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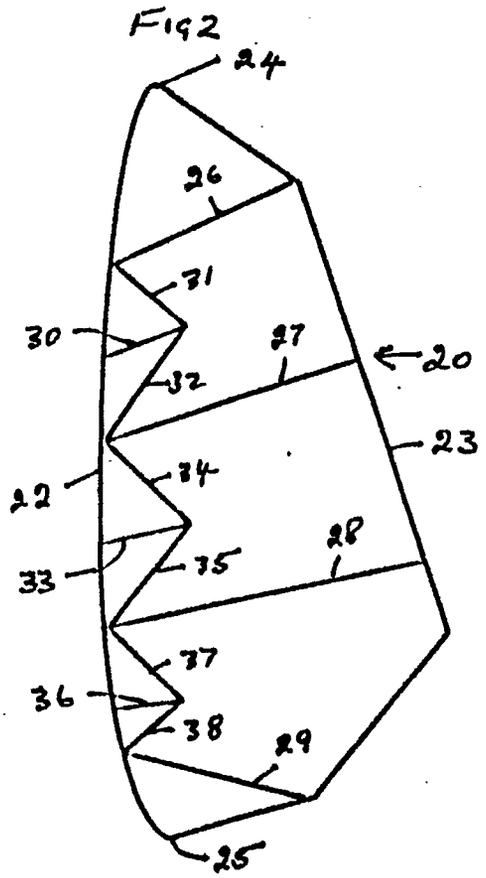
(54) Improved sails for sailboards and boats.

(57) An improved sail system is described, especially suitable for sailboard sails, in which a short batten (30, 33, 36) is located between each pair of full length battens (26-29), i.e. battens extending from the luff (22) to the leech (23) edges of the sail, and the inboard end (30a, 33a, 36a) of each short batten is joined to the luff end of each full length batten (26-29) by non-extensible flexible elements 31, 32, 34, 35, 37, 38 such as polyester fabric/film laminate strips sewn to the sail. Preferably the inboard end of the battens are secured to a seam (40) in the sail fabric (20) extending along the line of maximum tension from the head (24) to the tack (25) of the sail. Sail systems of the invention are more stable, achieve a better design shape and are lighter than conventional sails having a greater number of full length battens.

Fig 2



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IMPROVED SAILS FOR SAILBOARDS AND BOATS

The present invention relates to an improved design of sail especially suitable for use with sailboards.

Sails currently used in both sailboarding and boating in general include a number of battens. The battens may be long battens which traverse the full width of the sail or short battens which go part way into the sail.

In use the long battens are put under high pressure compression until the design shape of the sail is achieved.

This pressure may be applied by means such as webbing and buckle, webbing and velcro, mechanical devices or cords and eyelets. The pressure can be applied from either the luff (front) edge of the sail or from the leech (aft) edge of the sail. Short battens are used only to give support to a short width of sail cloth. The area of sail being supported by short battens is usually the leech of the sail although they are used in the foot of the sail also. Short battens are not placed under high pressure loads.

The greater number of battens the more stable is the sail, however battens are both expensive and heavy, the latter feature being of particular importance in sails used in sailboarding.

We have now developed a sail in which short battens are used in the luff of the sail.

Accordingly, therefore, the present invention provides a sail system comprising a sail, being a sheet of fabric extending lengthwise of a mast and attached to the mast at a plurality of points along its length for rotational movement thereabout, said sail having luff and leech edges and incorporating a plurality of full length battens extending between the luff and leech edges and attached to the sail along their length; characterised in that the said sail system further includes a plurality of short battens extending inboard of the sail from the luff edge, towards the leech edge, the short battens being located between full length battens.

Preferably one short batten is placed between two full length battens.

In the context of this description the term "fabric" includes, but is not limited, to conventional sail fabrics, such as close woven polyester fabric, a fabric/polymer film laminate, a fabric/scrim laminate, or a polymeric film.

Also in the context of the present description the expression "short battens" refers to battens that extend from one edge of a sail part way towards an opposite edge, preferably less than halfway.

We have also developed a method for transmitting some of the compression load from the long battens onto short battens either in the luff area of the sail.

A preferred design of sail uses both of these developments, short battens extending inboard from the luff edge of the sail are placed between full length battens, thereby improving the stability of the sail without the penalty of extra full length battens, and some of the compression load is transmitted from the long battens to the short battens

Transferance of the compression load is achieved by the use of very low stretch means, such as straps, extending from the luff end of the long battens to the inboard end of the short battens. In this manner some pressure is taken off the full length battens and is applied to the short battens thus enabling a reduction in the number of full length battens required to achieve a given design shape and stability of a sail when in use.

The sail of the present invention is especially suitable for use with sailboards in which application the short battens extend from the luff side of the sail and the low-stretch means extend from the luff end of the full length battens to the inboard end of the short battens.

Preferably the inboard ends of the short battens are positioned on the line of tension between the head and tack of the sail; the inboard ends of the short battens may conveniently be secured to a seam, which term includes non-stretch material secured to the sail, formed along the line of tension when such seam (or material) is present.

The low-stretch means may be any woven or non-woven material having a low stretch and which is flexible. Such materials include woven polyester cloth laminated to a polyester film, woven KEVLAR (R.T.M.) fabric, woven carbon fibre fabric or thick polyester fabric. The low stretch means may also be a cord, wire or any flexible material that allows the sail to be rolled up.

Embodiments of the invention will now be described with reference to the accompanying drawings in which:-

Figure 1 is a diagramatic representation of a prior art sail used in sailboarding and

Figure 2 is a diagramatic representation of a first embodiment of a sail of the present invention for use as a sailboard sail, and

Figure 3 is a representation of a second embodiment of a sail assembly according to the present invention.

In Figure 1 a sail, generally indicated at 1, has a luff edge 2, a leech edge 3, a head 4 and a tack 5. Full length battens 6, 7, 8, 9, and 10 formed from glass reinforced plastics material extend from

the luff edge of the sail to the leech edge 3, and are carried in pockets sewn into the sail in the conventional manner.

In Figure 2 a sail formed from a close woven polyester fabric, generally indicated at 20, has a luff edge 22, a leech edge 23, a head 24 and a tack 25. Full length battens 26, 27, 28 and 29 extend from the luff edge 22 to the leech edge 23. Short battens 30, 33 and 36 extend from the luff edge 22 of sail 20 inboard and are positioned between full length battens 26, 27; 27, 28; and 28, 29 respectively. Both the full length and short battens are carried in pockets sewn into the sail in the conventional manner. Non-stretch straps 31 and 32 link the inboard end of batten 30 to the luff edge ends of full length battens 26 and 27, similarly non-stretch straps 34 and 35 link the inboard end of batten 33 to the luff edge ends of full length battens 27 and 28 respectively and the inboard end of batten 36 is linked by non-stretch straps 37 and 38 extending from the inboard end of batten 36 to the luff edge end of battens 28 and 29. Non-stretch straps 31; 32; 34, 35 and 37, 38 are sewn into the sail and are formed of a woven polyester cloth laminated to a polyester film.

When used on a sailboard, for example, a compressive load is exerted on the full length battens 26, 27 and 28. Some of the compression load is, however, transmitted to the short battens 30, 33 and 36 through the non-stretch straps 31, 32; 34, 35; and 37, 38 respectively. In this type of sail the most difficult area for control of the shape of the sail is inboard of the luff edge 22 and the use of a number of short battens placed in that area and put under compressive load assists in achieving the design shape of the sail and produces a more stable sail with the use of fewer full length battens.

In Figure 3 like parts are identified by the same numerals as in Figure 2. Sail 20, however, includes portions 20a and 20b that are separated by a seam 40 which is positioned along a line representing the line of greatest tension when the sail is in use. The inboard ends 30a, 33a and 36a of battens 30, 33 and 36 are secured to seam 40.

Thus the sails of Figures 2 or 3 although having one fewer full length batten than the prior art sail shown in Figure 1, are both more stable and achieve a better design shape and are, in fact, comparable in these respects with a sail having 7 full length battens, but are much lighter in weight and less expensive to manufacture.

Although the above description refers to the use of a single short batten only between each pair of full length battens, more than one short batten may be used in each position. When more than one short batten is positioned between pairs of long battens the non-stretchable means, when employed, will of course link the inboard end of each short batten to the luff ends of the full length battens on either side.

Claims

1. A sail system comprising a sail (20), being a sheet of fabric extending lengthwise of a mast and attached to the mast at a plurality of points along its length for rotational movement thereabout, said sail (20) having luff (22) and leech (23) edges and incorporating a plurality of full length battens (26-29) extending between the luff (22) and leech (23) edges and attached to the sail (20) along their length; characterised in that the said sail system further includes a plurality of short battens (30, 33, 36) extending inboard of the sail from the luff edge (22), towards the leech edge (23), the short battens (30, 33, 36) being located between full length battens (26-29).

2. A sail system according to claim 1 wherein one short batten (30, 33, 36) is placed between two full length battens (26-29).

3. A sail system according to claim 1 or claim 2 wherein the short battens (30, 33, 36) extend less than halfway from the luff edge (22) towards the leech edge (23) of the sail.

4. A sail system according to claim 1 or 2 wherein the inboard end of the short battens are secured to the sail along the line of greatest tension between the head (24) and tack (25) of the sail.

5. A sail system according to claim 4 wherein the inboard ends 30a, 33a, 36a of the short battens are secured to a seam (40) lying along the line of tension between the head (24) a tack (25) of the sail.

6. A sail system according to any one of the preceeding claims wherein the system includes means (31, 32, 34, 35, 37, 38) which, when the sail is in use, transmits a part of the compression load applied to the full length battens (26-29) onto the short length battens (30, 33, 36).

7. A sail system according to claim 6 wherein the said means comprises flexible low stretch elements (31, 32, 34, 35, 37, 38) secured to the sail (20) and extending between the luff end (22) of the full length battens (26-29) and the inboard end of the short battens (30, 33, 36).

8. A sail system according to claim 7 wherein the low stretch elements (31, 32, 34, 35, 37, 38) comprise a woven polyester cloth laminated to a polyester film, a woven carbon film fabric or a heavy duty polyester fabric.

9. A sail system according to any one of the preceeding claims when used as a sail board sail.

10. A sail system according to claim 1 and substantially as herein described with reference to

Figures 2 or 3 of the drawings.

Fig1

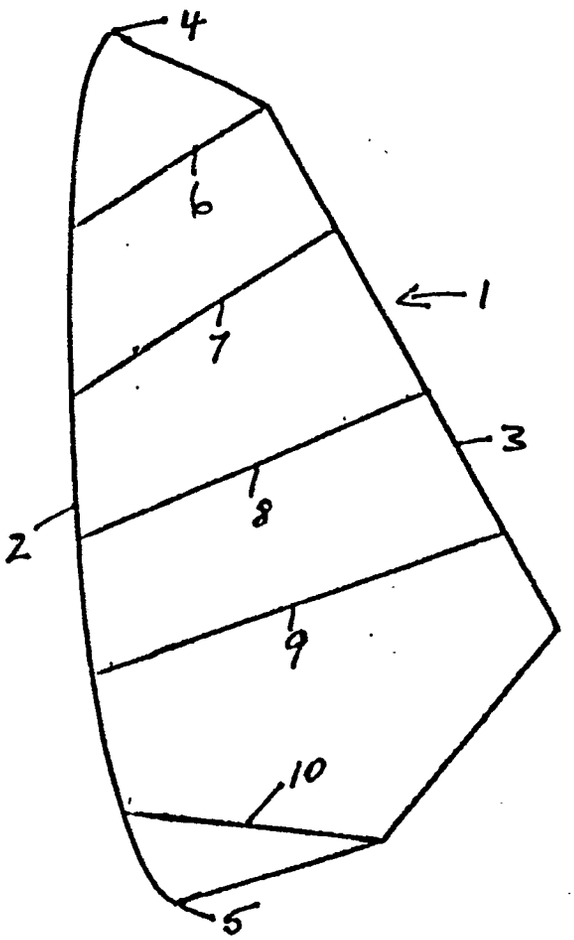


Fig2

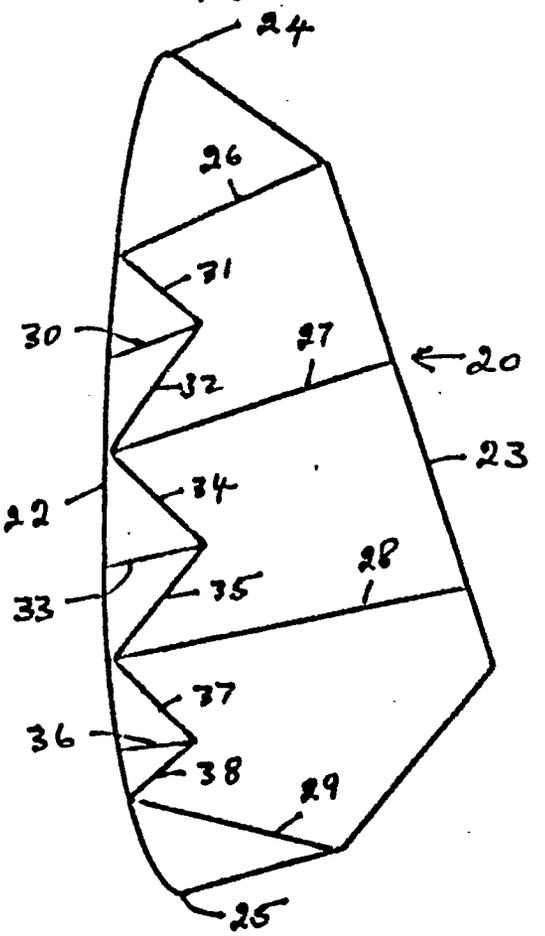
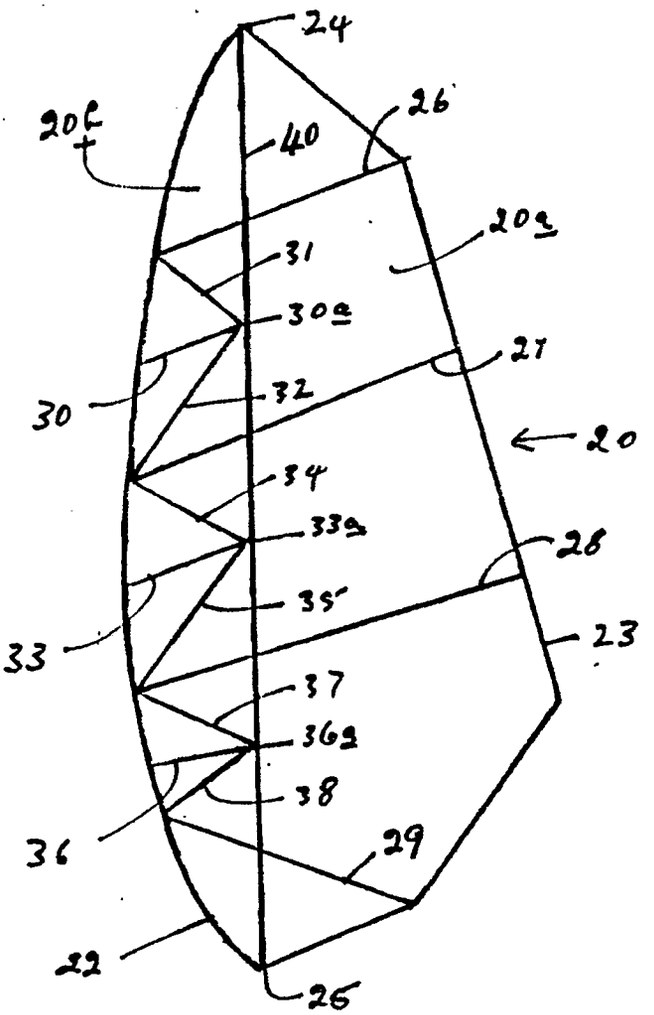


Fig.3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EUROPEAN SEARCH REPORT

Application Number

EP 90 30 6659

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.5)
X	DE-A-2 001 405 (MÖNTER) * Page 8, paragraph 2 - page 9, paragraph 1; page 16, last paragraph; figure 1 *	1-3,9, 10	B 63 H 9/06 B 63 B 35/79
Y		4-8	
X	WO-A-8 707 234 (ZINK) * Whole document *	1-3,9, 10	
Y		4-8	
A	DE-U-8 525 604 (SCHMIDT) * Page 5, last paragraph - page 6, paragraph 4; figures 1-5 *	1-10	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

B 63 B
B 63 H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21-09-1990	DE SENA Y HERNANDORENA A

CATEGORY OF CITED DOCUMENTS

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