

## EUROPEAN QUALIFYING EXAMINATION 2005

### PAPER B ELECTRICITY / MECHANICS

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### **Description of the Application**

The invention relates to a wind indicator for indicating whether a sail of a sailing vessel is optimally orientated with respect to the wind direction. An optimal orientation of the sail  
5 maximises the speed of the vessel.

As shown in Fig. 1, a known wind indicator 1, attached to a sail 2 of a sailing vessel 3, indicates to the sailor, whether the sail 2 has the optimum orientation relative to the wind direction W. The wind indicator 1 comprises a piece of light-weight, flexible material, one  
10 end of which is fixed to the sail 2, whereas the other end is free and can be moved by the wind. The piece of light-weight, flexible material can be a yarn or a ribbon.

At least one such wind indicator 1 is attached to each side of the sail 2 so that, when sailing, at least one ribbon is on the so-called windward side of the sail (facing the wind)  
15 and at least one ribbon is on the so-called leeward side of the sail (facing away from the wind).

Figs. 2A to 2C illustrate how the wind indicator 1 may be used to distinguish between an optimal and a less advantageous orientation of the sail 2 with respect to the wind  
20 direction W. The wind indicator on the windward side of the sail 2 is shown as a solid line and the one on the leeward side of the sail 2 is shown in dotted lines. If the free end of a ribbon on either the windward or leeward side of the sail 2 is fluttering (Fig. 2A and 2B respectively), due to turbulent airflow, then the sail 2 is not optimally orientated with respect to the wind. Only when the free ends of the ribbons on both the windward and  
25 the leeward sides of the sail 2 trail back in a substantially straight manner (as shown in Fig. 2C), i.e. the airflow is laminar, is the orientation of the sail 2 optimal with respect to the wind direction W.

A problem may arise when a ribbon is wet. The free end of a wet ribbon may stick to the sail and can then no longer be moved by the wind. It is difficult for a sailor to manually free a wet ribbon which has become stuck to the sail. The strength of the wind flow along the sail is often not sufficient to free the ribbon from the sail. The same problem  
5 may occur when using a yarn, instead of a ribbon.

It is therefore an object of the invention to provide a wind indicator whose free end does not remain stuck to the sail.

10 This object is achieved by a wind indicator according to appended claim 1.

A spacing member is positioned between the sail and the fixed end of the ribbon such that a distance is maintained between them. The wind is therefore able to flow between the sail and the ribbon. This helps to detach a ribbon that has become stuck to the sail.  
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Further advantageous embodiments of the invention are the subject of the dependent claims.

The drawings will be briefly described as follows:

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Fig. 1 shows a sailing vessel fitted with known wind indicators.

Figs. 2A to 2C show the known wind indicators under different sailing conditions.

Fig. 3 shows a wind indicator according to the present invention.

Fig. 4A shows the wind flow in the region of the wind indicator of Fig. 3.

25 Figs. 4B and 4C show the wind flow in the region of further wind indicators according to the present invention.

Referring to Fig. 3, a wind indicator 1 comprises a ribbon 6 and a spacing member in the form of an arm 5. The ribbon 6 comprises a fixed end 6a, fixed to the arm 5 and a free end 6b. When the arm 5 is tubular, the fixed end 6a of the ribbon 6 can be pushed into the arm 5 and fastened therein by any suitable manner, such as by gluing. The ribbon 6 is an example of a piece of light-weight, flexible material suitable for wind indicators. A suitable length of the ribbon is between 5 and 20 cm.

The arm 5 is attached to a sail by a wedge shaped attachment member 4. The attachment member 4 is provided with a flat lower surface 7 having a waterproof adhesive layer, which is protected by a removable protective layer 8, so that the attachment member 4 can easily be attached to the sail. The attachment member 4 and the arm 5 may be formed as a single part or as two separate parts. In the latter case the arm 5 may be glued into an opening in the inclined surface 9 of the attachment member 4.

The arm 5 keeps the fixed end 6a of the ribbon 6 at a distance from the sail so that the wind can flow between the underside of the ribbon 6 and the sail. The underside of the ribbon 6 is the side of the ribbon 6 facing the sail, when in normal use.

As shown in Figs. 4A, 4B and 4C, the wedge shape of the attachment member 4 contributes to the separation of a wet ribbon 6 from the sail 2. The wedge shaped attachment member 4 is arranged such that, in normal use, the wind flows over the inclined surface 9 as indicated by the arrows. In other words, the thin end of the wedge shaped attachment member 4 is directed towards the front edge of the sail 2. The angle of inclination of the surface 9 relative to the flat lower surface 7 is in the range of  $10^{\circ}$ - $20^{\circ}$  to minimise disturbance of the airflow along the sail 2. The inclined surface 9 can be planar or concavely curved.

As shown in Fig. 4A, a portion of the wind, which flows along the sail 2 and approaches the wind indicator 1, is redirected by the inclined surface 9 of the attachment member 4 towards the underside of the ribbon 6. The redirected wind portion applies a force to the underside of the ribbon 6 which keeps the ribbon away from the sail 2. The width of the inclined surface 9 is greater than the width of the arm 5 and greater than the width of the ribbon 6, so that the redirected wind portion engages with the full width of the underside of the ribbon 6. In order to achieve the same effect of redirecting the wind, other forms for the attachment member 4 may be used, provided that they include a suitably inclined surface.

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The same effect of redirecting the wind towards the underside of the ribbon 6 may be achieved by other locations of the arm 5 relative to the attachment member 4. For example, as shown in Fig. 4B, the arm 5 is attached at the thick end of the wedge-shaped attachment member 4. The arm 5 extends beyond the height of the thick end of the wedge shaped attachment member 4. In Fig. 4C, the arm 5 is attached at the thin end of the wedge shaped attachment member 4. The arm 5 is fixed on an extension 10 of the attachment member 4.

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## Claims

1. Wind indicator (1) for a sail (2) comprising a wind indicating ribbon (6), the ribbon (6) having a fixed end (6a) and a free end (6b) characterised in that the wind indicator (1) further comprises a spacing member (5) to which the fixed end (6a) of the ribbon (6) is fixed, such that, when the wind indicator (1) is attached to the sail (2), the spacing member (5) keeps the ribbon (6) spaced from the sail (2).
2. Wind indicator (1) according to claim 1 wherein the spacing member (5) is an arm.
3. Wind indicator (1) according to claim 1 or 2 further comprising an attachment member (4) having a flat lower surface (7) which is adapted to be glued on to the sail (2).
4. Wind indicator (1) according to claim 3 wherein the spacing member (5) and the attachment member (4) are formed as one piece.
5. Wind indicator (1) according to claim 3 or 4, whereby the attachment member (4) comprises a surface (9) which is inclined with respect to the flat lower surface (7).
6. Wind indicator (1) according to claim 5 wherein attachment member (4) is wedge shaped.

Drawings of the Application

1/2

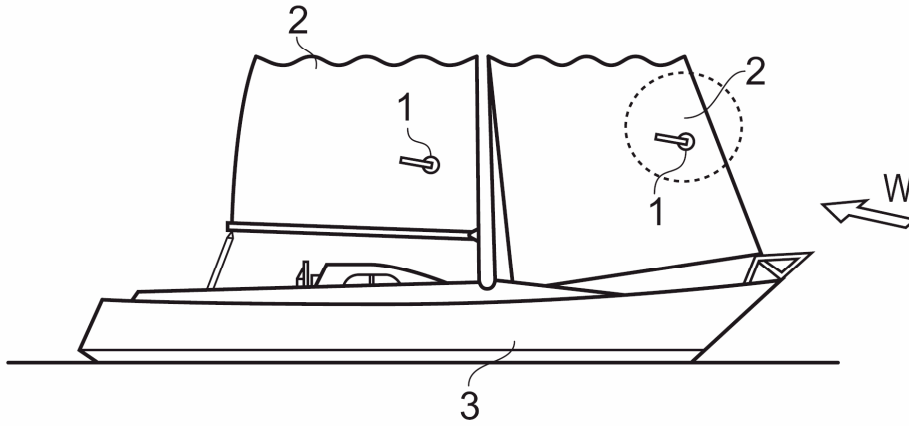
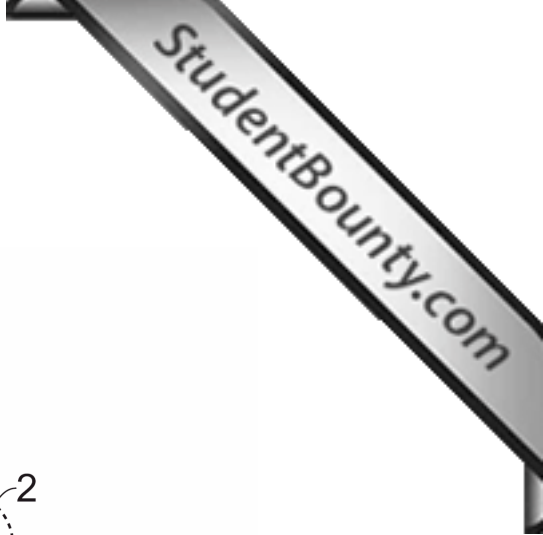


Fig. 1 PRIOR ART

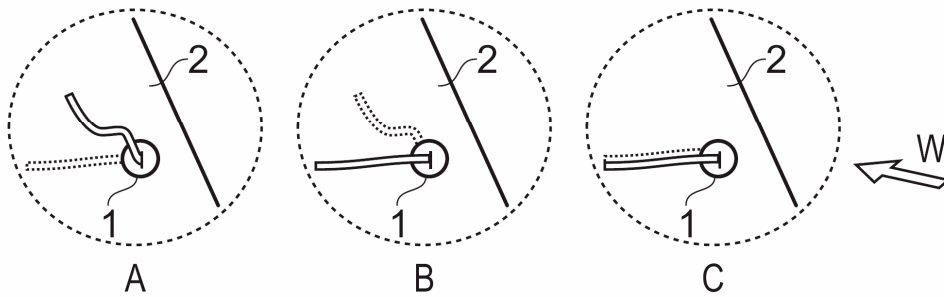


Fig. 2 PRIOR ART

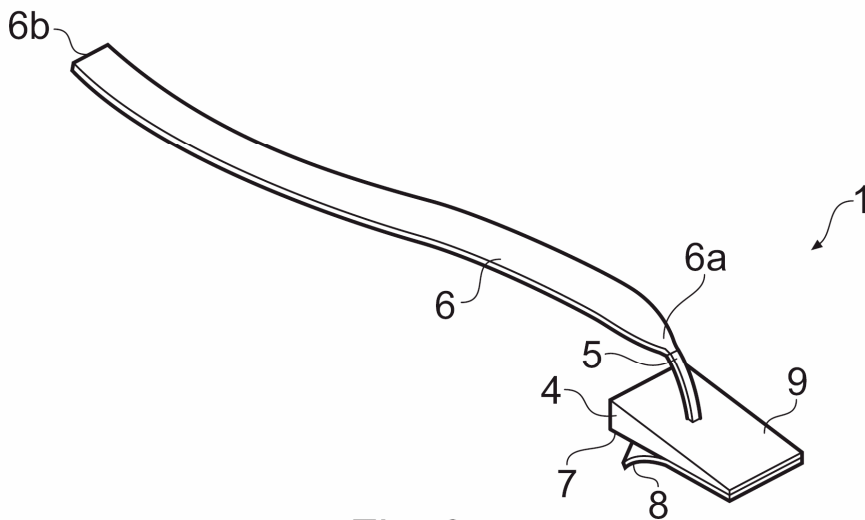


Fig. 3

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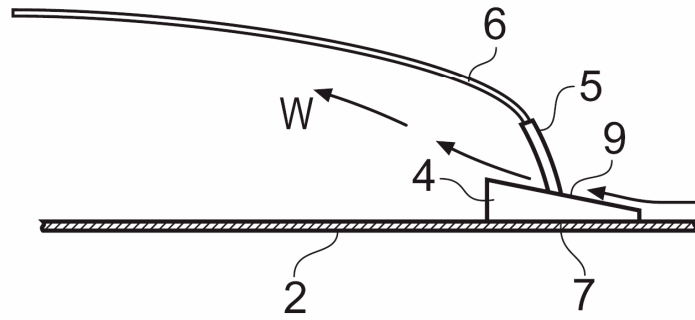


Fig. 4A

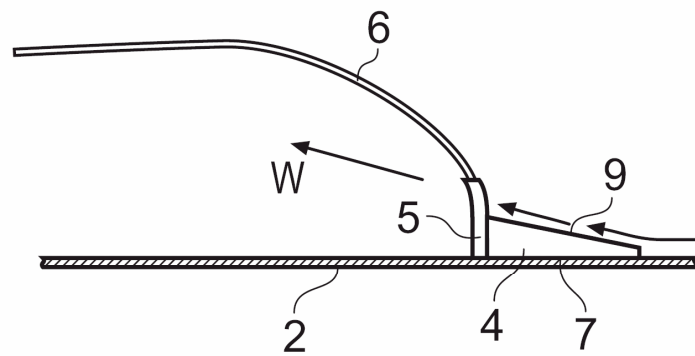


Fig. 4B

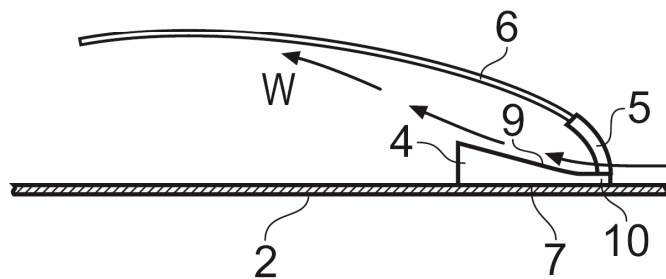


Fig. 4C



## Communication

1. D1 and D2, which were both published before the priority date of the present application, are referred to in this communication.
2. Claim 1 is not allowable under Art. 52(1) EPC, since its subject-matter is not new with respect to D1 in the sense of Art. 54(1) and (2) EPC.

D1 discloses a wind indicator (100) for a sail comprising a wind indicating ribbon (20), the ribbon (20) having a fixed end (21) and a free end (22), whereby the wind indicator (100) further comprises a spacing member (50) to which the fixed end (21) of the ribbon (20) is fixed, such that, when the wind indicator (100) is attached to the sail, the spacing member (50) keeps the ribbon (20) spaced from the sail.

Furthermore, the wind indicator of claim 1 is also not new with respect to the document D2 (see for example Figs. 1 and 2 and the last paragraph).

3. The subject-matter of claims 2 to 6 does not meet the requirements of Art. 52(1) EPC, since it is not new in the sense of Art. 54(1) and (2) EPC, for the following reasons:

The arm of claim 2 is known from document D2 (see reference 12).

The attachment member according to claim 3 is known from D1 (see reference 50) and from D2 (see references 11 in Fig. 1 and 15 in Fig. 2).

From D1 it is also known to form the attachment member and spacing member as one piece (see reference 50) as defined in claim 4.

The inclined surface according to claim 5 is disclosed in D1 (see Fig. 2) and also in D2 (see Fig. 2).

The wedge shape according to claim 6 is known from Fig. 2 of D1 and from Fig. 2 of D2.

4. It would also appear that the embodiment shown in Fig. 3 of the application could be obtained by replacing the attachment member 11 of D2 (see Fig. 1) with the wedge-shaped attachment member 50 of D1 (see Fig. 2).
5. The applicant is invited to submit an amended set of claims, which takes account of the above objections.

**Document D1 (State of the Art)**

The invention relates to a wind indicator for indicating the correct adjustment of a sail of a sailing vessel with respect to the direction of the wind.

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Fig. 1 illustrates a conventional wind indicator 10. The wind indicator 10 comprises a ribbon 20. One end 21 of the ribbon 20 is fixed to a sail, e.g. via an adhesive layer 23. The other end 22 of the ribbon 20 is moved by the wind.

10 Long ribbons, especially when they are wet, tend to stick to the surface of the sail. The invention solves this problem.

Fig. 2 illustrates a wind indicator 100 in accordance with the present invention. A rigid base 50, on which the ribbon 20 is attached, has a thickness which increases in the direction of the end 22 of the ribbon 20. This creates a wide gap between the ribbon 20 and the sail, thereby reducing the risk that the ribbon 20 sticks to the sail.

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To minimize disturbance of the airflow by the base 50, the inclination angle  $\alpha$  of the base 50 should not exceed  $45^\circ$ .

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The wind indicator 100 may be glued to the sail. The base 50 may comprise an adhesive layer protected by a thin detachable layer.

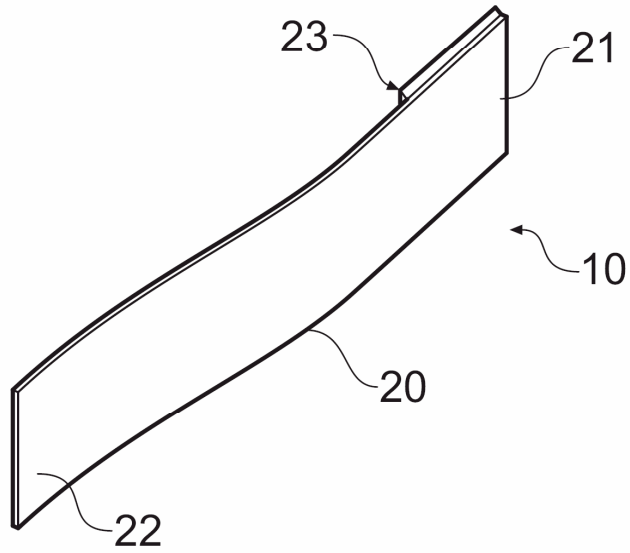
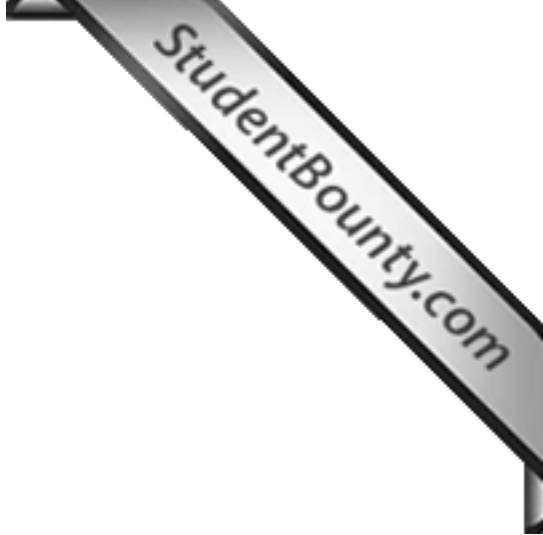


Fig. 1

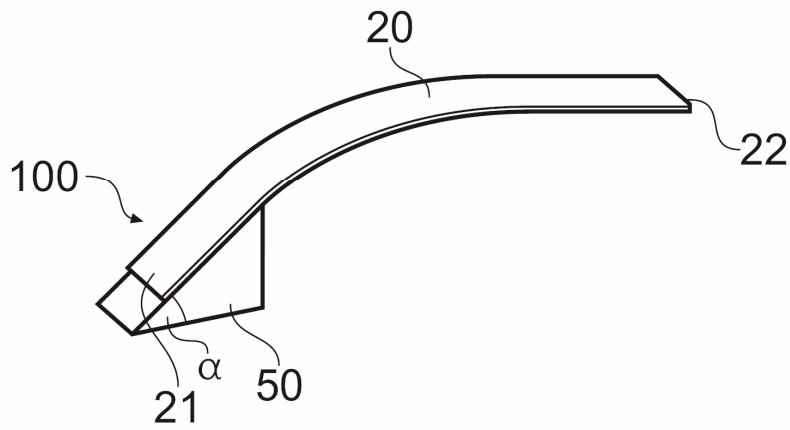


Fig. 2

**Document D2 (State of the Art)**

The invention relates to a device that indicates whether the airflow on a sail is laminar or turbulent.

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For this purpose, a piece of flexible, light-weight material, such as a yarn, is attached to the sail. If the airflow along the sail is laminar, the yarn trails in a straight manner. If the airflow is turbulent, the yarn flutters irregularly.

10 A disadvantage of a yarn is that, when it is wet, it sticks to the sail. The invention overcomes this disadvantage.

The airflow indicator 10 of the present invention, as shown in Fig. 1, comprises a cylindrical element 12 and a yarn 13. The yarn 13 is fixed at one end of the element 12, 15 for example with glue. The element 12 is inclined relative to the sail 20, so that the disturbance to the airflow along the sail 20 is minimised. The element 12 is attached to a base 11. The underside of the base 11 has an adhesive layer for attaching the airflow indicator 10 to the sail 20.

20 The airflow indicator 10 may alternatively comprise a triangular support 15 instead of base 11, as shown in Fig. 2. This support 15 is attached to the element 12 and to the sail 20. The support 15 reduces the risk of the element 12 breaking or being ripped off the sail 20 in strong winds. The width of the support 15 is less than the diameter of the cylindrical element 12 so that, in use, disturbance to the airflow due to the support 15 is 25 minimal.

The surface of the triangular support 15 which is directly in contact with the element 12 has a concave form adapted to receive the element 12. The triangular support 15 shown in Fig. 2 has a frame-like structure, but alternatively may be solid.

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It is noted that the airflow indicators described above may have a ribbon instead of the yarn 13.

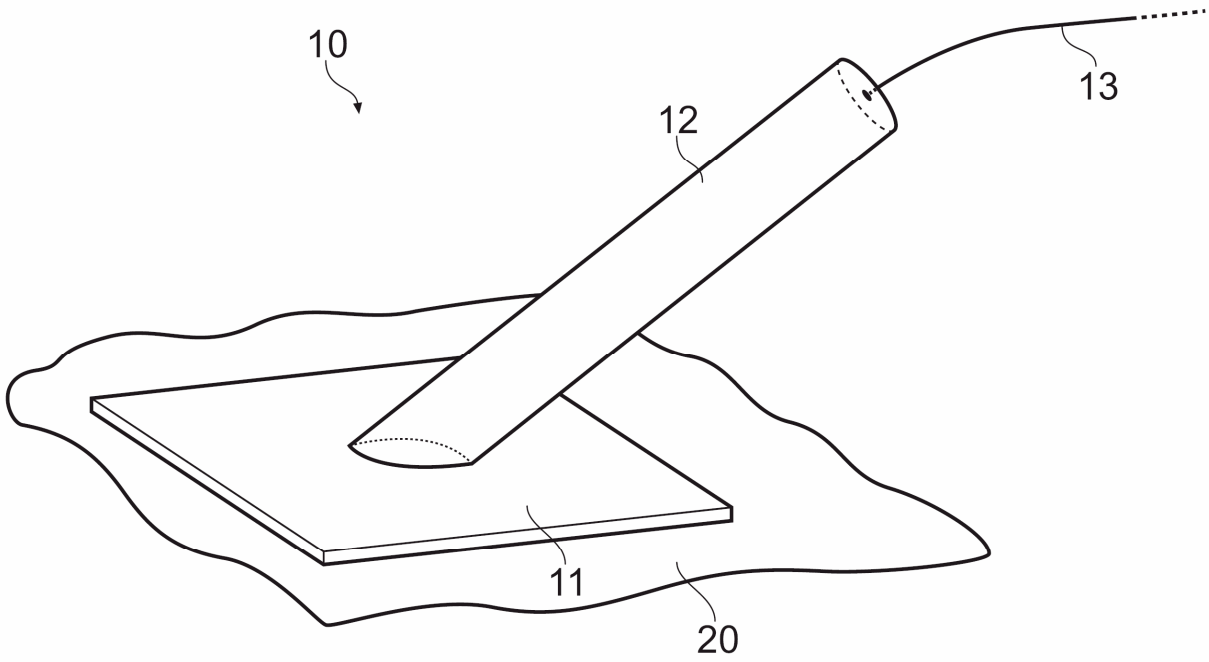
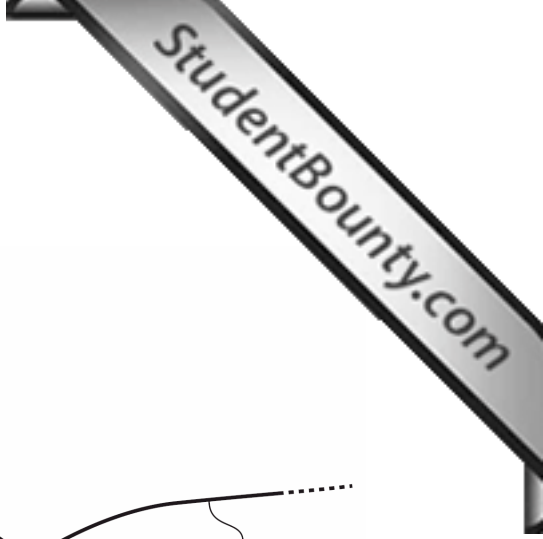


Fig. 1

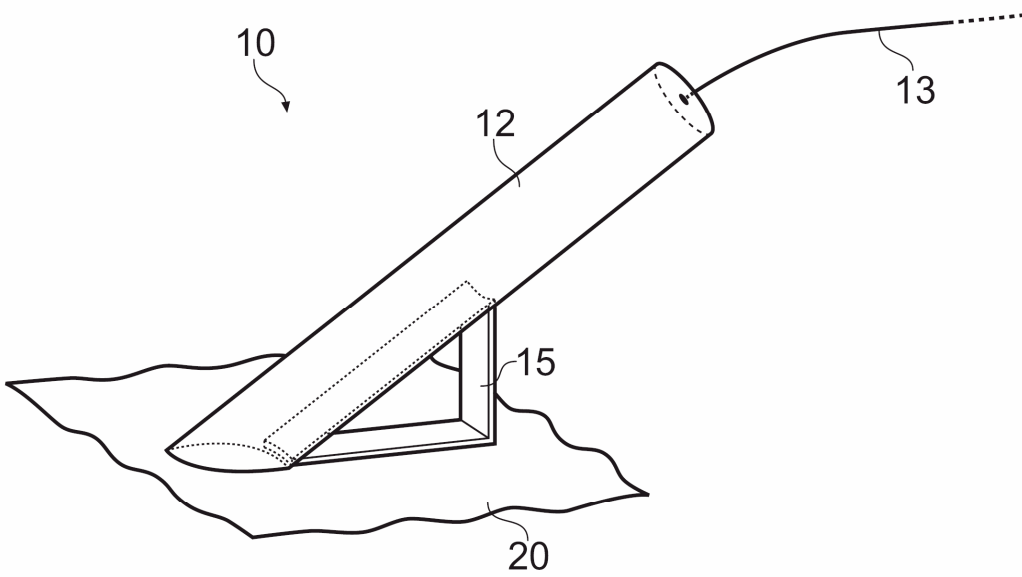


Fig. 2

**Client's Letter**

Dear Ms Carrie Cannon,

In reply to your letter we confirm that we are still interested in achieving patent protection for our wind indicator, despite the communication of the European Patent Office.

Our wind indicator offers a quicker detachment of a wet ribbon that has stuck to the sail, and prevents it from sticking again, even in light winds. This has been successfully tested in wind tunnels. We are of the opinion that both cited documents fail to suggest a wind indicator with such an advantageous effect.

I would like to point out that the claims as filed define a ribbon as the flexible part moved by the wind. Please make sure that other alternatives such as a yarn, which is also part of our product line, are not excluded from the scope of the claims.

Please take all the necessary steps to achieve the broadest possible protection for our invention, taking account of the above comments.

Yours sincerely,

I. Ayesir

Brig, Privateer & Co.