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(54) Mast construction

(57) The present invention relates to a mast construction for hanging out a panel, comprising: anchoring means for arranging in a ground; a mast connected to the anchoring means; and the form-retaining panel which extends on the upper part of the mast in substantially radial direction relative to the mast and which is formed from at least two plates and is rotatable on the longitudinal axis of the mast in accordance with a prevailing wind direction. The plates are mutually connected on edges located mutually opposite in radial direction and accommodate the mast between them out of the centre.

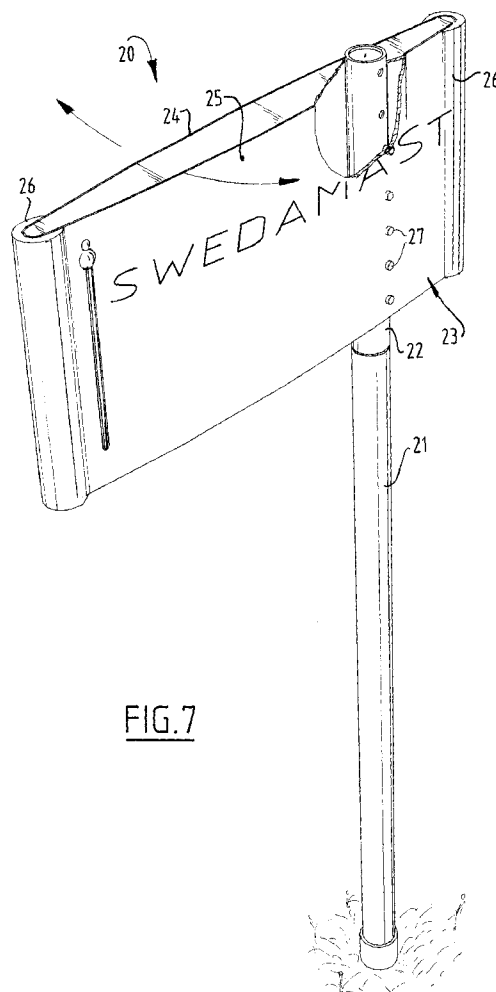


FIG. 7

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Description

The present invention relates to a mast construction for hanging out a panel, comprising: anchoring means for arranging in a ground; a mast connected to the anchoring means; and the form-retaining panel which extends on the upper part of the mast in substantially radial direction relative to the mast and which is formed from at least two plates and is rotatable on the longitudinal axis of the mast in accordance with a prevailing wind direction.

Such a mast construction is known from the American patent specification 1.825.564, wherein the panel is formed from metal sheet which extends symmetrically in substantially radial direction relative to the mast. The metal sheet therefore extends equally far on either side of the mast.

The known mast construction has the drawback that the panel is symmetrical relative to the mast round which the panel is rotatable under the influence of the wind. As a result, in the case of a wind incidence perpendicularly of the surface of the panel, a force can be generated on the mast which does not diminish as long as the panel retains the then assumed position, as will be the case with perpendicular wind incidence. The forces thus generated on the mast can assume proportions at determined wind speeds such that damage can be caused to the mast, or at least to the hinge mechanisms herein.

The invention has for its object to obviate the above stated drawback and to this end a mast construction is provided which is distinguished in that the plates are mutually connected on edges located mutually opposite in radial direction and accommodate the mast between them out of the centre.

In the configuration according to the present invention the panel functions as weather vane which positions itself in the wind direction with the smallest possible wind-catching surface, so that the forces acting on the panel and therefore on the mast and the bearings thereof as a result of the wind are minimized and it is possible to suffice with a lighter construction therefor.

In a preferred embodiment the plates are tear or wing-shaped in cross-section in radial direction, which contributes positively to the ability of the panel to position itself.

In an alternative or additional embodiment a mast construction according to the present invention has the property that at least the part of the mast bearing the panel is rotatable by means of at least one slide bearing between the part of the mast and at least the anchoring means. This means that only that part of the mast on which the panel is arranged is rotatable relative to the remaining parts of the mast. This is preferably brought about using slide bearings, since when there is a prevailing wind direction, for instance west wind, excessive load on another bearing such as a ball bearing in a direction corresponding with west wind damages such other bearings, while slide bearings can withstand this.

It is further possible to use supplementary or additional panels and the panel can be manufactured from stiff plastic. These and other embodiments will be elucidated with reference to the figure description hereinbelow of embodiments of the present invention. In the drawing:

fig. 1 shows a perspective view of a mast construction according to the present invention;

fig. 2 is a partly cut-away view of the underside of the mast construction shown in fig. 1;

fig. 3 is a partly cut-away perspective view of an alternative embodiment of a mast construction according to the present invention;

fig. 4 shows in perspective view a detail of a method according to the present invention whereby a panel is arranged on the mast;

fig. 5 is a perspective view of an alternative method of arranging the panel on the mast;

fig. 6 is a perspective view of a method related to fig. 5 for arranging the panel in another application thereof; and

fig. 7 is a partly broken-away perspective view of a mast construction according to another embodiment of the invention.

The same reference numerals refer in the figures to the same components.

Fig. 1 shows a perspective view of a mast construction according to the present invention. The mast construction herein comprises a mast 1 which is connected to anchoring means designed as a foot 3 and a sign designed as a form-retaining panel 2. The mast can herein swivel on the longitudinal axis thereof on foot 3 in the direction of arrow A under the influence of a prevailing wind direction. When this wind direction changes, the panel will therefore swivel together with mast 1 in the direction indicated with arrow A.

Panel 2 is arranged on mast 1 by means of a profile 7, wherein this profile 7 will be discussed further hereinbelow.

The configuration whereby the mast can swivel on its longitudinal axis is shown in partly cut-away view in fig. 2. Mast 1 is herein placed over a column 6 arranged fixedly on foot 3. This is preferably a foot 3 in the form of a tilting foot of stainless steel. Column 6 is herein preferably also manufactured from stainless steel and therefore forms a bearing mounted tube.

The mast 1 itself can preferably be manufactured from polyester or aluminium, wherein all that is important is that the part of mast 1 placed over column 6 is cylindrical. The remaining parts of mast 1 can likewise be cylindrical, but these parts may alternatively also be of elliptic cross-section. At the top of column 6 and at the bottom of mast 1 slide bearings 4 are arranged round the outside of column 6. In this manner both an axial and radial bearing mounting are effected, wherein a locking pin 5 is arranged in outward direction through

column 6 above the lower slide bearing 4 to prevent the mast from being lifted in upward direction from column 6, either by the wind or as a consequence of some other undesired external influence such as vandalism. As already described above, foot 3 is preferably designed as tilting foot so that, after tilting of the tilting foot with column 6 and mast 1 thereon, access is provided to locking pin 5, which can then be removed or arranged as required.

Column 6 is open on the top side thereof, whereby it is possible for cables, for instance for electrical power supply, or other necessary connections to be installed through the interior of column 6 and thereabove through the interior of mast 1.

The upper part of the slide bearing at the top of column 6 is preferably chamfered downward in inward direction in order to guide condensed water or other moisture coming from the interior of mast 1 through to the interior of column 6 without this water being able to have a disrupting effect on slide bearings 4. For this reason this upper slide bearing 4 overhangs the opened top part of column 6 in fig. 2, although such a small chamfering suffices here that this has not been shown.

In fig. 3 is shown an alternative embodiment of the mast construction according to the present invention. A sleeve 8 is herein arranged on the top part of mast 1, which sleeve is rotatable round mast 1 on the longitudinal axis thereof by means of slide bearings 4. Mast 1 is therefore per se stationary irrespective of the position of panel 2 and the prevailing wind direction. Only sleeve 8 aligns itself together with panel 2 in accordance with the prevailing wind direction, since panel 2 is fixedly mounted on sleeve 8 by means of profile 7. This mounting is here the same as that which would be used in the case the panel 2 were to be arranged not on sleeve 8 but directly onto a mast rotatable on its longitudinal axis, as shown in fig. 2.

In the embodiment shown in fig. 3, it is ensured that sleeve 8 cannot be lifted from or blow off mast 1 by means of the flange 10 which is arranged on mast 1 under sleeve 8, wherein a hook 9 arranged on sleeve 8 engages this flange 10.

Fig. 4 shows a perspective view of mast 1 at a position where panel 2 is arranged on mast 1. In the embodiment shown here this takes place directly using the above mentioned profile 7 which is fixed to the mast by means of blind rivets 11. On the side facing toward mast 1 the profile 7 has a concave form which corresponds exactly with the outer wall of mast 1, so that these connect onto each other over the whole inner surface. On the other side the profile 7 has a groove 13 with a width corresponding to the thickness of the panel. After insertion of panel 2 the profile and panel 2 are fixed to each other by means of bolts 12 which are placed through profile 7 and through panel 2 for co-action on the opposite side with nuts (not shown). In the above described manner a simple but reliable method is provided for arranging panel 2 on mast 1.

For both the blind rivets 11 and the fixing by means of bolts 12 and nuts there are of course different alternatives available to a skilled person, such as arranging profile 7 with adhesive on the outside of mast 1 and the use of spring clamps to hold panel 2 in the groove of profile 7. All such known couplings and mountings should be deemed as lying within the scope of the invention according to the present application.

Alternatively, the method described here of arranging panel 2 on mast 1 can also be applied in the case of a sleeve as described with reference to fig. 3.

In fig. 5 is shown an alternative embodiment for arranging panel 2 on mast 1. Use is made herein of an auxiliary profile 14 which is first arranged on the outside of mast 1, again using blind rivets 11. Auxiliary profile 14 is provided on either side with flanges 15 and profile 7 is provided on the side directed toward mast 1 with a recess 17, the form of which corresponds with that of auxiliary profile 14.

Flanges 15 lie a relatively small distance from the outside of mast 1, wherein the part 16 here protruding outward extends even further outward than this distance.

As described above, the surface of profile 7 facing toward mast 1 is provided with a curvature or concave form corresponding with this outer side of mast 1 for close-fitting connection thereto. The mast shown here has a radius R which determines said curvature.

Shown in fig. 6 is the situation wherein a mast is applied with a larger radius R' than that of the mast in fig. 5 with radius R. In the case shown here, the auxiliary profile 14 is mounted with the thicker portion 16 facing toward mast 1. The distance between flanges 15 and the outer side of mast 1 is herein greater, so that the same profile 7 can be used to be pushed over auxiliary profile 14 with auxiliary profile 14 in the recess 17. The edges of profile 7 facing toward the outer side of mast 1 herein connect closely onto this outer side of mast 1 and a space 18 in the form of a half-moon is situated between the surface of profile 7 facing toward mast 1 and the outer wall of mast 1.

A fixed mounting of profile 7 to mast 1 is effected herewith for masts of varying diameter. This takes place using identical parts, i.e. profile 7 and auxiliary profile 14, wherein however the use of auxiliary profile 14 differs. Thus is avoided that separate profiles 7 are necessary for each diameter of a desired mast and a saving in costs for this purpose is obtained.

The construction proposed here is suitable for masts of different diameters. Within the scope of the present invention other constructions can also be applied whereby the use of an auxiliary profile prevents profiles for arranging panels having to have a different form for each type of mast.

As shown in fig. 1, a profile (and auxiliary profile) is further assumed which has a length equal to that of the panel. Although a less attractive appearance of the mast construction results, it is also possible to apply two or

more than two profiles (and auxiliary profiles) which can be arranged at a mutual distance, whereby a saving in material costs can be realized.

Fig. 7 shows a mast construction 20 according to another embodiment of the invention. Panel 23 is herein assembled from two plates 24, 25 which are mutually connected at opposite edges by means of edge profiles 26. Plates 24 clamp between them the part 22 of mast 21 which is rotatable on the longitudinal axis of mast 21.

Mounting of panel 23 on the rotatable mast part 22 takes place simply by means of screws 27 or the like which are screwed through each of the plates 24, 25 into the rotatable mast part 22. Rivets or the like can also be used instead of screws.

As shown in fig. 7, the mast part 22 lies outside the centre of panel 23. This results on the one side of mast 21, on the left in fig. 7, in a larger surface than on the right of the mast. Panel 23 will thereby direct itself at all times into the wind with the smaller portion, on the right in fig. 7, so that the surface exposed to the wind force is small and the load on mast 21 accordingly remains limited.

Although not shown in fig. 7, the upper part of panel 23 can be closed with a suitably profiled cover in order to prevent entry of water. The bottom part can also be closed in this manner.

The invention is not limited to the embodiments shown in the figures and described above. Many variants are possible and are included in the following claims. The panel can thus have a form other than the rectangular one as shown. The circumference of the panel can for instance be adapted to the circumference of an image arranged on the panel.

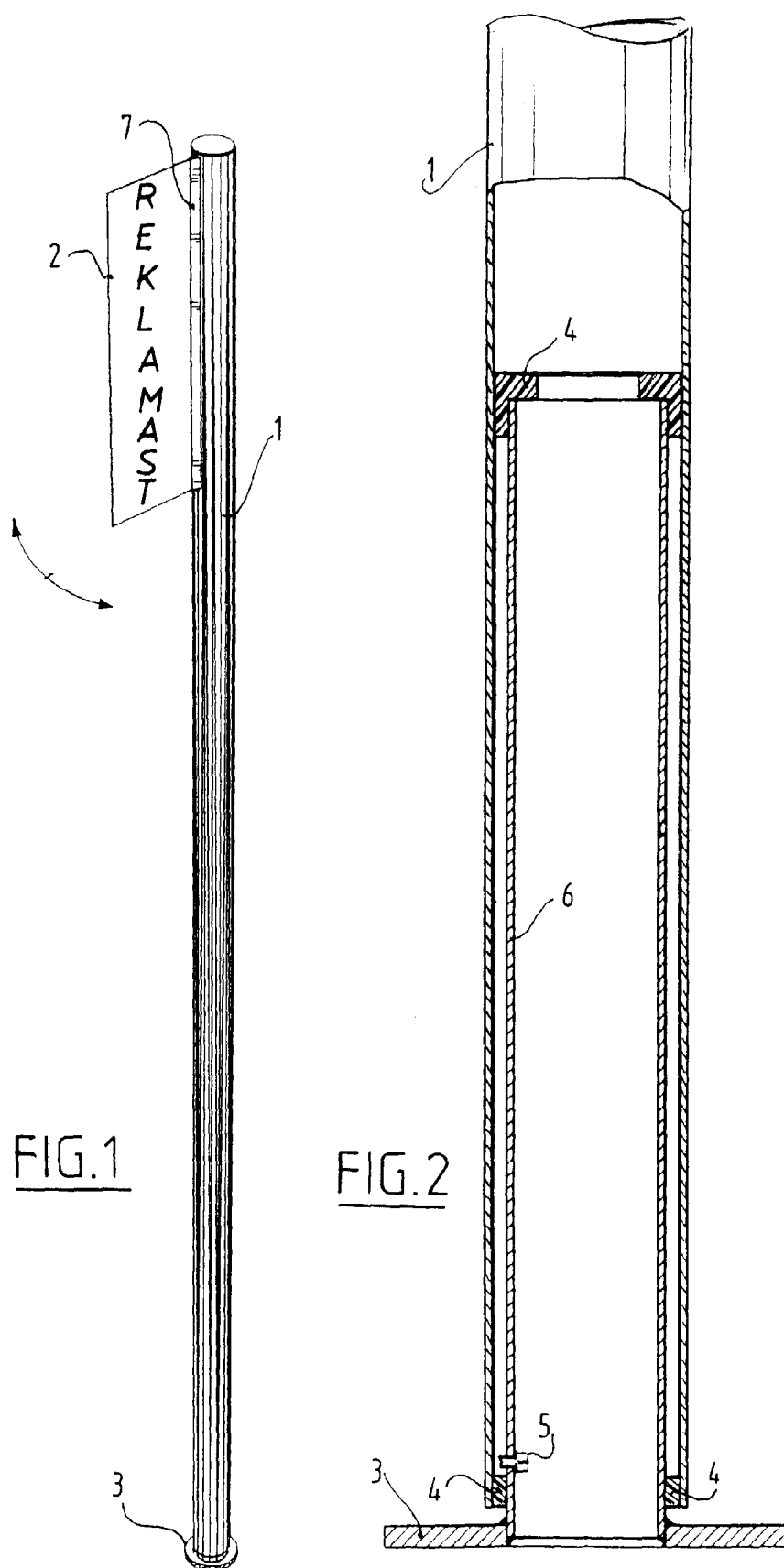
It is also possible to arrange a number of panels one above another for separate rotation on the longitudinal axis of the mast.

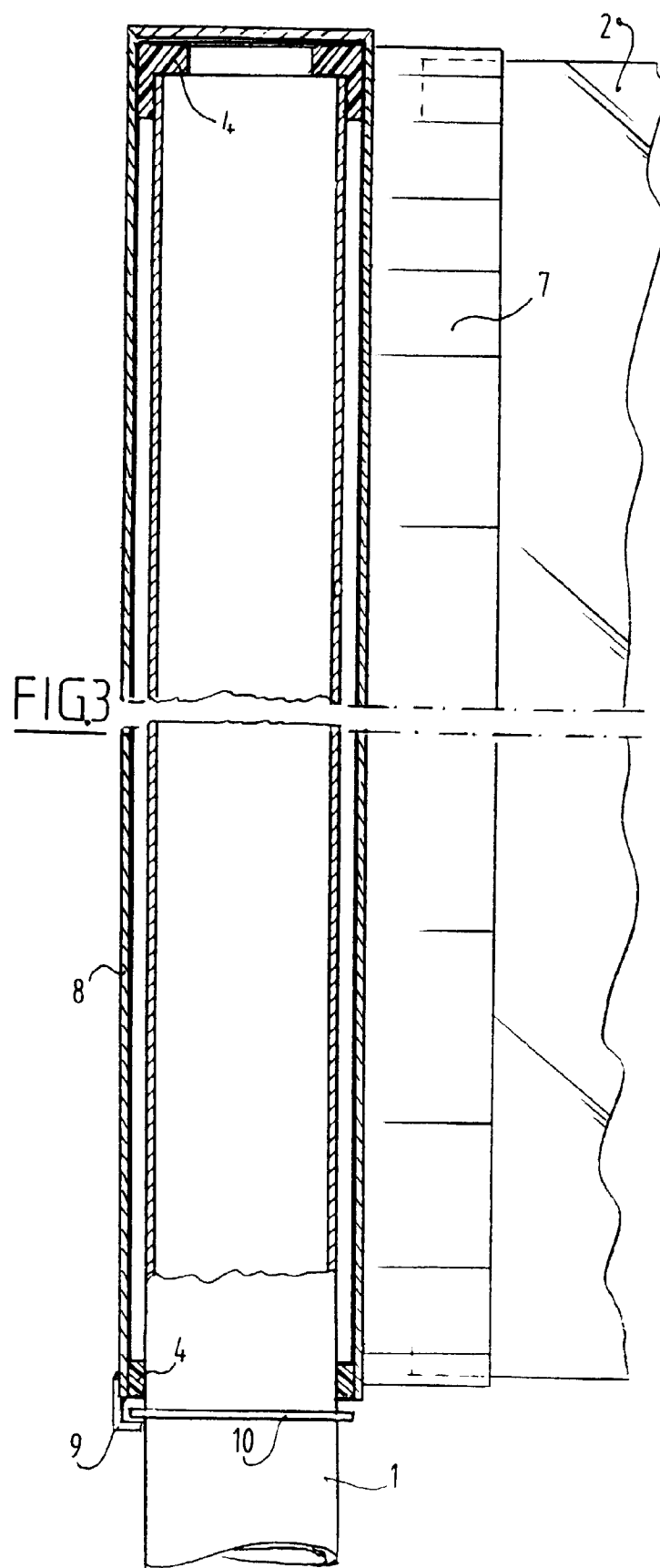
acterized in that at least the part of the mast bearing the panel is rotatable by means of at least one slide bearing between the part of the mast and at least the anchoring means.

4. Mast construction as claimed in claim 1, 2 or 3, **characterized by** an additional panel with a smaller surface which is coupled to the mast separately of the panel.
5. Mast construction as claimed in one or more of the claims 1-4, **characterized in that** the panel is manufactured from stiff plastic.

Claims

1. Mast construction for hanging out a panel, comprising: anchoring means for arranging in a ground; a mast connected to the anchoring means; and the form-retaining panel which extends on the upper part of the mast in substantially radial direction relative to the mast and which is formed from at least two plates and is rotatable on the longitudinal axis of the mast in accordance with a prevailing wind direction, **characterized in that** the plates are mutually connected on edges located mutually opposite in radial direction and accommodate the mast between them out of the centre.
2. Mast construction as claimed in claim 1, **characterized in that** in radial direction the plates have a tear or wing shape in cross-section.
3. Mast construction as claimed in claim 1 or 2, **char-**





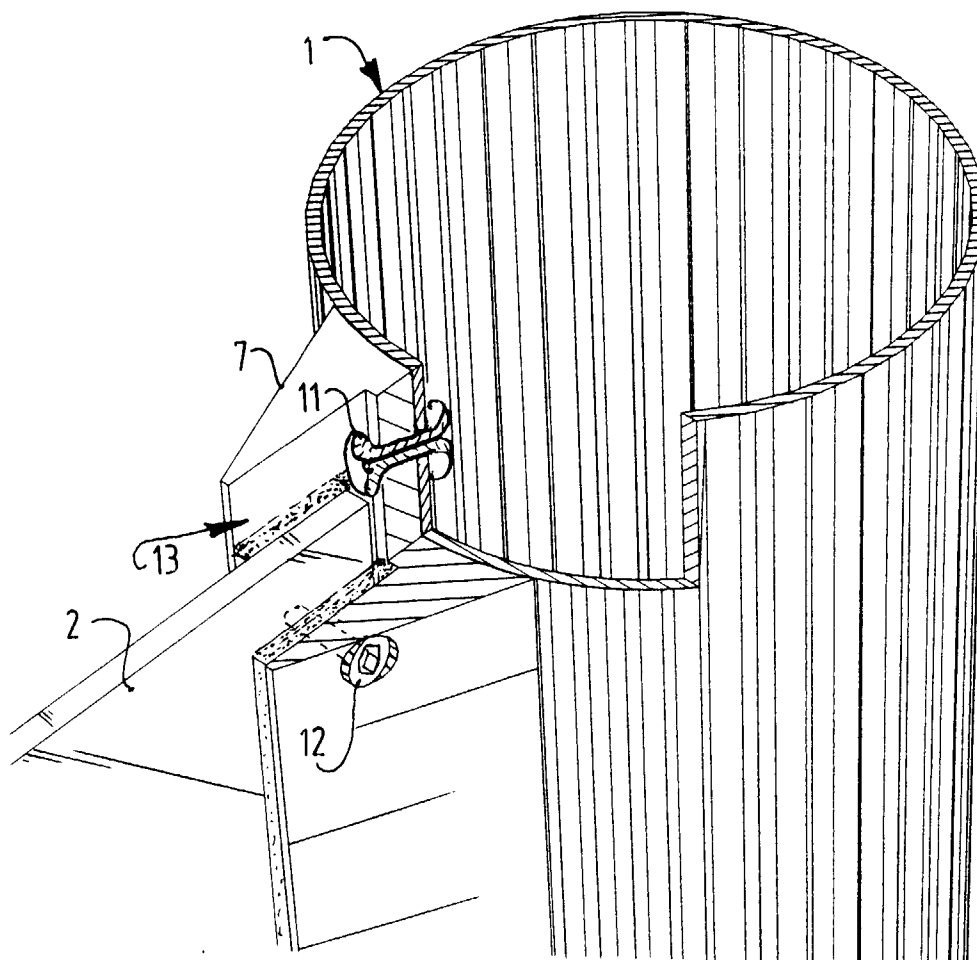
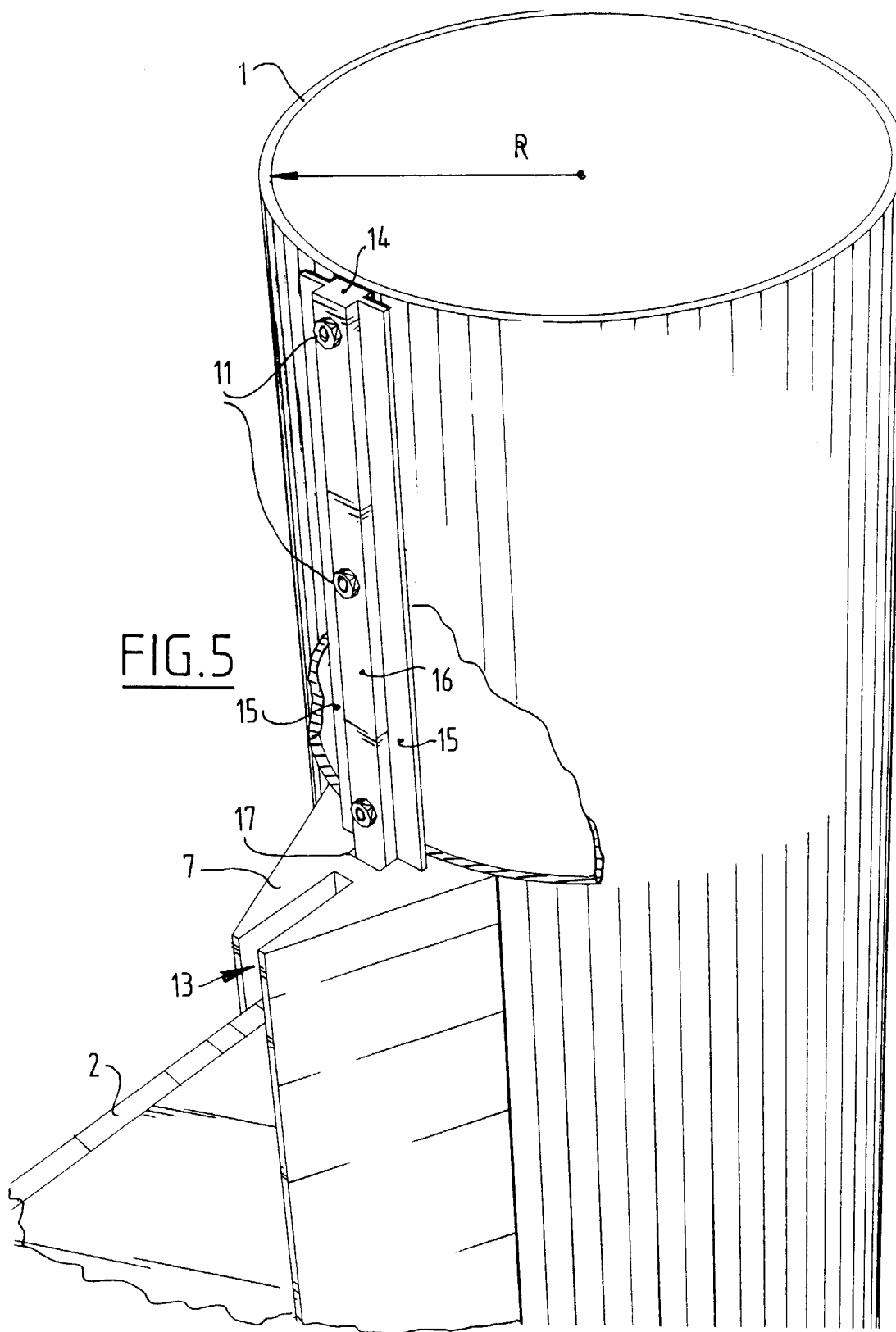
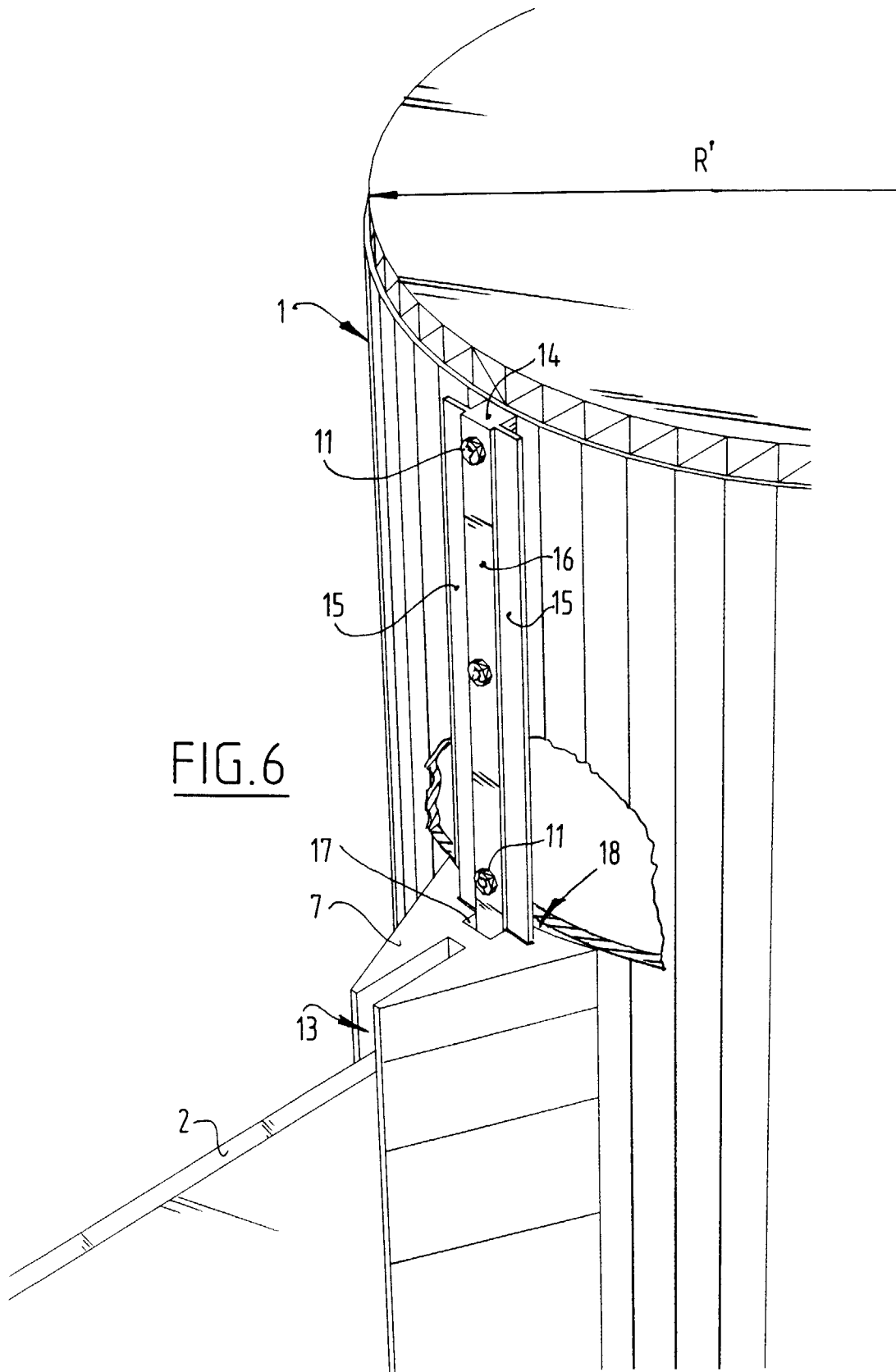
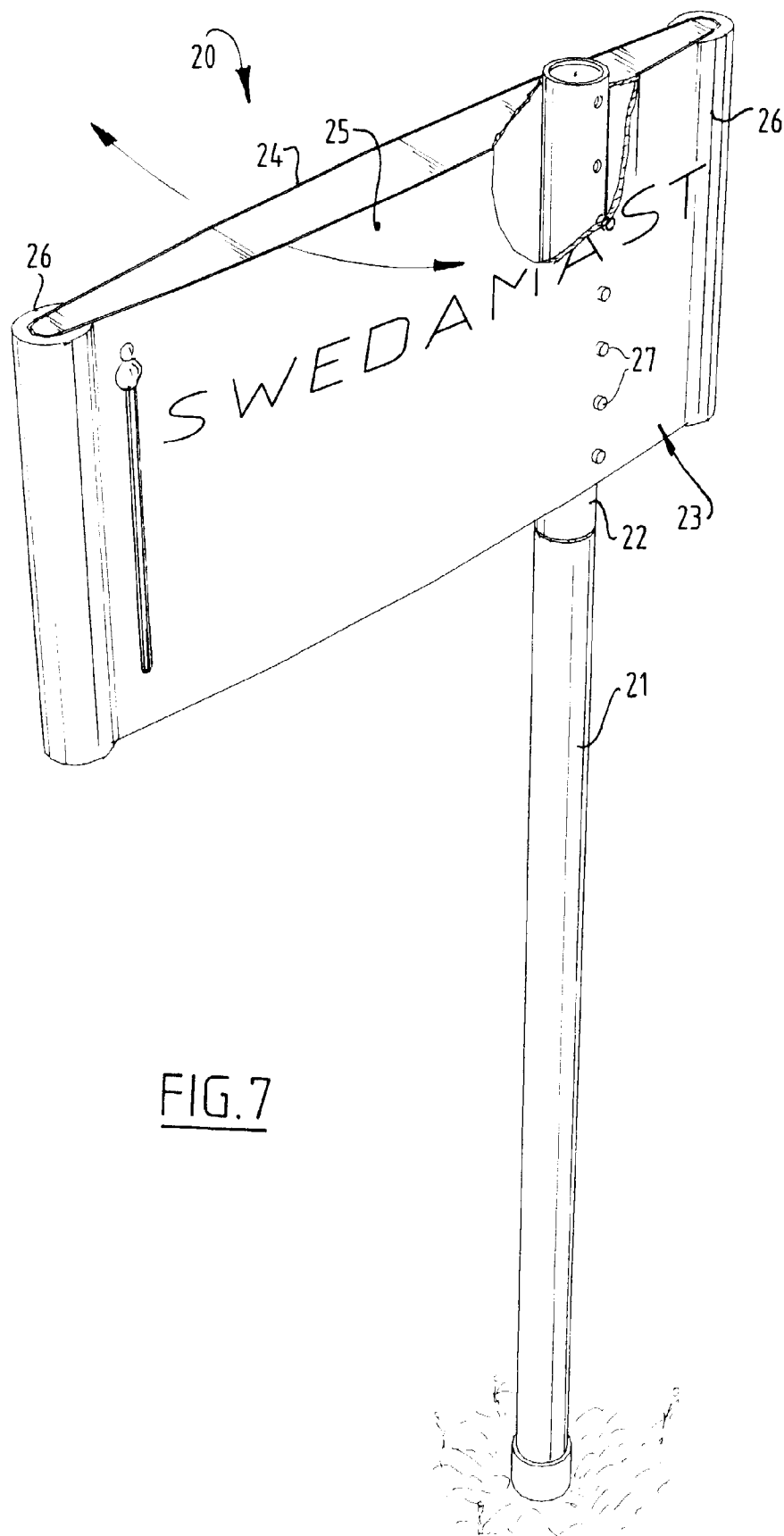


FIG.4









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EUROPEAN SEARCH REPORT

Application Number
EP 98 20 1221

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.6)
A	US 4 910 898 A (F. HECTOR) 27 March 1990 * the whole document *	1-5	G09F15/00 G09F7/22
D,A	US 1 825 564 A (J. WHITLOW) 29 September 1931 * the whole document *	1-5	
A	US 4 641 448 A (R. COBB) 10 February 1987		
A	FR 2 637 720 A (J. DENIS ET AL.) 13 April 1990		
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			G09F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		16 July 1998	Gallo, G
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