

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 753 627 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:
15.01.1997 Bulletin 1997/03

(51) Int Cl.⁶: **E01F 13/02**

(21) Application number: **96305340.0**

(22) Date of filing: **11.07.1996**

(84) Designated Contracting States:
DE ES FR

(72) Inventor: **Houghton, Harry Vincent**
Egerton, Bolton BL7 9EW (GB)

(30) Priority: **13.07.1995 GB 9514347**
04.01.1996 GB 9600129

(74) Representative: **Low, Peter John et al**
Wilson, Gunn, M'Caw,
41-51 Royal Exchange,
Cross Street
Manchester, M2 7BD (GB)

(71) Applicant: **SWINTEX LIMITED**
Bolton BL9 9NX (GB)

(54) Hurdle barrier

(57) A hurdle type barrier system where there is provided an assembly comprised of at least two substantially horizontally arranged barrier boards (1), together with at least two substantially vertically arranged support posts (2), said support posts having provided upon them an upper and lower receiving means (3,4) for accepting the needs of the two barrier boards; individual receiving means each being arranged whereby it ex-

tends to both the inboard (4) and outboard (3) opposing sides of the post in line with and relative to the barrier board, where the receiving means on at least the inboard part (4) is open to receive the barrier board, and where the fit of the barrier board within the receiving means is such that there is interference between the inner surface of the receiving means and the outer surface of the barrier board and where provision is made to prevent unintentional disassembly of the barrier.

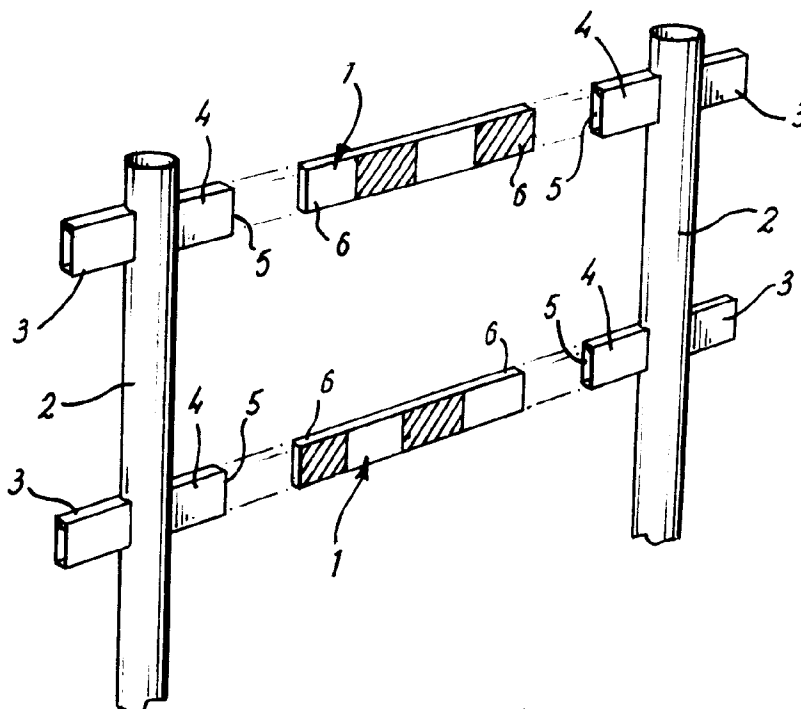


FIG. 1

EP 0 753 627 A1

Description

This invention relates to barriers of the type used at roadworks.

There are many types of barriers used to warn the public or protect workers at excavations in the road or in pedestrian areas and footpaths.

They may be of the type which uses two or more posts having detachable barrier boards fixed to them or suspended between them. Alternatively, they may be of the "hurdle" type, similar in arrangement to the hurdles used on athletics tracks. It is barriers of this hurdle type that this invention is concerned.

Typical traditional hurdle barriers have been constructed using two metal uprights provided with a simple base arrangement, and wooden or metal barrier boards are nailed, screwed, bolted or otherwise fixed to the two metal uprights. This most traditional configuration is nowadays considered less desirable due to the greater awareness concerning safety issues, resulting in a growth in popularity of the two plastic post systems with removable plastic barrier boards mentioned before.

However, in the main, these systems employ multiple components and fitments in their construction-base mouldings, a post with machined slots to take some moulded fitment on the end of the barrier board, or some other component arranged on the post to receive a board end with or without the moulded fitment. All of these components require finishing operations or have extra components compared to the traditional hurdle barrier. Hence they are more costly.

Also, because there are many more separate components for the worker to assemble at the excavation site, compared to simply placing a single assembly hurdle type barrier; time is lost and extra cost incurred by the contractor.

There have been many attempts, therefore, to duplicate the traditional metal post and wooden barrier board hurdle using plastic components. However, generally, these are deficient in strength or ability to withstand severe use when compared to the metal/wood hurdle arrangements. The greatest difficulty experienced when making a plastic post/plastic barrier board hurdle barrier is the joining of the boards to the posts. It is at this point that the greatest stress occurs in use, where the hurdle may for instance be thrown or dropped from a lorry down onto the pavement or road surface. Considerable loads in tension, torsion and compression are exerted in such a situation leading potentially to early failure of the structure, particularly at the joints between boards and posts.

Although it is desirable to construct the hurdle in a rigid fashion, it has proven quite difficult to achieve rigidity without additional components such as injection mouldings or extra bolts, rivets, screws etc. increasing again the cost of the product because of component finishing and assembly costs.

Some producers have provided joints between the

planks and posts that are not rigid but provide a degree of flexing through the use of elastomeric polymers. This approach, whilst assisting with shock absorption is a compromise since the greater the elasticity of the joints and the greater the ability to cope with stress, the less rigid the hurdle becomes, lessening its functional intention to provide a physically stable resistance to movement, a feature especially important for the visually impaired.

It is with these problems in mind that the present invention was made.

According to the present invention there is provided an assembly comprised of at least two barrier boards, preferably horizontally arranged, together with at least two support posts, preferably vertically arranged, said support posts having provided upon them an upper and lower receiving means for accepting the ends of the two barrier boards; individual receiving means each being arranged whereby it extends to both the inboard and outboard opposing sides of the post in line with and relative to the barrier board, where the receiving means on at least the inboard part is open to receive the barrier board, and where the fit of the barrier board within the receiving means is such that there is interference between the inner surface of the receiving means and the outer surface of the barrier board.

A specific embodiment of the invention is now described by way of example with reference to the accompanying drawings in which:-

Fig. 1 - shows an exploded view of the components prior to assembly.

Fig. 2 - shows a barrier plank assembled to the inboard part and outboard part of the receiving means and passing through the post.

Fig. 3 - shows the landscape view of the assembled hurdle barrier with closed ends of the outboard part of the receiving means.

Fig. 4 - shows as in Fig. 3 but where the outboard part of the receiving means is open and where the barrier plank has been arranged to pass through this end.

Referring to Fig. 1, there is shown upper and lower barrier boards (1), support posts (2), outboard part of receiving means (3), inboard part of receiving means (4) with inboard open aperture (5) to receive barrier board end (6).

Referring to Fig. 2 which is a partially cut away illustration, barrier board (1) is shown assembled to post (2) by introducing barrier board end (6) into open end (5) of inboard receiving means (4), such that end (6) passes through the open interior section of post (2) to engage in outboard part of receiving means (3). In this instance the outward end (7) of the outboard part of receiving means (3) is closed and the barrier board end (6) is pressed up to closed end (7) to provide a stop or register so that when all four plank ends are received in

their respective receiving means the assembly will form a rectangle as shown in Fig. 3. Alternatively, as is shown in Fig. 4, the outboard part of the receiving means (7) may be made so that it is open like the end (5) of the inboard receiving means (4). The barrier board end (6) may then be allowed to project right through from the inboard receiving means through and beyond the open end of the outboard receiving means.

In all of the illustrated arrangements one or more fixings such as a nut and bolt or rivet shown (8) may be placed in the receiving means to assist with preventing dislodgement of the barrier board.

Alternatively and more preferably, the barrier boards and/or the receiving means can singly or jointly be provided with one or more physical forms, the purpose of which is/are to allow the assembly of the barrier board to the receiving means but to subsequently prevent the unintentional disengagement of the barrier board from the receiving means.

Examples of the physical forms considered to be more desirable are an inwardly projecting wedge shaped boss formed in the receiving means that allows passage of the barrier board end into the receiving means until the said wedge shaped projecting boss snaps into a hole or recess provided in the barrier board, the wedge shape preventing the board's subsequent withdrawal due to the engagement of the boss within the hole. Barb forms arrowheads and many other forms may also be employed.

In a still further and more preferable embodiment the position(s) of the physical forms chosen to effect the non-withdrawal of the barrier board is (are) carefully chosen to prevent incorrect assembly of the barrier. For instance, if in the above example the wedge shaped boss is provided only on the part of the receiving means designated as being the 'front' of the barrier assembly, and the recess or hole provided in the barrier board is likewise only present on the 'front' face of the barrier board, then the two parts will only prevent disassembly when correctly assembled with both parts having their front aspects arrayed facing in the same direction. In the event of assembly error, the boss and hole will not be able to engage and disassembly followed by reassembly in the correct orientation can be more easily completed.

By careful positioning of the engagement means chosen to effect the non-return function, the skilled practitioner can ensure that the barrier board is correctly located (not too far or too little) into the receiving means and that the barrier board is the correct way up if required.

The function of passage of the board end into the receiving means but subsequent prevention of withdrawal from the receiving means may be achieved by a variety of means under the scope of this invention, but the essential desirable characteristic of the embodiment is that the said physical form(s) is (are) contained in or provided on:- the barrier board; the area immediate to

the receiving means provided on the post; and/or as part of the receiving means itself such that there are no additional or separate parts required.

The hurdle barrier described above as a preferred embodiment has significant commercial advantage, in that it allows, where appropriate, the final assembly to be carried out by the user rather than in the factory, and no special tools or fitments are needed and assembly can only be completed in a correct manner. Where the user is located at a large distance from the manufacturer, the hurdle barrier of the preferred embodiment may be sent disassembled with considerable savings in freight costs compared to a fully assembled hurdle.

Alternatively, but less preferred under the scope of the invention, the barrier board may be permanently fixed into the receiving means by the use of an adhesive suitable for the purpose, or by welding the board in place by the use of heat, ultrasonic welding or radio energy or friction welding techniques.

The receiving means are preferably integrally moulded into the post by techniques such as rotomoulding or blow moulding, but, alternatively, they could equally be formed as separate mouldings provided that a section or sections of the post is/are removed sufficient to allow the barrier board to pass through between the inboard and outboard part of the receiving means; the post is a firm fit within the receiving means attachment and that the barrier plank is a firm or interference fit in the inboard and outboard part of the receiving means attachment.

In all cases, hurdle barrier units made according to this invention must necessarily have a closely associated fit between the barrier board and the receiving means, which we describe as an interference fit. The definition of interference fit is further defined elsewhere in this application.

The applicants prefer that the receiving means has an inboard part and an outboard part of the receiving means projecting laterally on opposite sides of the post to approximately equal proportions, but it is understood that one side may be made shorter in projected length than the other, provided that together they are of sufficient combined length to provide the required rigidity and strength.

The receiving means is illustrated as being centrally positioned on a round post in the manner of the London Underground logo, but it is understood that the post may be of a section other than round and that the receiving means may be offset from the centre line of the post, provided the fit requirements are substantially retained.

In none of the illustrations so far visited is there shown a base by which the post is supported. This is because any appropriate and serviceable base may be used and it may be separate or separable from the post or permanently fixed to the post or indeed moulded as part of the post itself, but it is advantageous that the base used to support the posts does not project beyond the end of the barrier board end when it is fitted so as to

pass through the receiving means, or, similarly, that the base does not project beyond a vertical line drawn down from the closed end of the outboard receiving means.

Hurdle barriers constructed substantially in the manner herein described have shown to be capable of providing a remarkable degree of rigidity as a rectangular hurdle unit to give excellent tactile warning characteristics, whilst at the same time when the receiving means are moulded as part of the post, reducing the component parts substantially, and providing an assembled structure that resists damage and dissipates stress very well.

The hurdle barrier heretofore described is one that stands alone as a discrete unit and, as such, may be used as recommended in U.K. Codes of Practice such as Chapter 8 of the Traffic Signs Manual provided that Chapter 8's other requirements regarding dimensions, reflective performance of the prescribed barrier face sign etc. are adhered to.

In addition, the hurdle barrier may be further improved by providing an extension to at least the upper of the two outboard receiving means whereby the extension projects laterally beyond the end of the outboard receiving means and is arranged so that it will engage with a similar or mating extension on another similar hurdle barrier placed in line but adjacent and abutting the first. When several such hurdles are placed in a line end to end so that they engage as described, the stability of the whole length is improved.

Similarly, if the outwardly projecting extension projects and links with the next post so that the two hurdles can be arranged as an L shape without the bases touching, it will be possible using 4 individual but linked together hurdles to provide a very robust and interlocked rectangle or square. In this configuration it may be further advantageous to provide a slightly larger base provided with the means to support two posts spaced apart to accommodate the mating engaging extensions on the outboard part of the upper receiving means on each of the respective posts, then a further improvement in rigidity and stability is gained since the whole assembly is linked at both upper and lower levels.

Provision may be made on the upper area of the post or on the barrier board to receive a warning lamp and provision may be provided on the upper and/or lower part of the posts or the barrier boards whereby netting or additional signs can be affixed.

If desired at least a part of the barrier of the invention may have a retro reflective surface.

Definitions

Definition of the requirements of fit - Interference referring to Fig. 5. The hollow section of the receiving means shall, at least at one point of its upper and lower internal surfaces, come into contact with the corresponding outer surface of the barrier board it receives.

Thus, board outer surface (10) shall come into con-

tact at least once with inner surface(s) (15) and/or (21). Outer surface (13) shall come into contact at least once with inner surface(s) (16) and/or (18).

It is not essential for outer surface (11) to contact internal surface(s) (17) and/or (20), nor for outer surface (12) to contact inner surface(s) (14) and/or (19) but it is desirable.

It is also not essential for all upper and lower internal surfaces (15), (16), (18) and (21) to engage barrier board surfaces (10) and (13) simultaneously but it is desirable.

If the section of the barrier board is anything other than rectangular, for instance it is in the form of a generalised X shape such that the corners of the board section form the contact points within the receiving means, this is considered to be a contact of both internal surfaces in the receiving means that form the intersect containing the corner in contact with the board.

It is not essential for the barrier board to have a similar cross-sectional to the receiving means in order to achieve the desired interference fit.

The fit shall be such that when the barrier board is located in its desired position with the receiving means that it shall be held substantially rigid and substantially at a right angle with respect to the post.

Definition of Barrier Board

Primarily this is defined as a board which carries a prescribed sign, reflectorised as required by traffic regulations. However, it may also not carry a sign and may be plain. In the case of the lower barrier boards referred to throughout this text, a substitute structural element such as a tube, angle section or other tie piece that performs substantially the same function as a barrier board described above is to be treated as equal and the same as a barrier board.

Barrier boards may be of rectangular section but can be of any cross-section such as tubular, X section, I beam or any other section.

Claims

1. A barrier assembly comprising at least two barrier boards, together with at least two support posts, said support posts having provided upon them an upper and lower receiving means for accepting the ends of the barrier boards; said receiving means each being arranged so that it is in two parts such that one part is generally projecting laterally inboard of the support post and the other so that it is at least in part projecting laterally outboard from the support post and where the receiving means of at least the inboard part is open ended to receive the end of a barrier board and where said barrier board passes through the inboard part of the said receiving means to engage in the outboard part and where the fit of

the barrier board within the receiving means is such that there is interference (as defined herein) between the inner surface and/or surfaces of said receiving means and the outer surface or surfaces of the barrier board, said completed assembly taking the visual form of a hurdle.

2. An assembly as in Claim 1 whereby the outboard part of the receiving means is open-ended to allow the barrier board to extend beyond its extremity.

3. An assembly as in Claims 1 or 2 wherein the receiving means is an integral moulding with and formed as part of the support post.

4. An assembly as in Claims 1 or 2 wherein the receiving means is a separate part fitted intimately to the support post and where the support post has part of its wall removed to allow passage of the barrier board between the inboard and outboard parts of the receiving means.

5. An assembly as in Claims 1 - 4 wherein the support post is moulded or extruded in thermoplastic material.

6. An assembly as in Claims 1-5 wherein the support post is manufactured using rotomoulding or blow moulding processes.

7. An assembly as in claims 1 - 6 wherein the barrier boards are of thermoplastic material.

8. A barrier assembly of Claims 1 and 3 to 7 wherein the outboard part of at least the upper receiving means has a fitment that when introduced to a corresponding or mating fitment on another adjoining assembly will detachably join the two assemblies together.

9. A barrier assembly as in any preceding claim wherein provision is made in the receiving means to prevent unintentional disassembly of the barrier board from the support post and receiving means.

10. A barrier assembly as in any preceding claim wherein engagement provision is made in either the receiving means or the barrier board end or both, such that when the barrier board is introduced into the receiving means, the said end of the barrier board may not subsequently be inadvertently withdrawn out of the receiving means and where such provision means forms part of the barrier board end and/or the receiving means such that no additional separate component such as a pin, bolt, screw, rivet, tie, strap etc., is required.

11. A barrier assembly as in Claim 10 where the en-

gagement provision is in the form of an inward projection provided on the receiving means such that it engages in a suitably formed recess in the barrier board.

12. A barrier assembly as in Claim 10 where the engagement provision is in the form of a projection out from the surface(s) of the barrier board to engage in a suitable cavity or recess slot or shoulder provided in the receiving means.

13. A barrier assembly as in Claims 10, 11 and 12, whereby the distance to which the barrier board is inserted into the receiving means is determined by the position of the non return forms provided.

14. A barrier assembly as in Claims 10 to 13 whereby the positioning of the non return forms also prescribe the orientation of assembly of the barrier board relative to the receiving means.

15. A barrier assembly of any preceding claim that has a fitment to carry a warning lamp.

16. A barrier assembly as claimed in any preceding claim, wherein the barrier boards are arranged substantially horizontally.

17. A barrier assembly as claimed in any preceding claim, wherein the support posts are arranged substantially vertically.

18. A barrier assembly as claimed in any preceding claim, wherein one or more base supports are provided for holding the assembly upright.

19. A barrier as claimed in any preceding claim, wherein at least a part of the barrier has a retro reflective surface.

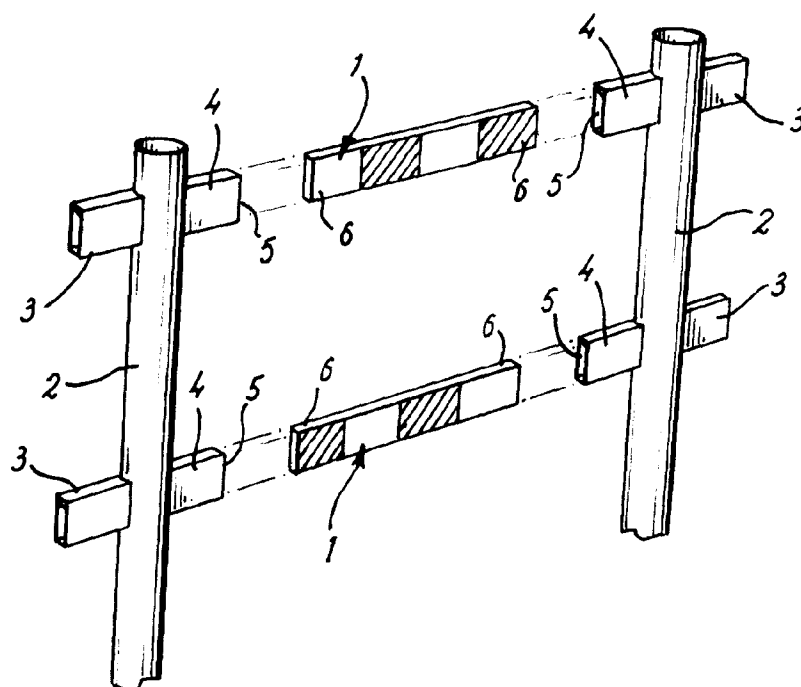


FIG. 1

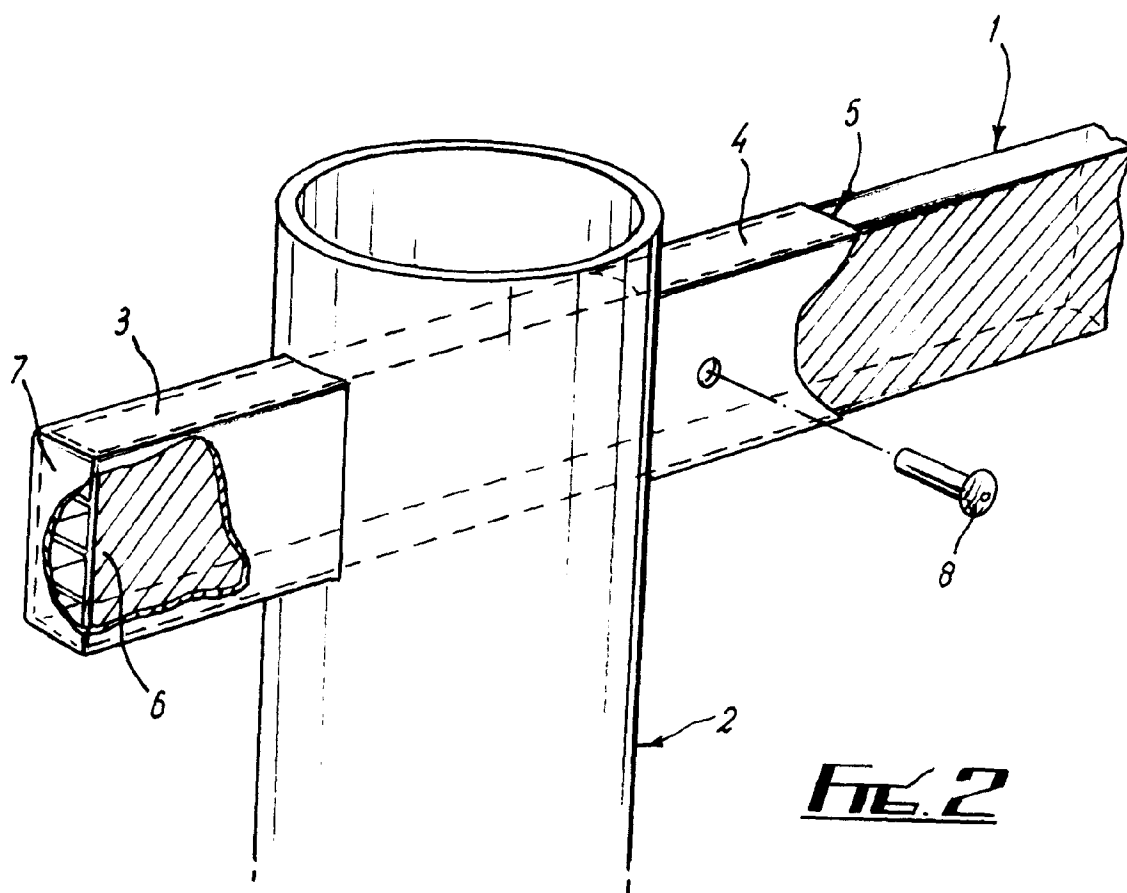


FIG. 2

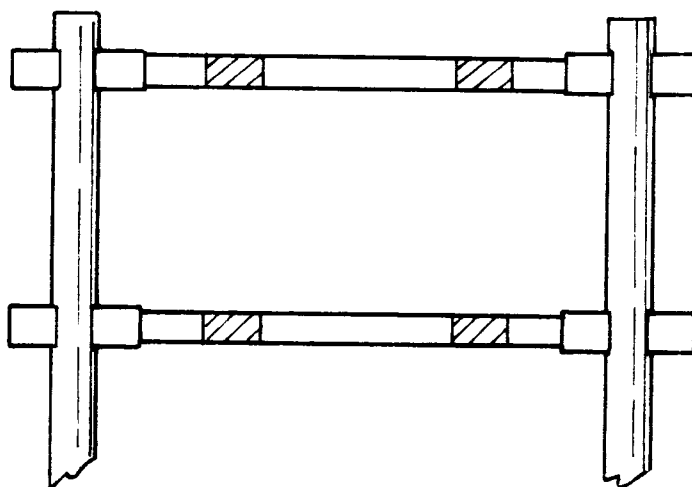


FIG. 3

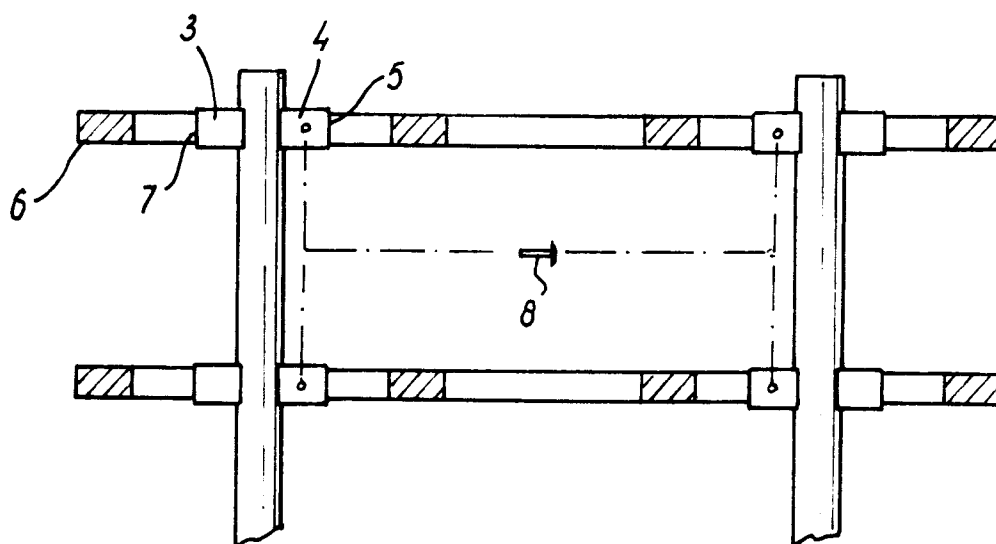
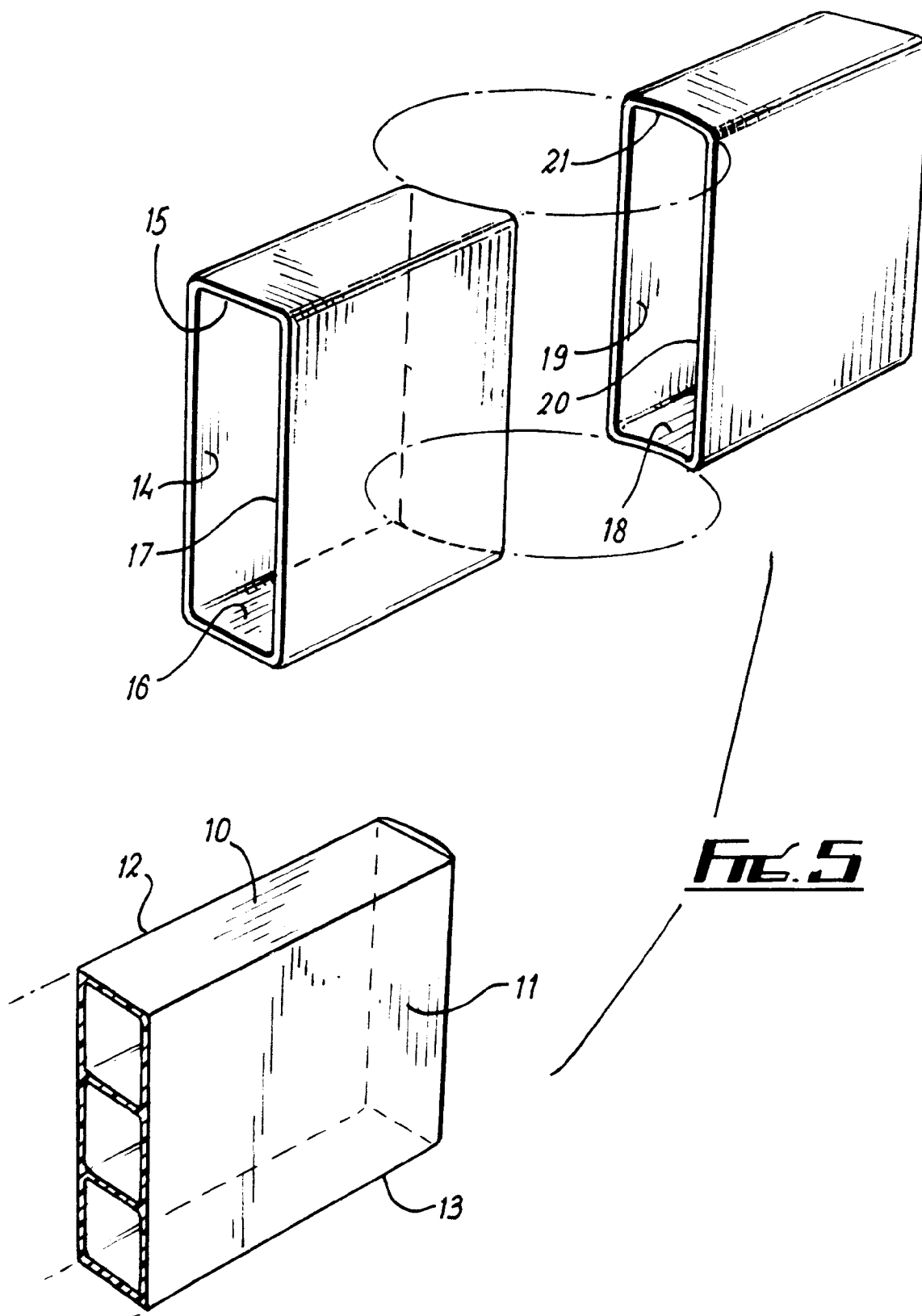


FIG. 4





European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 30 5340

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)
Y	GB-A-1 445 843 (NW ELECTRICITY BOARD) * page 1, line 47 - line 71 * * page 2, line 21 - line 45; figures * ---	1-19	E01F13/02
Y	US-A-4 050 401 (H.W. KELLY) * column 3, line 33 - line 46 * * column 4, line 16 - line 23; figures 1,7,16,17 * ---	1-19	
A	GB-A-2 134 164 (GLASDON LTD.) * page 1, line 68 - line 82 * * page 2, line 22 - line 24; figures 2,10 * ---	1,7, 15-19	
A	US-A-3 799 507 (R.R. RIZZO) -----		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 25 October 1996	Examiner Verveer, D
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	
TECHNICAL FIELDS SEARCHED (Int.Cl.6) E01F			

EPO FORM 1501 03.82 (P4/C01)