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(54) **A fence**

(57) A fence comprising a substantially vertical wall (2) and an upwardly sloping extension (3), which is provided with spaced-apart bars (8) and with material (10) extending between the bars. A first portion of the extension is rigidly connected to the wall, whilst a second portion is connected to the first portion against spring force (13). Each bar comprises a first bar portion (11), which is rigidly connected to the wall, and a second bar portion (12), which is connected to the first bar portion so that it can pivot against spring force (13) with respect thereto.



FIG. 2

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Description

The invention relates to a fence comprising a substantially vertical wall and an upwardly sloping extension, which is provided with spaced-apart bars and with material extending between said bars, wherein a first portion of the extension is rigidly connected to the wall, whilst a second portion is connected to said first portion against spring force.

Such a fence, which is known per se, comprises a wall which is made up of steel fencing or a brick wall, to which an upwardly sloping extension is secured near the upper side thereof. The material extending between the bars may comprise a mesh or wires, through which a person is unable to pass.

Such a fence is inter alia used in prisons, whereby the upwardly sloping extension makes it more difficult to climb over the fence. Normally the extension extends to that side from which climbing over is to be prevented. With a known fence the entire extension is rigidly connected to the wall. The drawback of this rigid extension is that if a person attempts to climb over the extension, the extension provides relatively much support for that person.

A fence as referred to in the introduction is known from German utility model 91.01.345.3. With this known fence a first portion of the mesh-like material is tensioned between the bars that are rigidly connected to the wall, and a second portion of the mesh-like material extends beyond the ends of the bars remote from the wall. According to said utility model said second portion of the mesh-like material is elastically deformable. It has become apparent, however, that because of the fact that the mesh-like materials are relatively thin, plastic deformation of the mesh-like material will occur relatively quickly when the end of the second portion of the mesh-like material remote from the wall is subjected to the load of a single persons weight, as a result of which it is no longer made more difficult to climb over the extension.

The object of the invention is to provide a fence comprising an elastically deformable extension, wherein the drawbacks of the known fence are avoided.

This objective is accomplished with the fence according to the invention in that each bar comprises a first bar portion, which is rigidly connected to the wall, and a second bar portion, which is connected to said first bar portion in such a manner that it can pivot against spring force with respect thereto.

Because the two bar portions are pivotally interconnected, the second bar portion will bend downwards with respect to the first bar portion when an attempt is made to climb over the fence. The second portion, which makes a pivoting movement when said climbing takes place, makes said climbing more difficult, because the moving second portion does not provide any hold. If a relatively large load is exerted on the second portion, said second portion will extend parallel to

the wall. As a result of the presence of the first portion, a relatively large distance will be maintained with respect to the wall and to a portion projecting above said wall, which makes it more difficult to climb over the fence. Once the attempt to climb over the fence is stopped, the second portion will return to the original position with respect to the first portion under the influence of spring force. The mesh-like material must be flexible to such an extent that it is capable of following the deformations of the second bar portion relative to said first bar portion. When the second bar portion returns to its original position with respect to the first bar portion, the forces exerted on the mesh-like material by the second bar portion will cause the mesh-like material to return to its original position as well.

It is noted that from US-A-4,081,171 a fence is known which comprises a rigid extension, which extension can break off from the wall and which will subsequently keep hanging against the wall by a spring. In that case the extension will not be spaced from the wall anymore, whilst furthermore the height to be climbed will be reduced. An elastically deformable extension cannot be derived from said patent specification.

One embodiment of the fence according to the invention is characterized in that said bar portions are interconnected by means of a draw spring.

It is possible to determine in advance at which load a desired angular displacement of the second bar portion with respect to the first bar portion will be obtained by suitably selecting the spring characteristic and the degree of initial tension of the draw spring, as well as the length of the two bar portions. The extension may be constructed in such a manner thereby, that a load ranging from 60 - 120 kg will result in an associated angular displacement of 45 - 90°.

Another embodiment of the fence according to the invention is characterized in that the length of said second bar portion is about 1/3 to 2/3 of the length of said extension.

If the length of the second bar portion is less than 1/3 of the length of the extension, the presence of the pivoted second bar portion will have relatively little effect. If the length of the second bar portion is more than 2/3 of the length of the extension, this relatively great length will cause said second bar portion to simply bend and extend substantially parallel to the wall. The distance to the wall will be relatively small thereby, which makes it relatively easy to climb over the fence.

The invention will be explained in more detail hereafter with reference to the drawings, in which:

Figure 1 is a front view of a fence according to the invention;

Figure 2 is a side view of the fence shown in Figure 1;

Figure 3 shows a detail of the fence of Figure 2, which is indicated at III;

Figure 4 shows a detail of the fence of Figure 3;

Figure 5 is a view in the direction indicated by arrows V-V of the fence shown in Figure 3; and Figure 6 is a cross-sectional view of the view shown in Figure 5.

Corresponding parts are indicated by the same numerals in the figures.

Figures 1 and 2 are a front view and a side view respectively of an embodiment of a fence 1 according to the invention, which comprises a wall 2 and an upwardly sloping extension 3, which is connected to the end of the wall . Wall 2 comprises a number of spaced-apart posts 4, which are secured in ground 6 by means of foundations 5. Steel fencing 7 is attached between said vertically extending posts 4. Extension 3 comprises a plurality of spaced-apart bars 8, which are each connected with one end 9 to an end of posts 4 remote from foundation 5. A mesh-like material, such as expanded metal 10, is attached between bars 8. Each bar 8 comprises a first bar portion 11, which is secured to post 4 with one end 9, and a second bar portion 12, which is secured to first bar portion 11 by means of a spring element 13. First and second bar portions 11, 12 are in line in their unloaded condition. When a force F is exerted on the end of second bar portion 12 remote from the first bar portion, the second bar portion 12 will pivot against the spring force of spring element 13 with respect to first bar portion 11 and take up the position indicated at 12'.

Figure 3 shows an enlarged detail III of the fence shown in Figure 2. The first bar portion 11 is tubular, and it comprises a portion 14 which is bent over at an angle near post 4, which portion fits in tubular post 4 and is secured thereto by means of a bolt 15. First bar portion 11 is connected to a first end of a spring 13 on a side remote from post 4, whereby a number of windings 16 of draw spring 13 are positioned within tubular bar portion 11. Second bar portion 12 is also tubular, and it is connected to spring 13 in a similar manner, with windings 17 being positioned within tubular bar portion 12. The mesh-like material 10 is secured to bar portions 11, 12 by means of brackets 18. Each U-shaped bracket 18 is provided at the ends of legs 19 with flanges 20 extending away from each other. U-shaped bracket 18 is positioned over bar portion 11, 12, whereby the mesh-like material is disposed opposite flanges 20. A plate 21 is provided on a side remote from bar portion 11, 12, which plate comprises a large number of holes, which are positioned opposite the holes that are provided in flanges 20. Bolts 22, on which nuts 23 are screwed, extend through the holes in flanges 20 and plate 21. The mesh-like material is drawn firmly against bar portions 11, 12 by tightening nuts 23.

When the fence is used in a prison, extension 8 will be directed to that side from which climbing over is to be prevented. If a person should nevertheless undertake an attempt to climb over the fence, said person will exert a load F on the end of bar portion 12 remote from post

4. Bar portion 12 will pivot against the spring force of spring 13 thereby, in the direction indicated by arrow P, and take up the position 12' illustrated in dotted lines, for example. In a position such as the present one, wherein the bar portions include an obtuse angle with each other and the second bar portion is spaced from wall 2 by some distance, climbing over the fence is made more difficult. As soon as said person lets go of the second bar portion, said second bar portion will return to its original position under the influence of the spring force of spring 13. The mesh-like material is likewise elastically deformed upon being moved in the direction indicated by arrow P, and it is returned to its original position by spring 13. It is possible to realise a desired angular displacement at a predetermined load by suitably selecting the spring characteristic and the degree of initial tension of the draw spring and the length of the two bar portions. The extension may be constructed in such a manner thereby, that a load ranging from 60 - 120 kg will result in an associated angular displacement of 45 - 90°.

It is possible, if desired, to mount a sensor on fence 1, which sensor will deliver a signal upon deformation of spring 13. This signal may be supplied to a monitoring system, by means of which an attempt at climbing over the fence can be signalled at once.

Rolls of barbed wire and/or rolls of wire netting concertinas may be attached to the extensions, if desired.

It is also possible to weld the first portion to the post.

It is also possible to use barbed wire, wire mesh or plate materials as the mesh-like material, provided no openings through which a person can pass are present between the wires or in said wire mesh.

Furthermore it is possible to provide the flexible second portion with a number of wires, which are tensioned in the longitudinal direction of the fence, and which are attached to a number of extensions. A detection unit is coupled to said wires, by means of which mechanical deformation of the extensions is detected. When an attempt is made to climb over the wall, this will cause the flexible second portion to pivot. Since the second portion makes a relatively large pivoting movement, the detection can be made relatively simply and quickly. A relatively small movement of the wires brought about by natural causes, such as vibrations caused by wind and/or rain, snow and/or birds will not result in activation of the detection unit, thus making it easier to exclude the occurrence of a false alarm.

Claims

1. A fence comprising a substantially vertical wall and an upwardly sloping extension, which is provided with spaced-apart bars and with material extending between said bars, wherein a first portion of the extension is rigidly connected to the wall, whilst a second portion is connected to said first portion

against spring force, characterized in that each bar comprises a first bar portion, which is rigidly connected to the wall, and a second bar portion, which is connected to said first bar portion so that it can pivot against spring force with respect thereto.

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2. A fence according to claim 1, characterized in that said bar portions are interconnected by means of a draw spring.

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3. A fence according to claim 2, characterized in that a predetermined pivoting movement of the second bar portion with respect to the first bar portion will take place at a predetermined spring characteristic of the draw spring and a predetermined load on the end of the second bar portion remote from the first bar portion.

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4. A fence according to any one of the preceding claims, characterized in that the length of said second bar portion is about 1/3 to 2/3 of the length of said extension.

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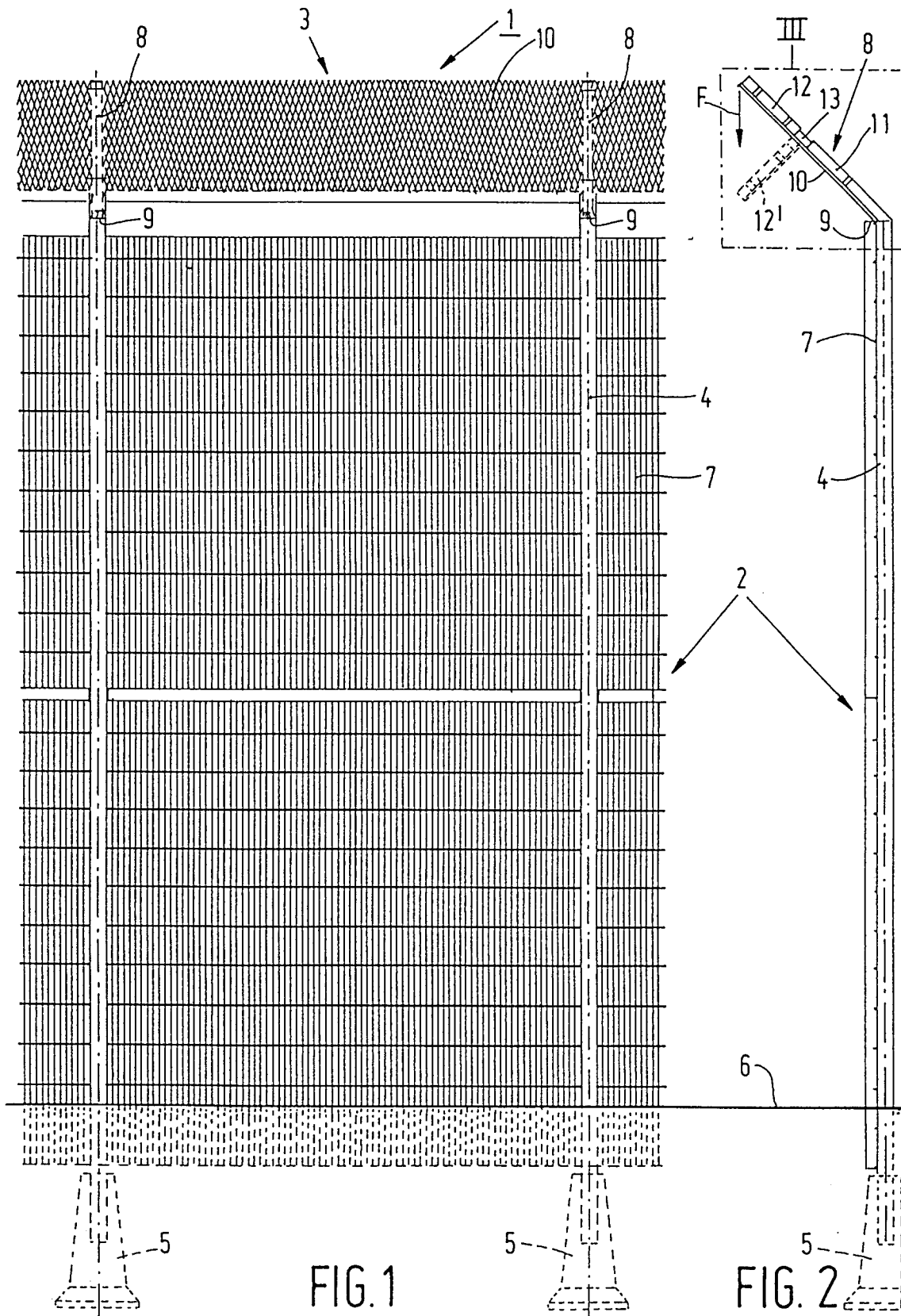


FIG. 1

FIG. 2

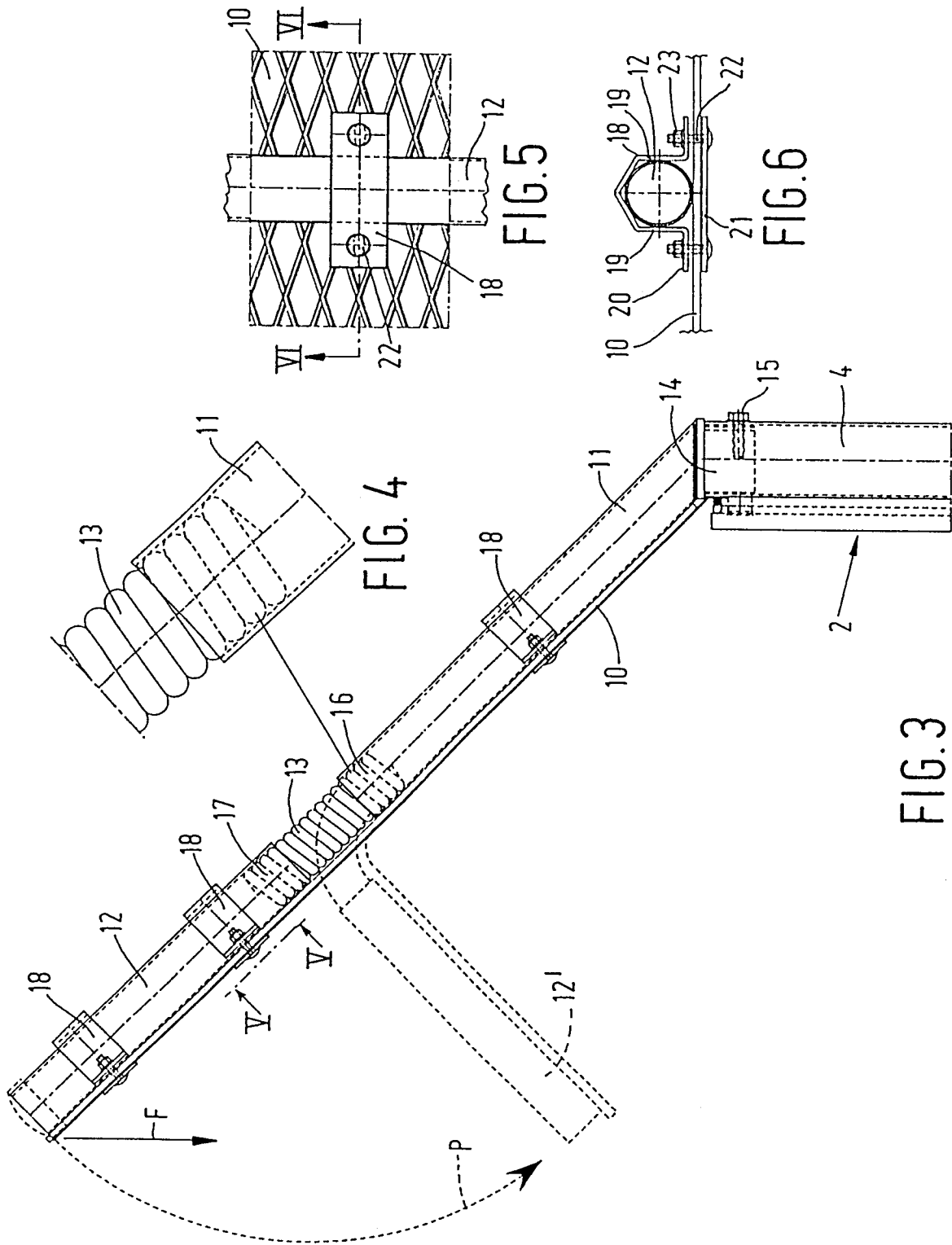


FIG. 3



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EUROPEAN SEARCH REPORT

Application Number
EP 98 20 0648

| 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,D | DE 91 01 345 U (THIELE VERWALTUNGS-GMBH) 6 June 1991 * page 2, line 1 - last line; claims 1-3; figure 1 * | 1 | E04H17/24 |
| A,D | US 4 081 177 A (GRAFF) 28 March 1978 * column 2, line 11 - column 3, line 20; figure 1 * | 2 | |
| A | DE 86 24 656 U (LOEVEN) 22 January 1987 | | |
| The present search report has been drawn up for all claims | | | TECHNICAL FIELDS SEARCHED (Int.Cl.6) |
| | | | E04H |
| Place of search | Date of completion of the search | Examiner | |
| THE HAGUE | 19 June 1998 | Clasing, M | |
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