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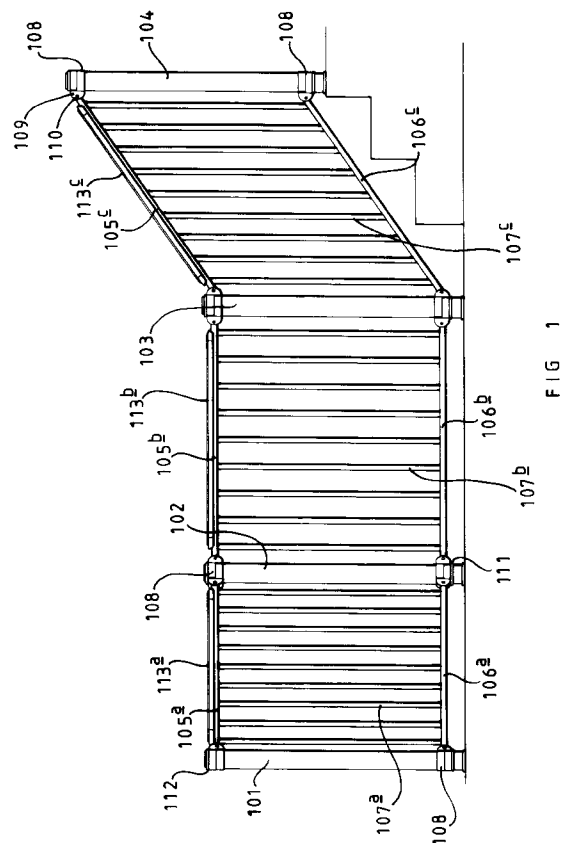
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(54) **Barrier fence.**

(57) A barrier fence comprises a row of uprights (101-104) interconnected by rigid cross-members (105,106). The cross-members (105,106) are pivotally connected to the uprights (101-104) such that successive sections of the barrier can be aligned at any angle in both the vertical and horizontal planes, depending on the desired orientation or the terrain of the site.



This invention relates to a barrier fence for permanent or temporary installation on a site, in particular to a barrier fence comprising uprights and cross-members.

Hitherto, where it has been desired to erect a barrier fence comprising uprights and cross-members, great difficulties have been encountered unless the building site is perfectly level. It has been necessary to carry out a detailed survey of the site prior to erection of the fence and to fabricate many of the components to suit the contours of the site. This has added greatly to the time taken to complete the structure, and to the expense thereof.

British Patent No 1285577 describes a barrier system which permits a certain amount of vertical flexibility in assembly and some, very limited flexibility in the horizontal plane. This system, however, can be installed only in straight lines or on shallow curves, eg alongside bends in roads.

It is also frequently necessary to erect a temporary barrier, eg for the control of crowds at sporting or other events. In one system for this purpose, rigid barrier elements comprising vertical end-posts connected by horizontal cross-members are connected together by male/female engagement of corresponding lugs and apertures on adjacent elements. Whilst this arrangement permits some flexibility in the angular disposition of adjacent elements in the horizontal plane, it does not enable the barrier to be positioned on inclined surfaces or alongside flights of steps.

In another known system, each barrier post accommodates a reel of tape which can be unwound and connected to the next post. This permits complete freedom in the relative positioning of adjacent posts, but the connecting tapes provide only a very flimsy barrier which is easily crossed and is therefore relatively ineffective.

There has now been devised a barrier fence structure comprising uprights and cross-members which overcomes or substantially mitigates the above-mentioned disadvantages.

According to the invention, there is provided a barrier fence comprising a row of uprights interconnected by rigid cross-members, the cross-members being pivotally connected to the uprights such that successive cross-members may be aligned at substantially any angle in both the vertical and horizontal planes.

The barrier fence according to the invention is advantageous primarily in that it can be readily erected, even on a site which is on, or which includes, an inclined surface, using standard components and without the need for surveying. Furthermore, the uprights may be disposed vertically, irrespective of the degree of slope of the site.

In addition, the fact that adjacent sections of the barrier may be disposed at a range of angles in the horizontal plane enables bends to be introduced into

the barrier. The barrier can be installed on sloping ground or alongside flights of stairs. The barrier may also be used as a temporary structure, yet is sturdy and rigid enough to be effective.

Although the connection between the uprights and the cross-members is pivotal, after the barrier has been erected the structure may be completely rigid.

Although the range of angles over which the cross-members may be oriented relative to the uprights in the vertical plane may be 90° or more, in practice 40° is sufficient for most purposes, since a barrier fence would be unlikely to be erected on an incline of greater than 20°.

Likewise, although the range of angles over which adjacent sections may be oriented in the horizontal plane may approach 360°, in practice a range of from 90° to 270° is generally sufficient since this allows adjacent sections to be disposed at angles close to right angles.

To provide a more effective barrier, successive uprights are preferably connected by a plurality, most preferably by two, cross-members. The cross-members are preferably connected by pivotally-mounted vertical slats.

For orientation in the horizontal plane, the cross-member is preferably connected to coupling rings which are rotatably mounted on the uprights.

The barrier according to the invention may be fixed, in which case the uprights may be embedded in the ground, or may be a temporary structure, in which case some at least of the uprights are provided with a base member or foot to keep the barrier upright.

The invention will now be described in more detail, by way of illustration only, with reference to the accompanying drawings, in which

Figure 1 is a side elevation of a portion of a barrier according to the invention,

Figure 2 is a plan view of the barrier of Figure 1, and

Figure 3 is a detailed view of the top portion of an upright forming part of the barrier of Figures 1 and 2.

Referring first to Figure 1, a barrier comprises a series of vertical posts 101-104 of circular cross-section. Adjacent pairs of posts 101-104 are connected by upper and lower cross-members (105a-d, 106a-d respectively), each pair of which is connected by nine vertical slats 107a-d (slats 107d not being visible in the Figures).

Each cross-member 105a-d, 106a-d is pivotally connected at each of its ends to a coupling ring 108 which is rotatably mounted on the corresponding post 101-104. Each coupling ring 108 is provided with a pair of flanges 109 which receive the end of the cross-member 105a-d, 106a-d, the pivotal connection being completed by a pin 110 passing through apertures in

the flanges 109 and cross-member 105a-d, 106a-d.

Each post 101-104 carries two pairs of coupling rings 108, one pair, located near the top of the post, being for connection to the upper cross-members 105a-d connecting the post to the two adjacent posts, and the other pair, located near the base of the post, for connection to the corresponding lower cross-members 106a-d. For example, the upper coupling rings 108 on post 103 are connected to upper cross-members 105b and 105c, and the lower coupling rings to lower cross-members 106b and 106c. Of course, terminal posts such as 101 may carry only single upper and lower coupling rings. The lower pair of coupling rings 108 is supported and spaced from the base of the post by a circumferential flange 111. A similar flange 112 is provided at the top of the post 101-104, above the upper pair of coupling rings 108. Each upper cross-member 105a-d carries a hand-rail 113a-d which is secured to the upper cross-member 105a-d by screws.

Figure 3 shows a pair of coupling rings, specifically that at the top of upright 103, in greater detail. The pair comprises an upper ring 108a and a lower ring 108b. Each ring 108a, 108b is provided with a pair of flanges 109a, 109b. Each flange 109a, 109b is generally semi-circular in side elevation, being joined to the corresponding ring 108a, 108b along about half the diameter of the semicircle and overlapping the other ring along the remainder of the diameter. Both rings rotate (prior to assembly of the barrier) freely about the post 103.

In use, the barrier may be disposed in any desired arrangement. As shown in the Figures, the cross-members 105a, 106a between posts 101 and 102 make an obtuse angle in the horizontal plane with those 105b, 106b between posts 102 and 103. Post 104 is fixed on the topmost step of a short flight of steps, the cross-members 105c, 106c between posts 103 and 104 being oriented accordingly.

sections may be oriented in the horizontal plane includes angles from 90° to 270°.

4. A barrier fence as claimed in any one of the preceding claims, wherein successive uprights (101-104) are connected by a plurality of cross-members (105, 106).
5. A barrier fence as claimed in Claim 4, wherein successive uprights (101-104) are connected by two cross-members (105, 106).
6. A barrier fence as claimed in Claim 4 or Claim 5, wherein the cross-members (105, 106) are connected by pivotally-mounted vertical slats (107).
7. A barrier fence as claimed in any one of the preceding claims, wherein the cross-members (105, 106) are connected to coupling rings (108) which are rotatably mounted on the uprights (101-104).
8. A barrier fence as claimed in Claim 7, wherein at least some of the uprights (101-104) are provided with upper and lower pairs of rotatably mounted coupling rings (108) to which the cross-members (105-106) are pivotally connected.
9. A barrier fence as claimed in any one of the preceding claims which is rigid, the uprights (101-104) being embedded in the ground.
10. A barrier fence as claimed in any one of Claims 1 to 8, which is a temporary structure, in which some at least of the uprights are provided with a base member or foot.

Claims

1. A barrier fence comprising a row of uprights (101-104) interconnected by rigid cross-members (105, 106), the cross-members (105, 106) being pivotally connected to the uprights (101-104) such that successive cross-members (105, 106) may be aligned at substantially any angle in both the vertical and horizontal planes.
2. A barrier fence as claimed in Claim 1, wherein the range of angles over which the cross-members (105, 106) may be oriented relative to the uprights (101-104) in the vertical plane is 90° or more.
3. A barrier fence as claimed in Claim 1 or Claim 2, wherein the range of angles over which adjacent

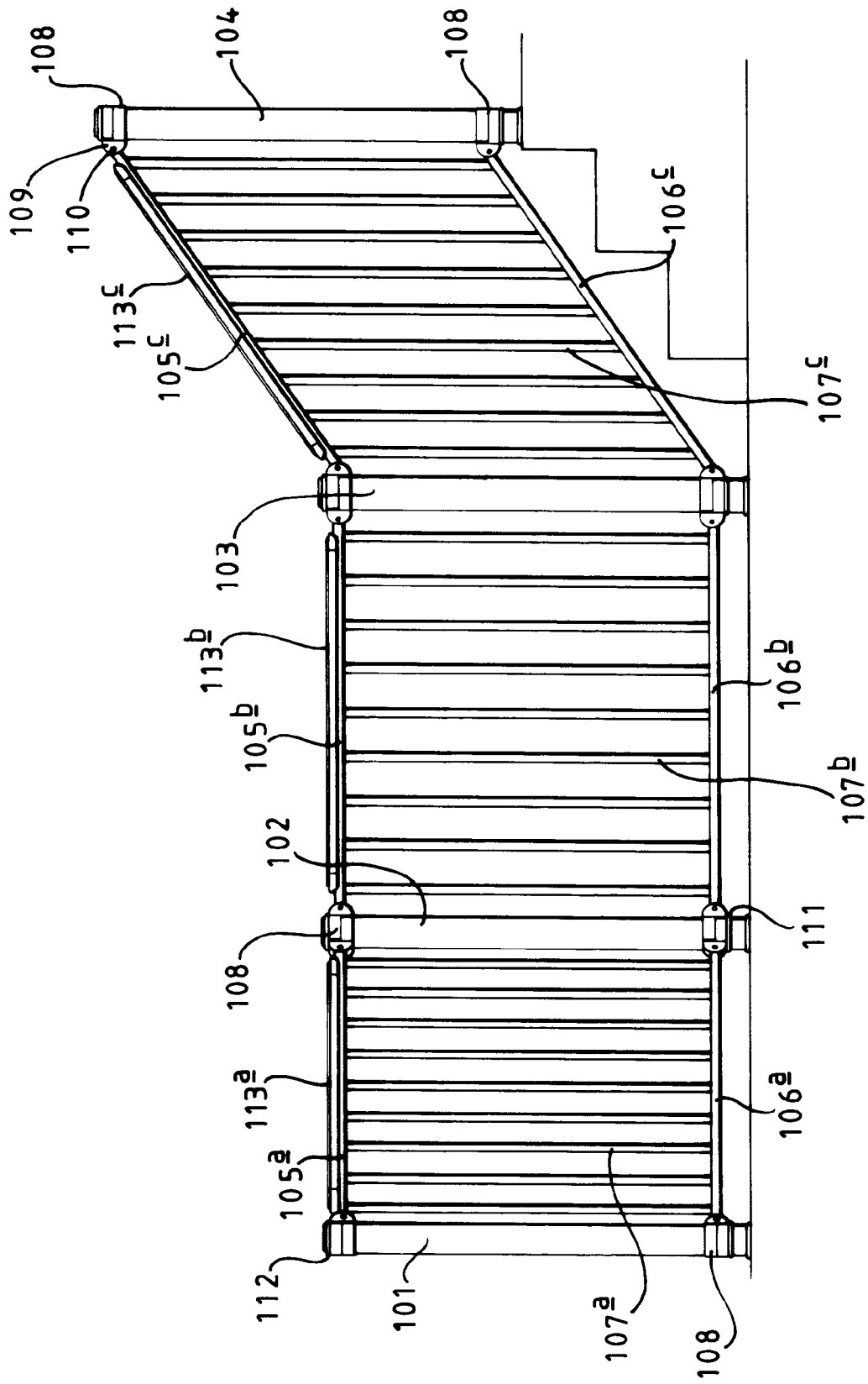
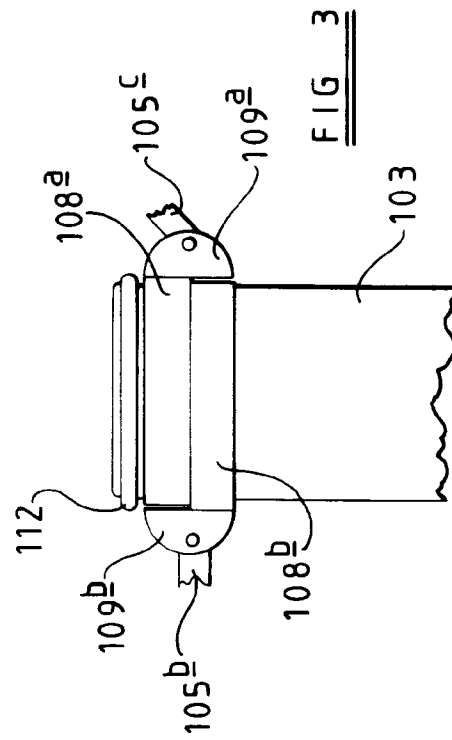
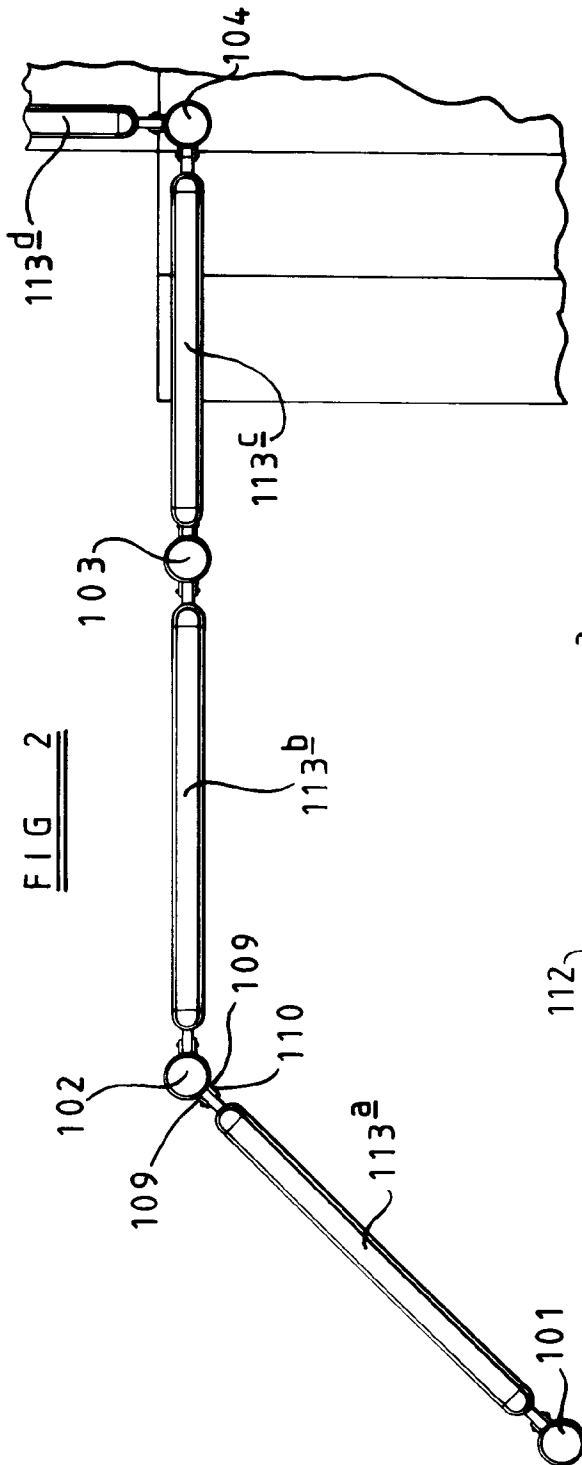


FIG. 1





European Patent
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EUROPEAN SEARCH REPORT

Application Number

EP 92 30 8602

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	EP-A-0 293 337 (ROVERA) * column 2, line 1 - column 3, line 17; figures 1-7 *	1-6, 9, 10	E04H17/14
X	US-A-3 960 367 (ROGERS) * column 1, line 51 - column 2, line 25; figures 1-4 *	1-5, 7-9	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			E04H
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 20 JANUARY 1993	Examiner BARBAS A.
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			

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