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(54) Water barrier

(57) The invention relates to a water barrier, which may be deployed temporarily. It consists of a system of metal support elements (1) which support a plastic sheeting (5). The system may be transported, unrolled and erected using very little effort and after being used it may be rolled up again. An important saving in material is obtained by designing the support elements (1) such that they are subjected to tensile forces.

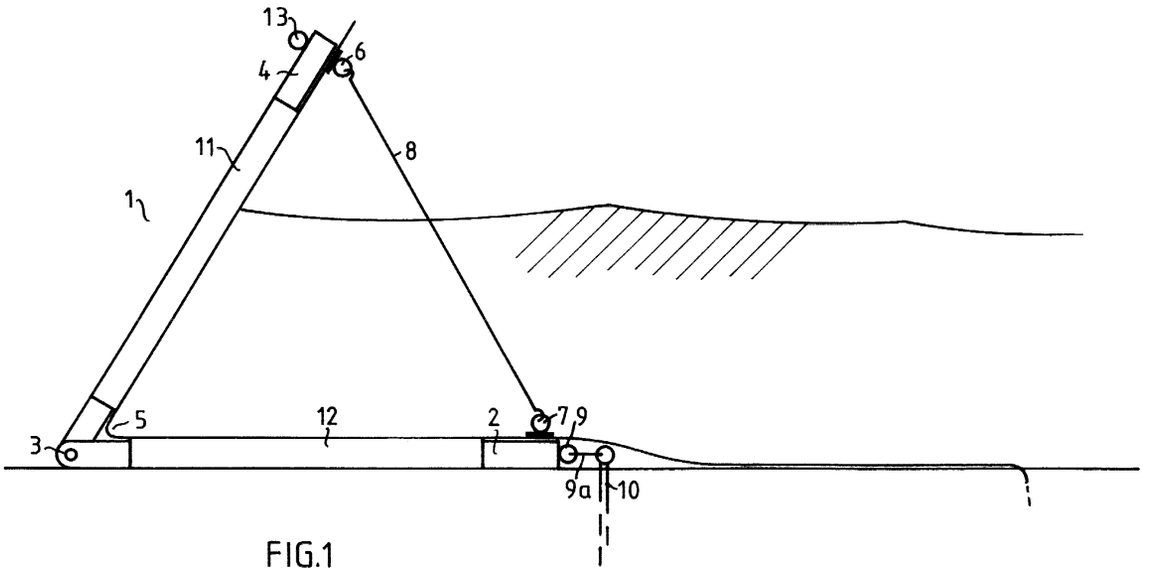

FIG.1

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Description

[0001] The invention relates to a system for separating a wet and a dry area, comprising a number of hook-shaped support elements, each provided with a first leg and a second leg, pivotally connected to the first leg, of which the first leg operationally is placed on the ground while the second leg forms an angle with the ground, and a liquid impervious plastic sheeting which is supported by the support elements.

[0002] A system of this kind is known from EP-A-0 854 238. In the known system, an acute angle of the support element points towards the wet area, as a result of which the system in fact looks like a classically built dam. The disadvantage of the known system is that operationally between the two legs a water pressure taking element must be placed, and more in particular that in this position the element is submitted to compressive strain and to breaking strain. This implies that the element must be made rather robust, which tends to make the entire support element bulky and heavy.

[0003] According to the inventive thought, which forms the basis for the invention, the support element may be constructed in such a manner that the element will be submitted to tensile stress, which permits a much more slender construction. Accordingly, the inventive system is characterized in that the first leg and the second leg operationally form an acute angle, with the acute angle pointing towards the dry area, and that a free end of the first leg and a free end of the second leg are connected by an element with tensile stress taking capacity, like a cable.

[0004] A favourable embodiment of the inventive system is characterized in that de support elements are provided with arresting means, such that the acute angle is equal to or larger than a predetermined minimum angle. This means that, once the tensile stress-taking element has been placed, the support element is completely fixed into one position.

[0005] Another favourable embodiment is characterized in that the first leg and the second leg are arranged such that they may form a straight angle, which means that the support elements may be easily gathered and stored when they are no longer used.

[0006] A favourable embodiment according to another aspect of the invention is characterized in that on previously determined locations the plastic sheeting is provided with case-shaped elements in which the straightened support elements can be slid. In this way, the plastic sheeting with the straightened support elements in position can be rolled-up after being used and stored. If the system is to be deployed again, the plastic sheeting is unrolled and the support elements are bent and fixed, after which the water barrier is at least substantially operational. Preferably, the case-shaped elements are made of plastic sheeting material and are fixed onto the plastic sheeting, which means that they occupy little space in a rolled-up position. It may be noted that operationally there is hardly any strain on the case shaped elements, as they are situated on the dry side, while the water pushes the sheeting against the support elements.

[0007] A favourable embodiment according to another aspect of the invention is characterized in that to the free end of the first leg and a free end of the second leg lugs can be mounted between which the element with tensile stress taking capacity can be fixed.

[0008] A favourable embodiment according to another aspect of the invention is characterized in that the system is provided with anchoring means, for anchoring the support elements or the plastic sheeting in order to prevent the entire water barrier from sliding away. Preferably, under operational conditions the anchoring means are connected to the lug mounted onto the first leg.

[0009] A favourable embodiment according to another aspect of the invention is characterized in that guy wires are provided, operationally connected to the lug mounted onto the second leg. In this way it becomes possible for the water barrier to follow a bend in the landscape in a horizontal and/or vertical direction.

[0010] A favourable embodiment according to another aspect of the invention is characterized in that the anchoring means comprise a projection on the second leg, which is positioned against the first leg when the support element is straightened. This projection is driven into the ground by the water pressure and it prevents the water barrier from sliding away, while it does not form an obstacle when the sheeting is rolled-up.

[0011] A water barrier made according to the invention can be put in place within a short time, its weight is relatively low and it demands only a limited storage volume if it is not used or if it is transported to a place where it will be deployed.

[0012] The invention will now be further explained with a reference to the following figures, in which:

- Fig. 1 schematically represents a possible embodiment of the inventive water barrier in cross section;
- Fig. 2 schematically represents a length of the inventive water barrier in top view;
- Fig. 3A represents a possible embodiment of the hinge in side view;
- Fig. 3B represents this hinge in top view;
- Fig. 4 represents a second possible embodiment of the hinge in side view;
- Fig. 5A represents a possible embodiment of the end stop in cross section;
- Fig. 5B represents an alternative embodiment of the end stop in cross section.

[0013] Fig. 1 schematically represents a possible embodiment of the inventive water barrier in cross section, comprising a number of hook-shaped support elements 1, consisting of a leg 2, which operationally lies on the

ground and which is pivotally connected by a hinge 3 to an operationally standing leg 4. Moreover, the water barrier comprises a liquid impervious plastic sheeting 5, which is supported by the support elements 1. Lying leg 2 and standing leg 4 are for example made of aluminium tubular section having a rectangular cross section and hinge 3 is made such that leg 2 and leg 4 on the one hand may form a straight angle and on the other hand may form an acute angle of for example minimal 60 degrees, as shown in Fig. 1. If leg 2 and leg 4 make a straight angle, then the water barrier including the sheeting 5 can be rolled-up and very simple be transported and stored. If it becomes necessary to deploy the water barrier, then it is unrolled and the support elements are fixed into the shown position by a steel cable 8, mounted between two lugs 6 and 7, which in turn are mounted to respectively leg 4 and leg 2. Next, the water barrier is completely stretched in a longitudinal direction, after which all lugs 9 which are mounted to the ends of legs 2 are secured, via connecting pieces 9a, with anchors 10 which have been or will be anchored into the ground. Connecting pieces 9a may be for example spring-loaded split hooks or disposable strips made of a synthetic material, so-called tyre wraps. Anchors 10 may be simple ground pins or commercially available ground anchors, well known in the art. Sheeting 5, which is for example made of a synthetic material, reinforced with polyamide fibres, passes over the anchors 10. Its end is preferably buried in a small trench. If desired, weights can be placed on the end of sheeting 5, like sand bags. Sheeting 5 is preferably provided with stitched-on or glued-on case-shaped elements 11,12 made of plastic sheeting material, through which the legs 4,2 can be slid. Moreover, an additional lug 13 can be mounted onto the upper end of leg 4 to which, if necessary, guy means may be attached for guying support element 1.

[0014] Fig. 2 schematically represents a length of the inventive water barrier in top view, with support elements 1a, 1b, 1c, 1d, 1e, anchors 10a,10b,10c,10d,10e and sheeting 5. A situation is shown in which the water barrier must make a rather sharp turn. For that purpose, two folds 14a and 14b have been made in sheeting 5, and the ends have been buried again. In order to prevent leaking through, sand bags 15a,15b have been placed onto folds 14a,14b. Moreover, support element 1c is provided with two guy wires 16a,16b, connected to additional lug 13 and to anchors 17a,17b in order to absorb tangential forces. If a turn must be made in the opposite direction, then sheeting 5 should locally be made longer. Instead of this, one may simply reduce the distance between the support elements 1.

[0015] Fig. 3A represents a possible embodiment of hinge 3 in side view. In this embodiment, leg 2 is made of aluminium tubular section having a rectangular cross section of 50 x 50 x 5 mm and leg 4 of rectangular tubular section having a cross section of 40 x 40 x 5 mm. At the end of leg 2 recesses have been milled-out, such that two side walls 18a,18b are formed which enclose the end 19 of leg 4. A hinge is formed by placing a rivet or a bolt and nut 20 in the hinge point. The acute angle that leg 2 and leg 4 may make is limited by a stop 21, formed by the end of the top wall of leg 2, adjacent to the milled-out recess.

[0016] Fig. 3B represents this hinge in top view, with the two side walls 18a,18b between which end 19 of leg 4 may rotate, stop 21 which limits the angle of rotation and rivet or bolt and nut 20.

[0017] Fig. 4 represents a second possible embodiment of hinge 3 in side view, in which on the bottom side of leg 2 substantially more material has been milled away, up to a point 22, as a result of which the end 19 of leg 4 stretches much farther into leg 2. When the water barrier is placed, end 19 forms a projection, which penetrates into the ground and constitutes an additional anchoring means for support element 1. End 19 is preferably made sharp-ended, such that it may penetrate easier into the ground.

[0018] Fig. 5A represents a possible embodiment of the end stop for leg 4 in cross-section, in which lug 6 is fixed. The actual end stop consists of a block 23 made of aluminium or plastic, which is slid into the end of leg 4 and fastened and which is provided with a threaded hole. In sheeting 5 and leg 4, holes have been made at the corresponding places, such that lug 6 may be screwed into block 23. Lug 6 is moreover provided with a closing plate 24, which firmly clamps sheeting 5. Moreover, an additional lug 13 may be screwed into block 23, for guying support element 1.

[0019] Fig. 5B represents an alternative embodiment of the end stop in cross section shown for leg 2. Here, lug 7 is just like lug 6 fixed into a block 25 made of aluminium or plastic. Moreover, a lug 9 is fixed into the free end of block 25, to which a ground pin can be attached for taking up the water pressure onto the support element.

[0020] The inventive water barrier can be produced in rolls of for example 50 meter and can be stored in a rolled-up state. When deployed, the 50-meter pieces can be coupled in an obvious manner, for example by providing each end with a support element 1, and by attaching the ends of the two adjacent support elements to the same anchor 10. On the wet side the two ends of sheeting 5 may be provided with for example wide strips covered with complementary burr type fasteners, which easily make a watertight connection.

Claims

1. System for separating a wet and a dry area, comprising a number of hook-shaped support elements, each provided with a first leg and a second leg, pivotally connected to the first leg, of which the first leg operationally is placed on the ground while the second leg forms an angle with the ground, and a liquid impervious plastic sheeting which is supported by

the support elements, **characterized in that** the first leg and the second leg operationally form an acute angle, with the acute angle pointing towards the dry area, and that a free end of the first leg and a free end of the second leg are connected by an element with tensile stress taking capacity, like a cable.

2. System according to claim 1, **characterized in that** de support elements are provided with arresting means, such that the acute angle is equal to or larger than a predetermined minimum angle.

3. System according to claim 2, **characterized in that** the first leg and the second leg are arranged such that they may form a straight angle.

4. System according to claim 3, **characterized in that** on previously determined locations the plastic sheeting is provided with case-shaped elements in which the straightened support elements can be slid.

5. System according to claim 4, **characterized in that** the case-shaped elements are made of plastic sheeting material and are fixed onto the plastic sheeting.

6. System according to one of the claims 3 to 5, **characterized in that** to the free end of the first leg and a free end of the second leg lugs can be mounted between which the element with tensile stress taking capacity can be fixed.

7. System according to claim 6, **characterized in that** the system is provided with anchoring means, for anchoring the support elements or the sheeting.

8. System according to claim 7, **characterized in that** operationally the anchoring means are connected to the lug mounted onto the first leg.

9. System according to claim 6, **characterized in that** guy wires are provided, operationally connected to the lug mounted onto the second leg.

10. System according to claim 7, **characterized in that** the anchoring means comprises a projection on the second leg, which is positioned against the first leg when the support element is straightened.

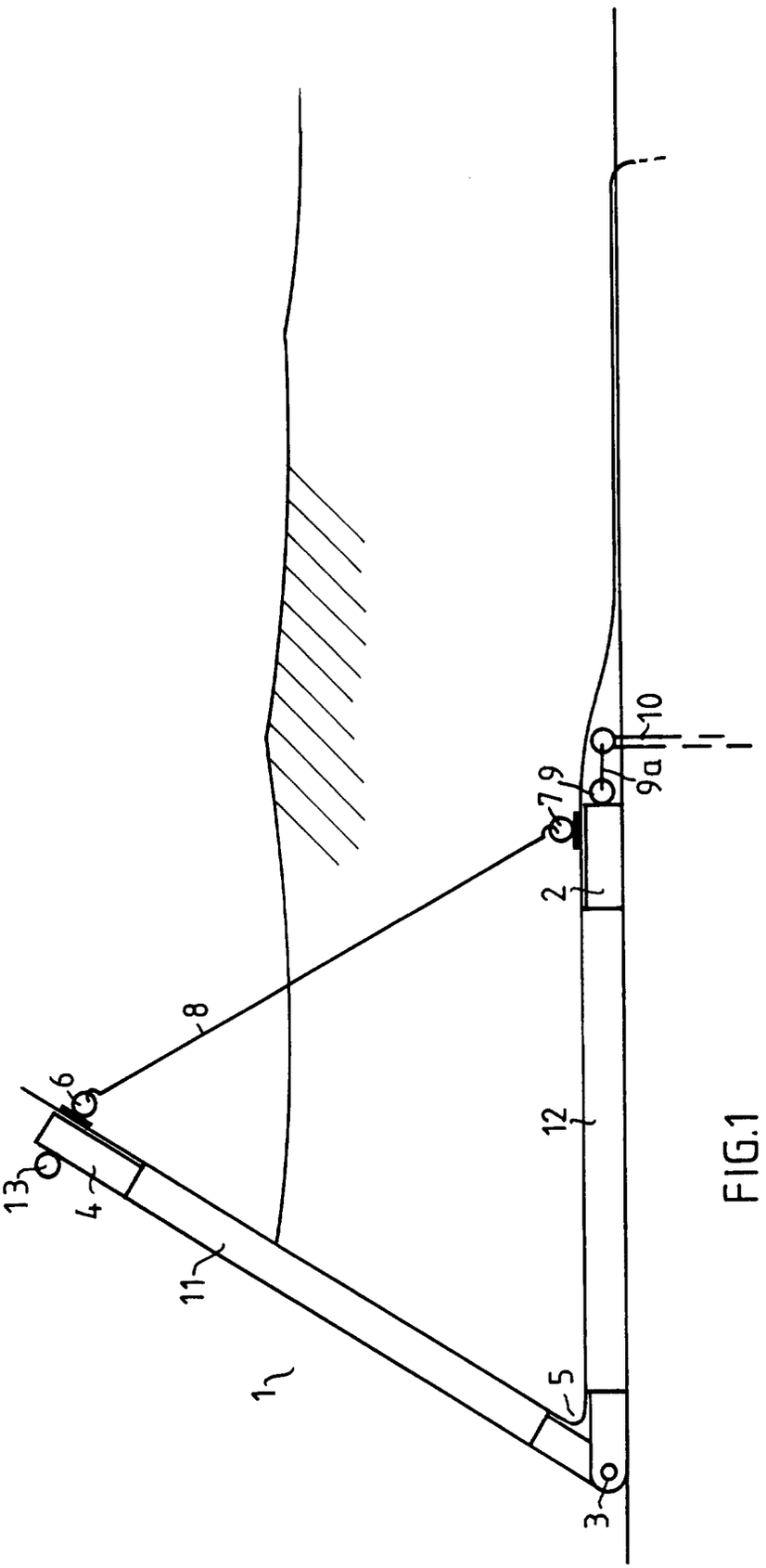

FIG.1

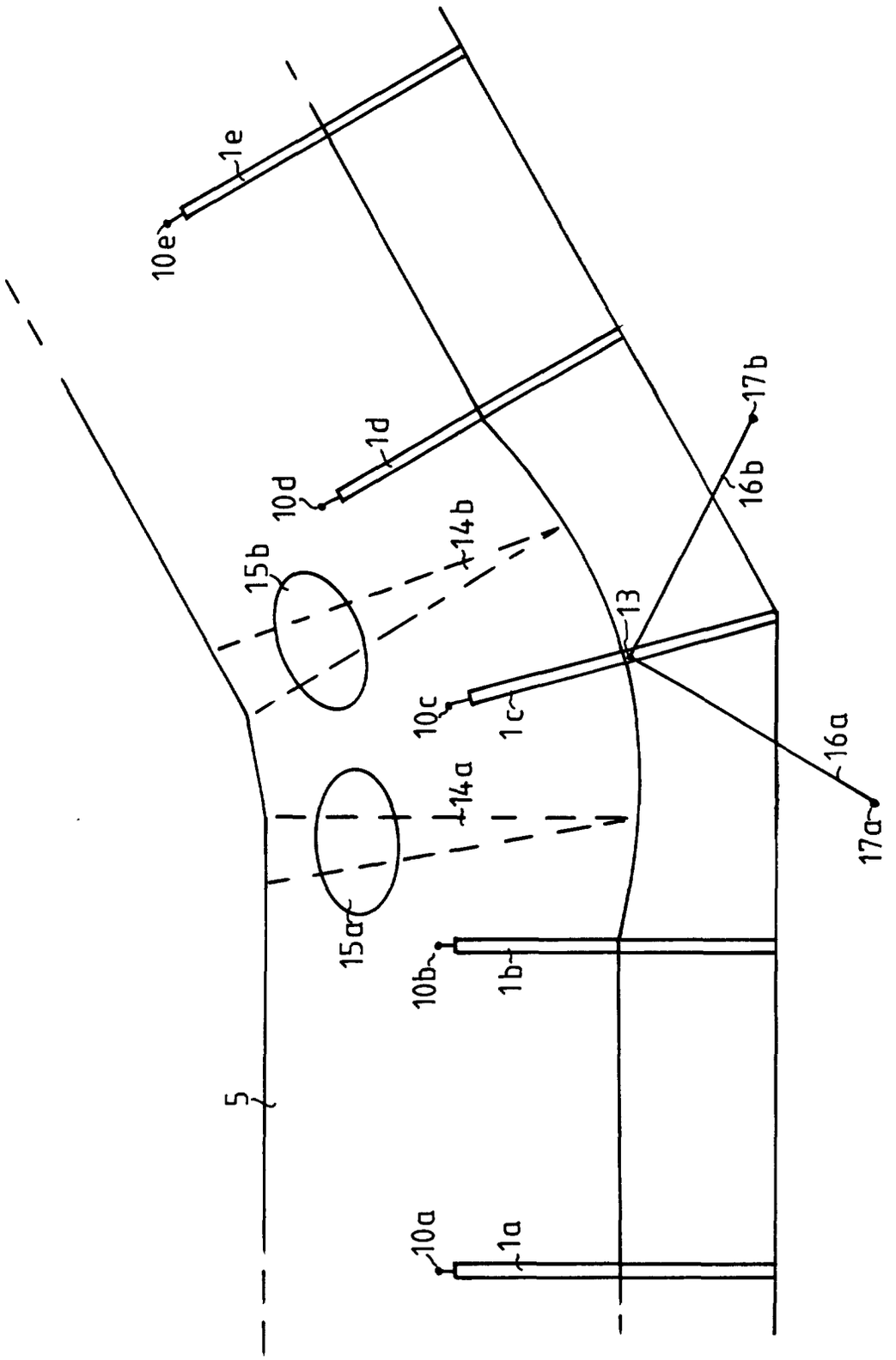
1e
10e
1d
10d
15b
14b
13
17b
16b
10c
1c
16a
14a
17a
15a
10b
1b
5
10a
1a

FIG. 2

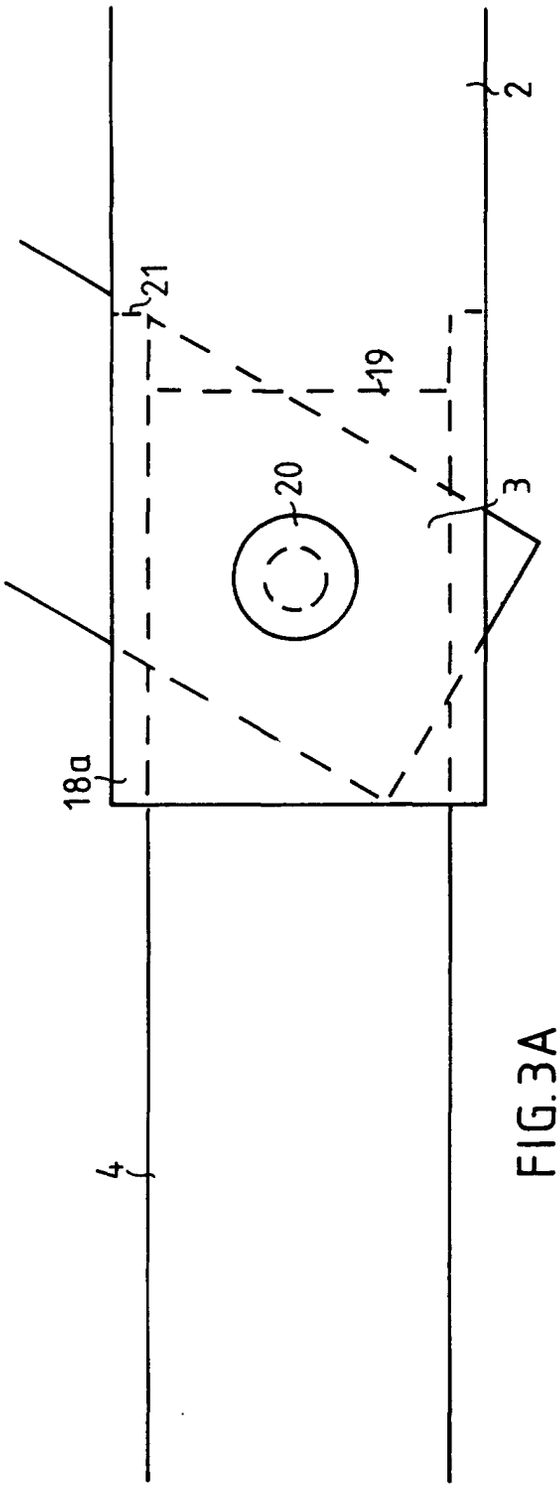

FIG.3A

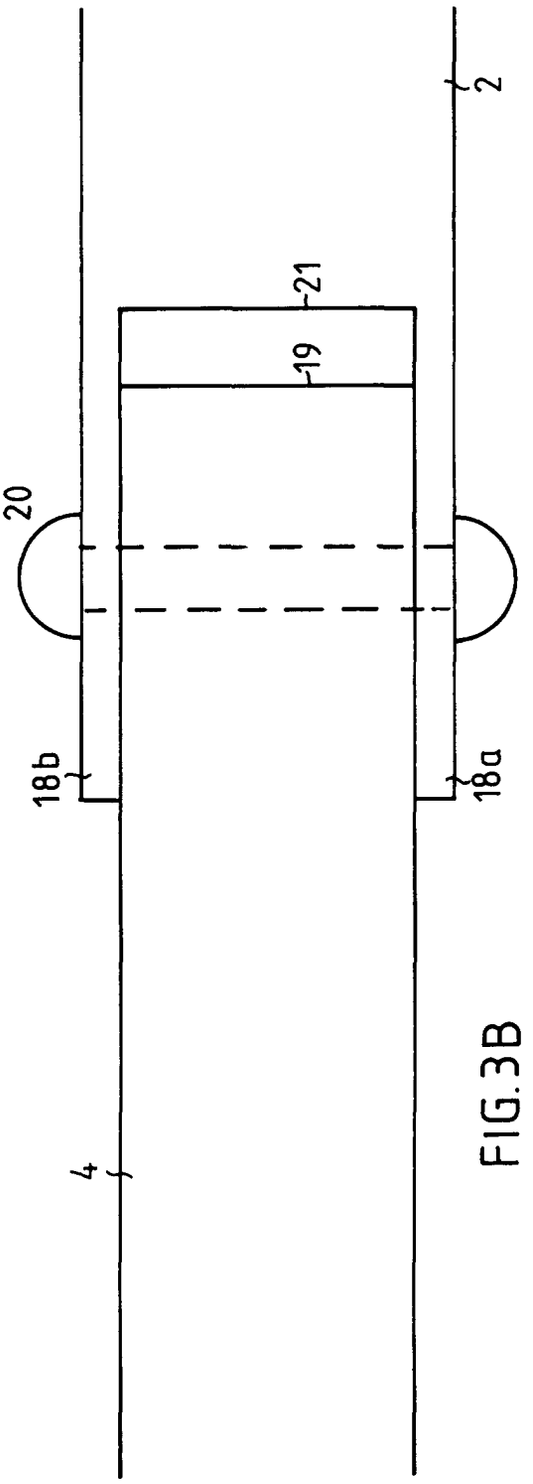

FIG.3B

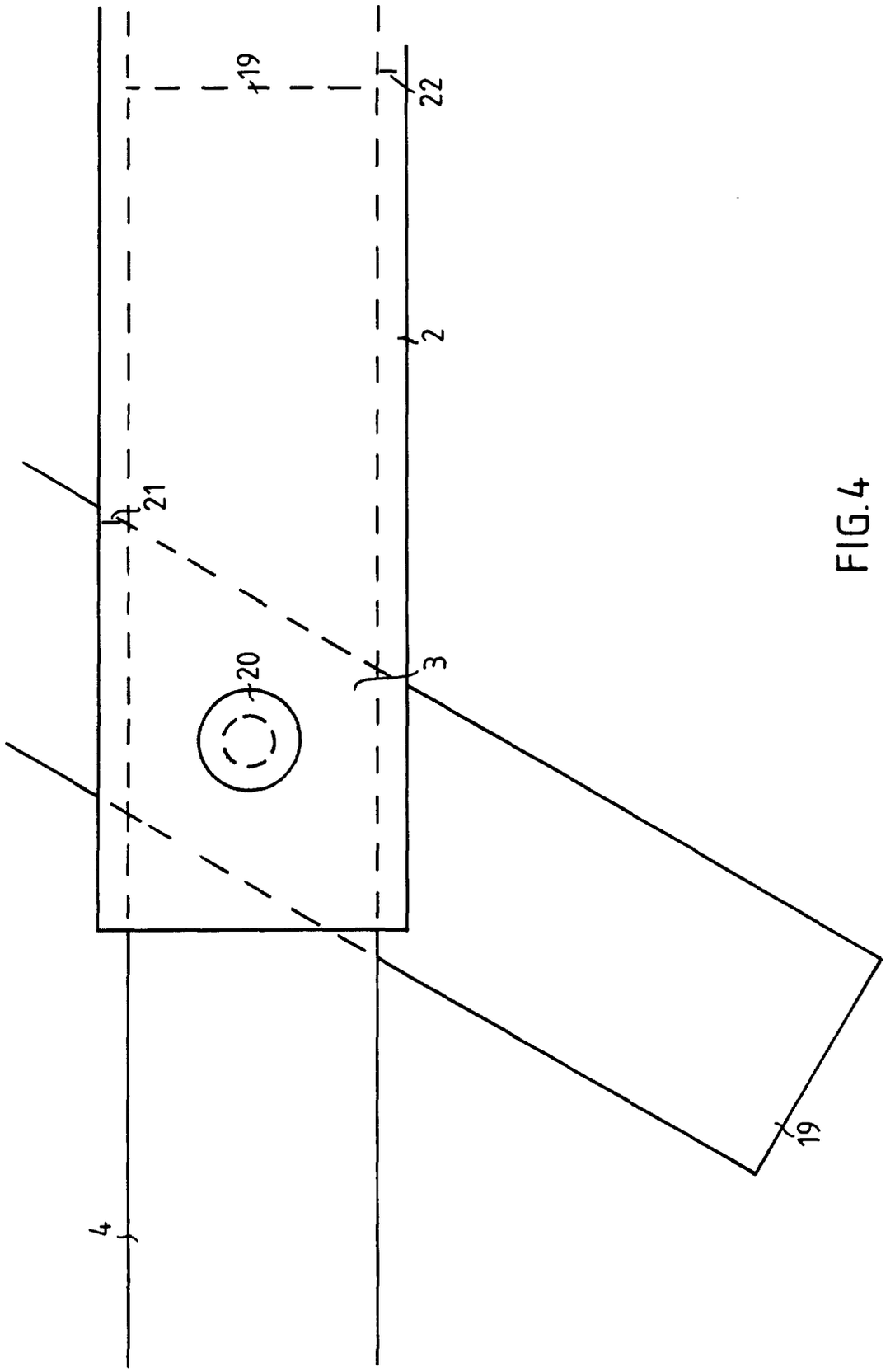

FIG.4

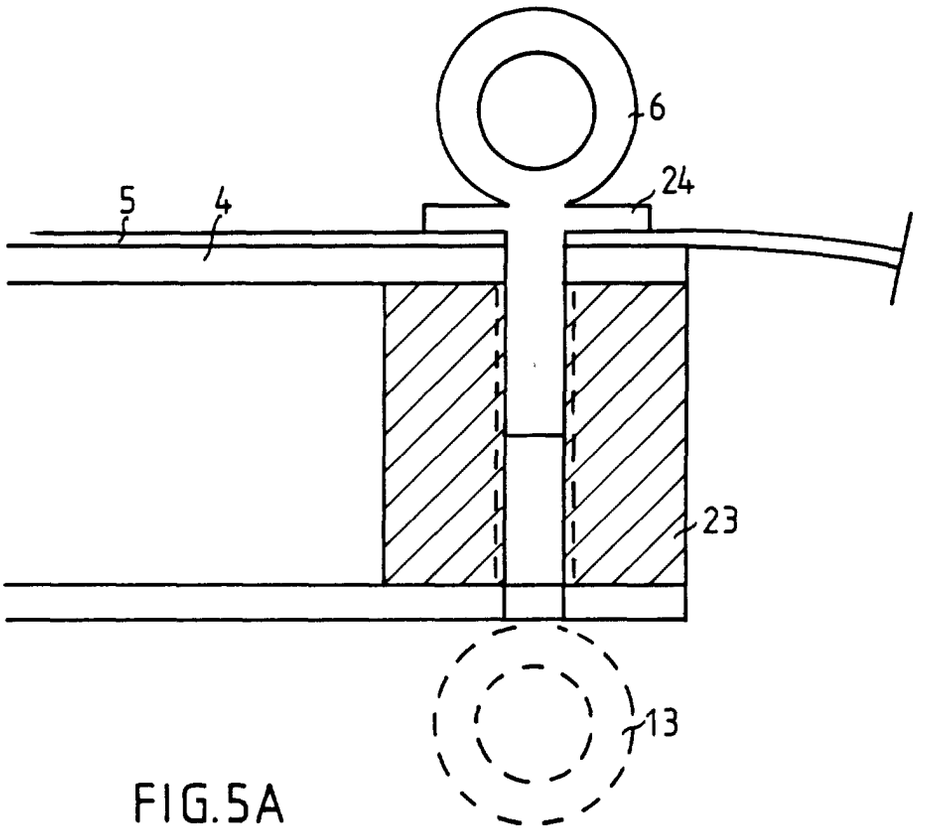

FIG.5A

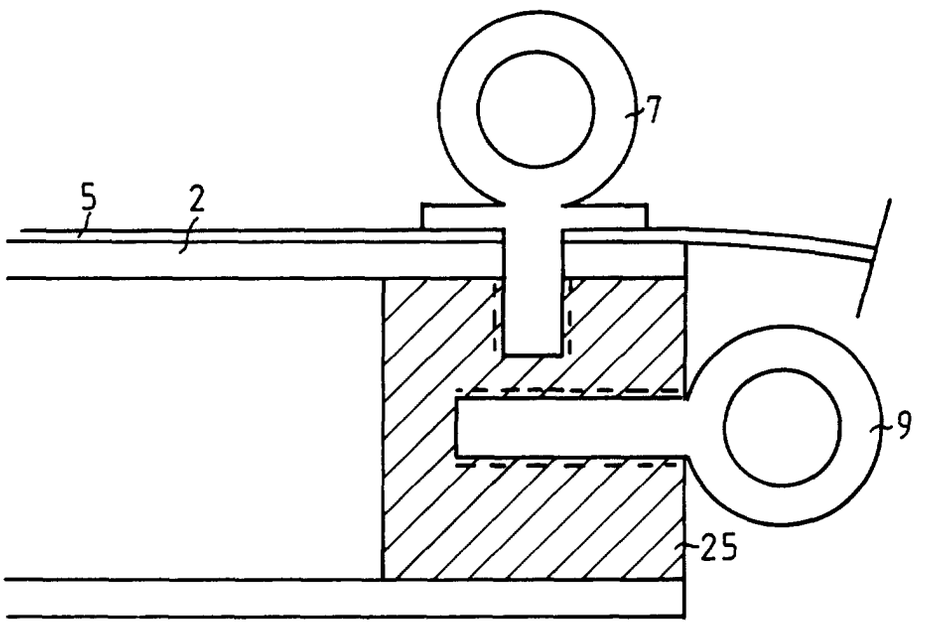

FIG.5B