipated that the degree of taper of the cross-sectional profile generally determining the bending properties of a batten whereas tapering of the wall thickness can provide for more specific bending properties. Thus the batten can have a tapering outer profile as well as a tapering inner bore as seen in Figure 4a or a constant inner bore with a tapering outer profile as seen in Figure 4b or a constant outer profile with a tapering inner bore as seen in Figure 4c. In this way battens can be provided that have substantially the exact bending properties as may be required for specific sailboard sail applications.

It is well known that the bending properties of sail battens vary for different requirements and the Applicant believes that all these requirements can

now be accurately complied with.

The sail batten 10 can be manufactured of fibre glass being a composition including glass fibres and a thermosetting resin and, as such, the batten 10 can typically be manufactured of uni-directional glass fibre sheeting having a 0,25mm thickness, which can be wound onto a mandril for forming the batten, and which sheeting can be bound together by means of a polyester resin, or the like. The ratio of glass fibres to polyester resin may typically be 60:40. Different methods of manufacture are also envisaged.

The batten 10 may optionally have a filler material 14 inserted into the elongate element 12 along the length thereof, the filler material typically being glass microspheres or a suitable foam material that can prevent collapsing of the tubular element 12 as a result of bending or twisting forces acting on the batten.

As such, opposite ends of the batten 10 may be provided with end caps 16 (only one shown in Figure 3), the end caps 16 being adapted to fit into opposite ends of the elongate element 12 as is clearly illustrated in Figure 3.

The Applicant believes that battens, in accordance with the invention, will be significantly cheaper than existing known battens while also being significantly lighter, and as these battens can be provided with specific bending or flexing properties it is believed that these battens will prove to be a significant development in the sailboard industry and, in particular, in respect of sailboard sails. The mode of use of battens of the above kind is well known and is therefore not described in any further detail in this specification.

Claims

1. A sail batten which includes a formed, hollow, non-cylindrical elongate element defining a varying cross-sectional profile along its length.

2. A sail batten as claimed in Claim 1, wherein the elongate element is self reinforced.

3. A sail batten as claimed in Claim 1, wherein the sail batten is formed from a thermosetting material such as fibre glass.

4. A sail batten as claimed in Claim 1, wherein the elongate element has a shaped geometrically defined outer profile and inner bore.

5. A sail batten as claimed in Claim 1, wherein the elongate element has a tapering bore and a constant wall thickness.

6. A sail batten as claimed in Claim 5, wherein the elongate element has an elliptical inner and outer outer cross-sectional profile.

7. A sail batten as claimed in Claim 5, wherein the elongate element has a polygonal inner and outer cross-sectional profile.

8. A sail batten as claimed in Claim 5, wherein the elongate element has a cross-sectional inner and outer profile defined by two parallel spaced apart straight lines defining the width of the batten, joined by curved end lines defining the thickness of the batten. 5

9. A sail batten as claimed in Claim 1, wherein the thickness of the wall of the element is uniform through its length. 10

10. A sail batten as claimed in Claim 1, wherein the thickness of the wall of the element is non uniform, the said wall thickness of the batten tapering from one end to the other. 15

11. A sail batten as claimed in Claim 1, wherein the elongate element has a profiled outer cross-sectional profile and an annular inner cross-sectional profile. 20

12. A sail batten as claimed in Claim 1, wherein the bore of the said element is filled with a filler material.

13. A sail batten as claimed in Claim 1, wherein the said element is provided with end caps for closing off the opposite ends of the element. 25

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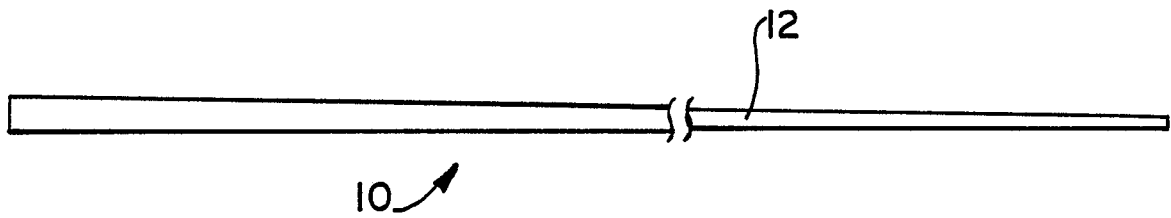


FIG 1

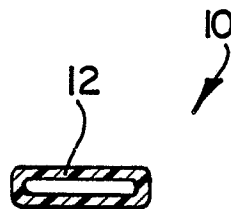


FIG 2

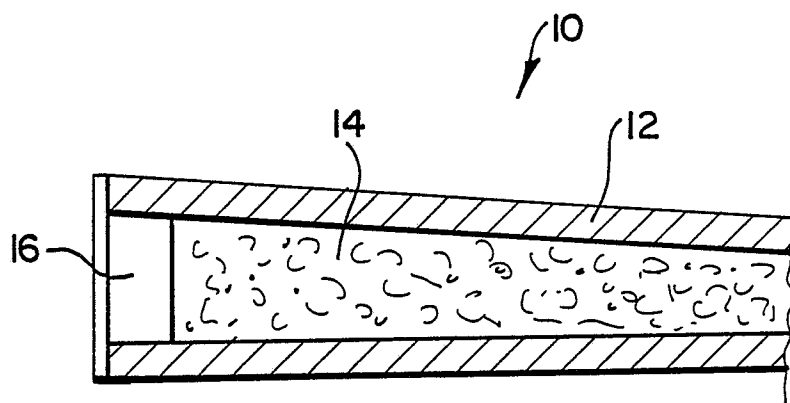


FIG 3

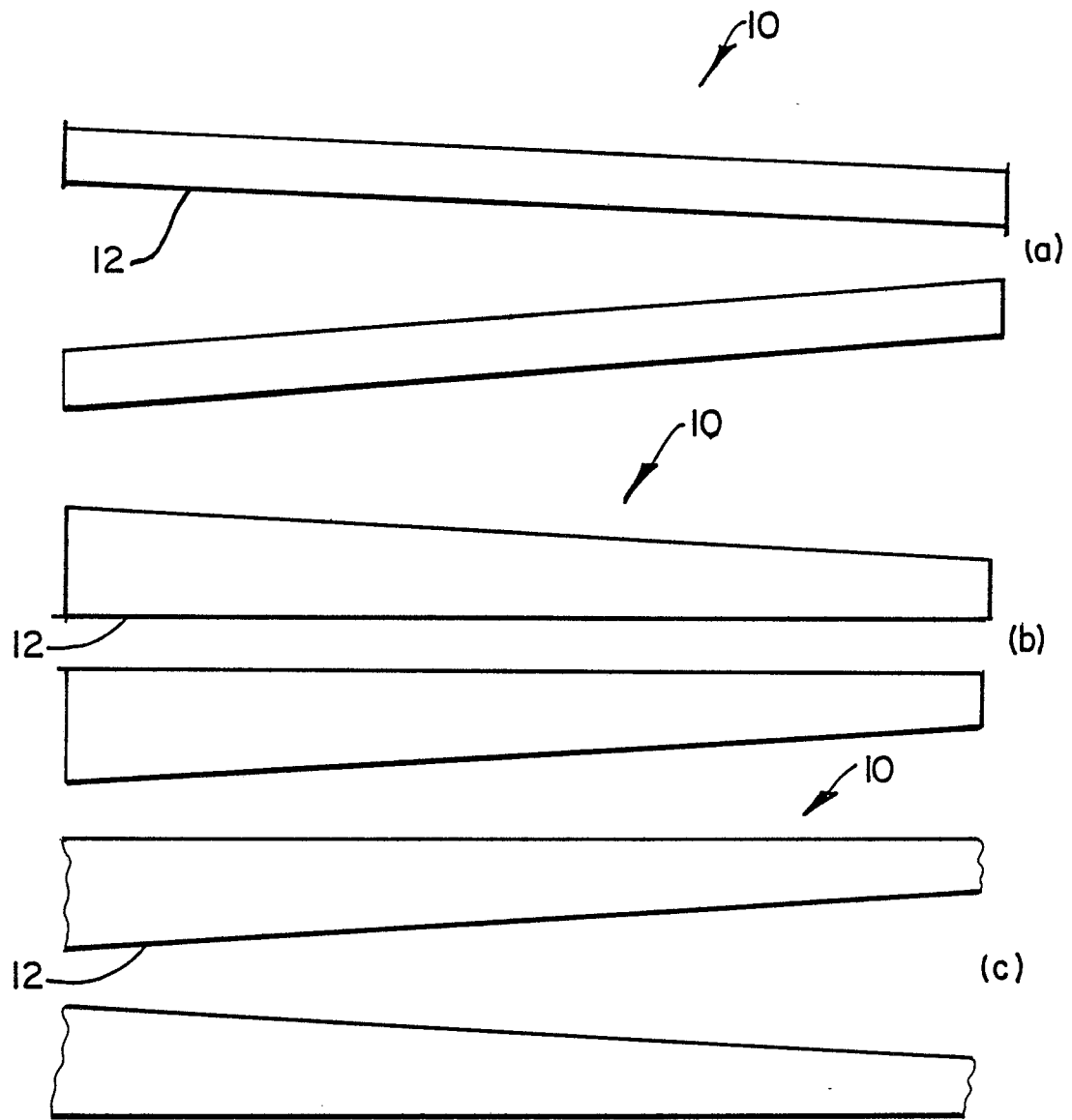


FIG 4



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	US-A-3 905 321 (BLYTHE Jr.) * Column 2, lines 16-48 * ---	1-3,5-13	B 63 H 9/06
X,P	EP-A-0 233 129 (J.BARIL) * Page 1, line 31 - page 2, line 7; page 2, lines 17-23; page 3, line 21 - page 4, line 16; page 5, lines 1-5,30-34; page 6, lines 1-7 * ---	1-2,8,9 ,11-13	
A	US-A-3 581 698 (J.U. BETE) * Abstract; column 1, line 59 - column 2, line 24 * ---	1,3,5,8 ,9,13	
A	US-A-3 168 068 (G.A. LASKO et al.) * Column 1, line 66 - column 2, line 62 * ---	1,2,4,5 ,7-10, 12	
A	US-A-2 608 172 (C.O.E. BIUW) * Column 2, lines 10-32 * -----	1-5,7-9 ,12	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 63 H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 17-10-1988	Examiner MARECHAL S.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			