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(71) Applicant: **Orsogril S.p.A.**
22040 Anzano del Parco (CO) (IT)

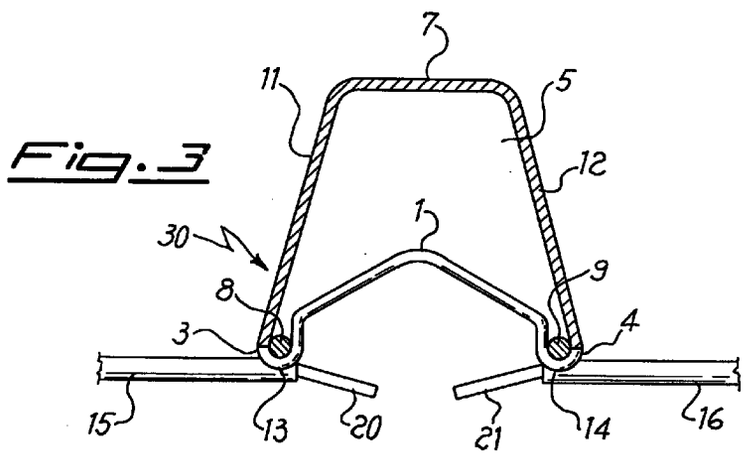
(72) Inventor: **Dell'Oro, Pierluigi**
22063 Cantu' (CO) (IT)

(74) Representative:
Marietti, Giuseppe
MARIETTI e GISLON S.r.l.
Via Larga, 16
20122 Milano (IT)

(54) Locking element for fencing panels and method for the erection of the said panels

(57) An element for the locking of fencing panels in welded net to a vertical hollow post (30), comprising a shaped and deformable spring (1), comprised of a segment folded to V-shape connecting a pair of extremities (13,14) folded to arc-of-circle shape, which is inserted into horizontal notches (17) in said post (30) to lock by means of each said arc-of-circle extremity (13,14), a first vertical extremity rod (8,9) belonging to each of the said panels into the hollow formed by a flap (20,21) and a side (11,12) of the post (30), by pressure exerted by the elastic return of the shaped spring (1). The invention moreover relates to a method for the erection of fencing panels in association with the locking element.

Fig. 3



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Description

The present invention relates to a locking element suitable for locking the panels of an enclosure fence to vertical support posts, said panels being of the type comprising a network of horizontal and vertical rods, joined together by means of welding. The present invention further relates to a method for the erection of said panels to form enclosures suitable for protecting private areas, sports facilities, buildings for civic or industrial use, schools, etc.

The traditional systems of locking fencing panels provided for the use of screws and bolts for the connection of the panels to the vertical posts, with consequent elevated enclosure erection times and costs.

An example of a system for the erection of enclosures that does not use screws and bolts is described in the French Patent Application FR 2 728 610 in the name of Eurofence. The said document describes a locking wedge applicable to fencing panels in welded net whose extremity vertical rods penetrate inside a V-section post with opposed flaps, said post being equipped with horizontal notches for the passage of the horizontal rods. This wedge, in the form of a plate, is used to maintain the vertical external rods of two adjacent panels in a wide-apart position between the arms of the V and the flaps turned on the inside of the post. The wedge-shaped plate is inserted into the post exploiting the horizontal notches present on the same post and has at its own extremities cut-outs to receive and lock the vertical rods and force them against the inside surface of the post in the aforementioned wide-apart position. Moreover the plate is shaped to adhere to the flaps of the post.

The same document also describes a special pliers that is used to elastically separate the flaps of the post, together with the vertical rods present in it, to allow the introduction of the plate.

This solution, while avoiding the problems connected with the use of screws and bolts of fixing, presents a first problem owing to the fact that it is necessary to elastically deform the vertical posts by separating the flaps in order to set the wedge-shaped plate in position. Accordingly, limits are imposed on the structure and to the mechanical strength of the posts. A second disadvantage of this solution is that a special type of pliers is necessary to effect this separation in a smooth way.

That being said, one purpose of the present invention is to produce a system for the locking of panels that doesn't incur in the aforementioned drawbacks.

Another purpose of the present invention it is to produce a method for the erection of enclosures that is rapid and inexpensive due to the locking elements according to the present invention.

These aims are achieved by the present invention which relates to a locking element which locks welded net fencing panels to hollow vertical posts, the said post being of a type endowed with pair of flaps that define a vertical opening interrupted by a plurality of horizontal notches, characterized by the said locking element comprising a shaped spring which is deformable and can be inserted into one of the said horizontal notches and by the said spring having a pair of extremities shaped like arcs of a circle, each of the said extremities being suitable for locking the first vertical external rod of each of the said adjacent panels into the space formed by one of the flaps and the side of the post, by pressure exerted by the reassertion force of the shaped spring.

At least one wedge can be associated with the said locking element, to facilitate the erection of the enclosure, and be located temporarily on the outside of the said post, to simultaneously engage the post and a second vertical rod belonging to one of the said panels.

The present invention relates moreover to a method for the erection of fencing panels in association with the locking element, characterized by comprising a phase of insertion into the post of a first external vertical rod belonging to each of the said panels, a phase of hookup of said panels to the post through the insertion into at least one of the said horizontal notches of one of said locking elements and a phase of locking through the engagement of the said extremity folded into an arc of the locking element with the said first vertical rods of the panels.

This method can moreover comprise a further phase of temporary engagement of the post with the second vertical rods belonging to said panels, through the interposition of at least one wedge between the post and one of the said second rods, said phase of temporary engagement being subsequent to the said phase of insertion into the post of the first rods of the panels.

The present invention offers the following advantages compared to the state of the art. In the first place, since the locking of the panels against the post is achieved by the elastic deformation of the shaped spring, it is not necessary to produce posts that have to open wide-apart elastically. That allows production and use of posts which don't deform elastically and are, therefore, stronger. In the second place the assembly of the enclosure can be effected without necessary use of tools specially designed to such end, allowing rapid and inexpensive assembly of the enclosure.

Further advantages and characteristics of the present invention will result more evident from the following description, which is of illustrative and not limitative nature, with reference to the attached drawings in which:

- Figure 1 shows a frontal view of a portion of a post to which have been connected two panels in welded net, locked in position by the locking element according to the invention;
- Figure 2 shows a view from above in section of a post with two panels connected which is about to have the locking element according to the invention inserted in on the inside; and

- Figure 3 shows in section the locking element in operational position on the inside of the post of the preceding figures.

The present invention will be described below making reference by way of illustration but not limitation to a post substantially trapezoidal in section, without necessarily limiting the application of the locking element and of the method of erection according to the invention to posts having this section.

Figure 1 shows a frontal view of a portion of a post 30 to which have been connected two panels in welded net, locked in position by the locking element according to the invention, which is visible more clearly in the following figures 2 and 3.

The panels in welded net are formed by a plurality of horizontal rods 15 16 and by a plurality of vertical rods 33, 34. Each of such panels is connected to the following panel by means of a vertical post 30 to form an enclosure suitable for protecting public or private spaces. Each post 30 is anchored to the ground, in a way not shown, by means of plinths in concrete or other suitable material. The frontal view of the post 30 illustrates how it comprises two flaps 20, 21 that form a vertical opening, interrupted by a plurality of horizontal notches 17; moreover, the post 30 presents a hollow interior that runs for its entire length, which is suitable to receive the first vertical rods 8, 9 of the panels and is generally closed above by a bung 50. The horizontal notches 17 (among other things) allow the insertion and the engagement of the horizontal rods 15, 16 of the panels. In figure 1 the wedges 31 and 32, applied externally to the post 30, and mediating between the same post and the second vertical rods 33, 34 are also visible. The function of such wedges 31, 32 will be illustrated more broadly below.

Figure 2 shows a view from above in section of a post 30 that connects two panels; this section is through one of the horizontal notches 17. The post 30 has a hollow interior 5 into which can be inserted the first vertical rods 8, 9 and the locking element according to the invention.

The post 30 is formed by a rolled profiled metal substantially trapezoidal in section perpendicular to its own vertical axis. This section shows an face 7, two convergent sides 11 and 12, and a pair of flaps 20 and 21, arranged in such a way as to define the hollow interior 5. The locking element comprises a shaped spring 1, of deformable type, with two extremities shaped as arcs of a circle 13 and 14. The shaped spring 1 comprises a segment folded in a V-shape that connects the arc-of-circle extremities 13 and 14. The concavity of the V-segment is turned in the direction opposed to that of the arcs-of-circle 13 and 14.

Figure 2 shows the first vertical rods 8 and 9 that engage respectively in the hollow defined by the external edges 3 and 4 of the profile that forms the post 30, and that each of the said rods 8 and 9 is connected to horizontal rods 15 and 16 to form the panels of welded net. The locking element is inserted into one of the notches 17 in the direction of the arrow F1.

Figure 3 shows in section the locking element in operational position on the inside of the hollow interior 5 of the post 30. In particular, it is clear how the arc-of-circle extremities 13 and 14 engage respectively with the first rods 8 and 9 to lock them on the inside surface of the post 30, pushing said rods by elastic reaction of the spring 1 against the corresponding hollow of the external edges 3 and 4.

The insertion into position of the locking element causes the shaped spring 1 to deform slightly in such a way as to bring the extremities to arc-of-circle 13 and 14 slightly together; on completed insertion such extremities are forced toward the outside by the elastic reaction of the spring 1 contributing to maintaining the rods 8 and 9 firmly against to the corresponding hollows of the post 30. Special tools are not necessary to manipulate the shaped spring 1 during the operations of locking; the employment of a normal pliers is sufficient. Preferably, but not necessarily, more than one locking element are inserted for each post 30.

Since in the present invention the locking element is deformable elastically to furnish the necessary strength to maintain the panels in position, is not necessary that the posts 30 be elastic, rigid posts can also be employed.

According to a possible embodiment of the invention, provision is made for the auxiliary employment of a pair of wedges 31 and 32, each of which, in the assembly of the enclosure phase, mediates between the post 30 and the seconds rods 33 and 34 respectively. The interposition of the wedges allows the holding back the panels in position, thus facilitating the operation of insertion of the locking elements. After the locking elements have been arranged in their operational position, the wedges 31 and 32 can be removed.

The present invention relates moreover to a method for the erection of fencing panels using the aforementioned locking element. The first phase of this method consists in insertion into the post 30 of the first vertical rods 8 and 9, exploiting the vertical opening of the same post, defined by the flaps 20 and 21, and the presence of the horizontal notches 17 to receive the extremities of the horizontal rods 15, 16. The second phase consists of hooking the panels to the post 30 by means of the insertion of at least one locking element for each post. The locking elements are easily inserted by exploiting the presence of the horizontal notches 17. The insertion of each locking element causes the shaped spring 1 to deform in such a way as to bring the arc-of-circle 13 and 14 extremities closer together. The third phase of the method consists of the locking the first vertical rods 8 and 9 to the post 30, by means of the engagement, respectively, of the extremities of arcs 13, 14 of the shaped spring 1, which push such vertical rods against the corresponding hollows in the external edges 3 and 4

of the post 30, exploiting the elastic return of the spring 1. The locking element can be manipulated during the aforesaid phases using a normal pliers.

To facilitate the erection of the enclosure, a variation of the method described provides for a further phase of temporary engagement of the wedges 31 and 32 with the post 30, interposing such wedges between the same post and the second rods 33 and 34 respectively. This phase of temporary engagement is naturally subsequent to the phase of insertion into the post of the first rods 8 and 9 of the panels in welded net and allows the following phases of hooking up and locking to be performed more conveniently by the erector of the enclosure. When the erection of the enclosure is finished, the wedges 31 and 32 can be removed.

Claims

1. Element for the locking of fencing panels in welded net to a hollow vertical post, said post being of the type endowed with a pair of flaps that define a vertical opening, interrupted by a plurality of horizontal notches, characterized by said locking element comprising a shaped spring which is deformable and can be inserted into one of the said horizontal notches and by said spring having a pair of extremities shaped like arcs of a circle, each of said extremities being suitable for locking a first vertical external rod belonging to each of said panels into the hollow formed by one of the said flaps and one side of the post, by pressure exerted by the elastic return of the shaped spring.

2. Element according to Claim 1, characterized by said shaped spring comprising a segment folded to V-shape that connects the said arc-of-circle extremities and having the concavity turned in the direction opposite to that of the arcs-of-circle.

3. Element according to Claim 1 or 2, characterized by having at least one wedge associated with it, arranged temporarily outside of said post, in a position suitable to bear simultaneously against the post and a second vertical rod belonging to one of said panels.

4. Method for the erection of fencing panels in association with the locking element according to one of the preceding Claims, characterized by comprising a phase of insertion into the post of a first vertical extremity rod belonging to each of said panels, a phase of hooking up said panels to the post through insertion into at least one of said horizontal notches of one of said lacking elements and a phase of locking through engagement of the said first vertical rods of the panels with the said folded to arc-of-circle extremities of the locking element.

5. Method according to Claim 4, characterized by comprising a further phase of temporary engagement of the post with said second vertical rods belonging to said panels, through the interposition of at least one wedge between the post and one of the second rods, said phase of temporary engagement being subsequent to the said phase of insertion into the post of the first rods of the panels.

Fig.1

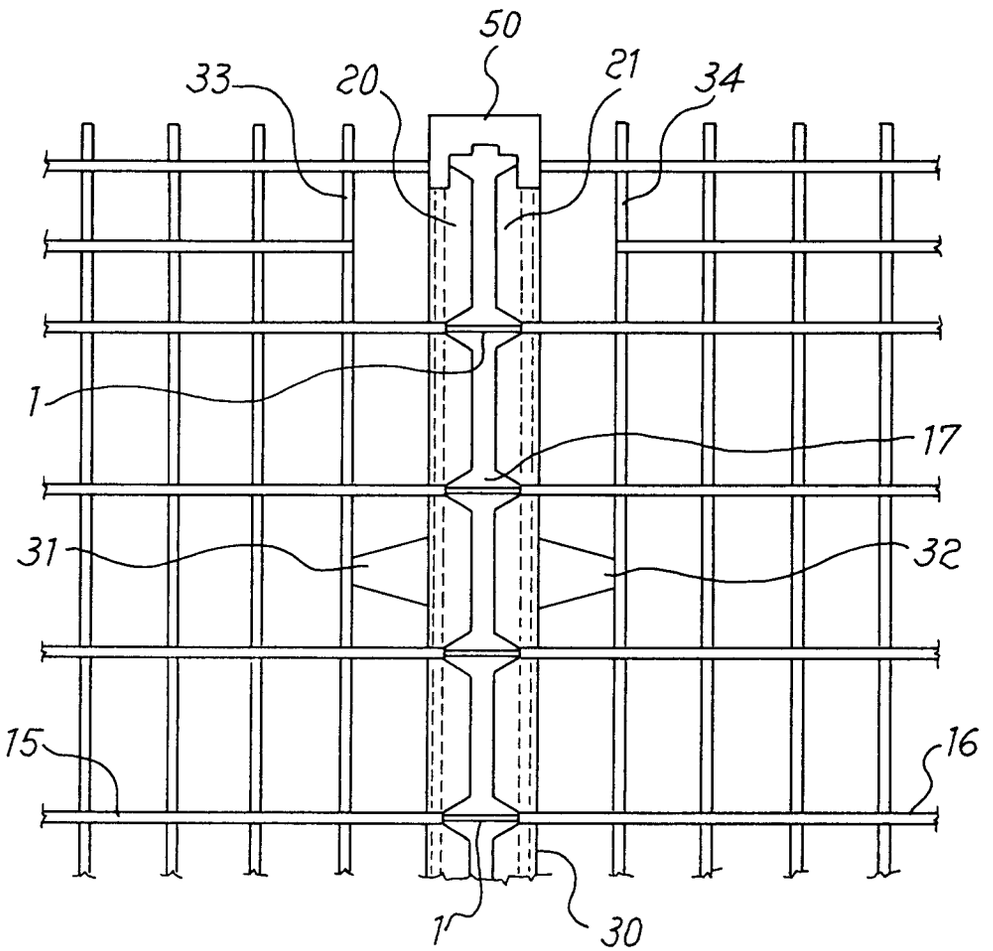

Fig.2

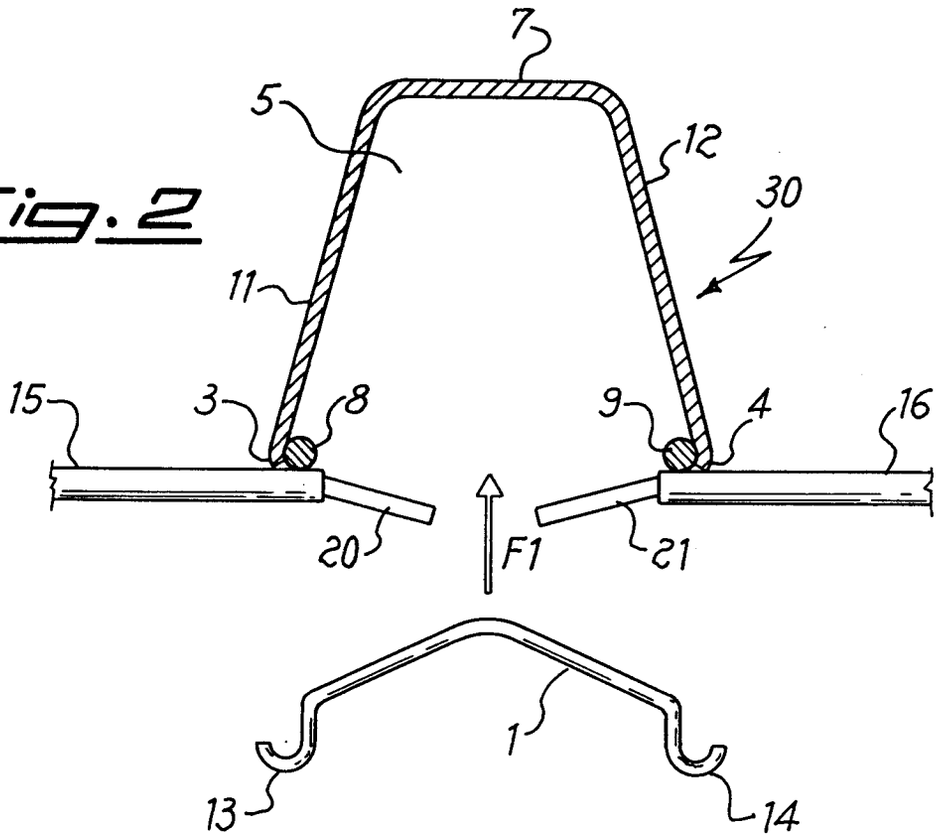
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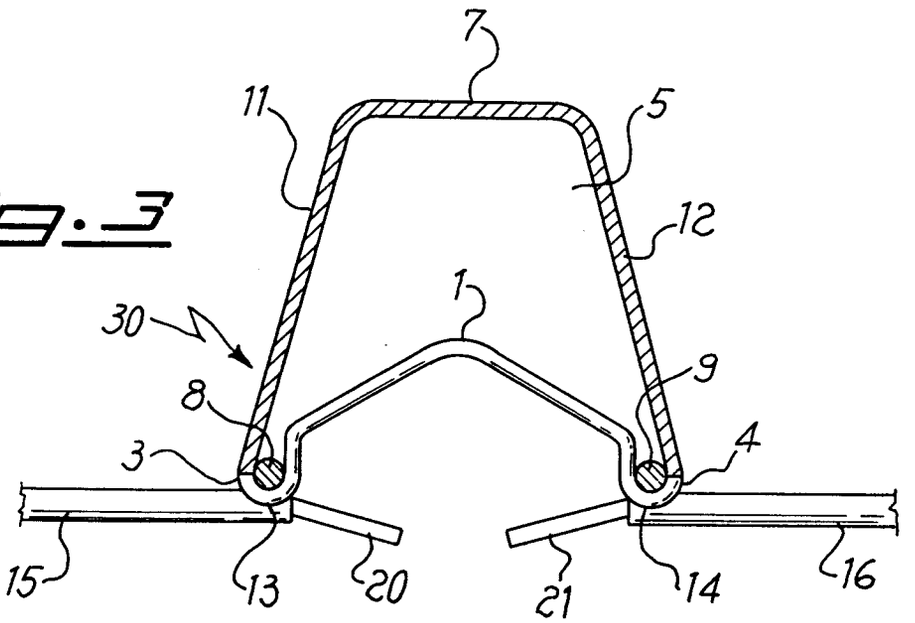
Fig.3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EUROPEAN SEARCH REPORT

Application Number
EP 97 83 0180

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	FR 2 728 610 A (EUROFENCE S.A.) * the whole document * ---	1	E04H17/00 E04H17/16
A	DE 86 17 638 U (J. ZAPF) * the whole document * ---	1	
A	EP 0 368 778 A (SOCIETE ANONYME DES ETABLISSEMENTS GANTOIS) * the whole document * -----	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

E04H

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	9 September 1997	Delzor, F

CATEGORY OF CITED DOCUMENTS

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