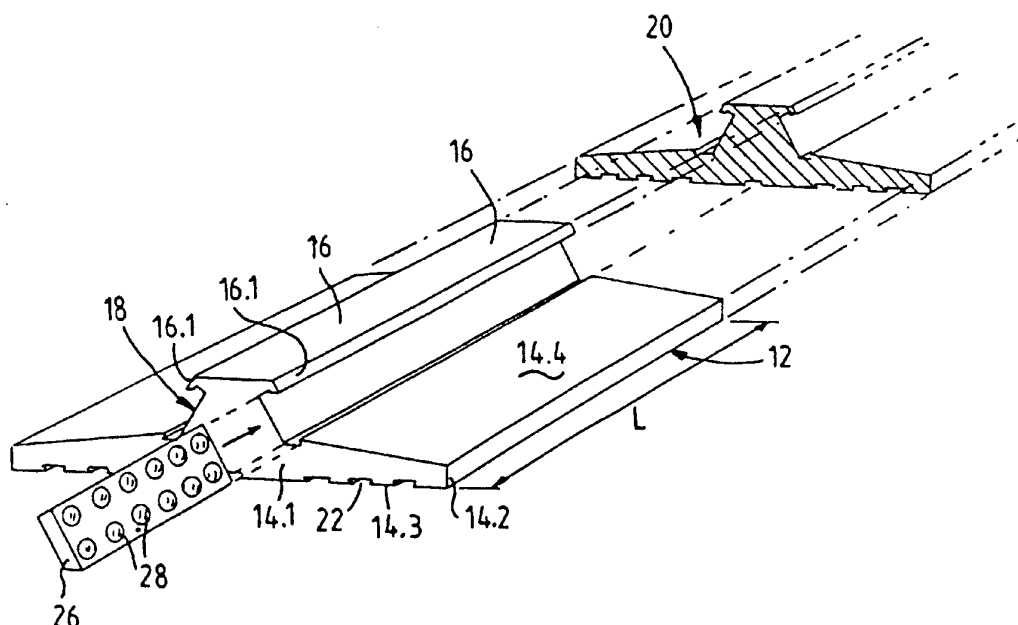


## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(54) Title: REFLECTOR STUDS FOR ROADS



**(57) Abstract**

A road marker (10) comprising a body (12) extruded from a non-resilient material is disclosed and claimed. The marker body comprises a sloping wide base (14), a neck (18) and a head (16) and is generally I-shaped in transverse cross section. The cross-sectional area of the neck (18) on line A is less than that of the head (16) and that of base (14) in parallel planes.

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## REFLECTOR STUDS FOR ROADS

**INTRODUCTION AND BACKGROUND**

THIS invention relates to markers for roads or pavements or so-called cat's eyes.

5 The road markers known to the applicant suffer from at least one of the following disadvantages. These markers are primarily made by an injection moulding process of a suitable metal or synthetic resinous material which makes them and their moulds relatively expensive. Due to their structure and to ensure stable anchorage in the pavement or road surface, their reflector elements are located too close to the road surface,  
10 so that soiling of these elements occur. Furthermore, due to their structure, rocking of the marker occurs upon impact with a vehicle wheel, which causes the marker to become loose in the road structure.

In US Patent 4,127,348 to **Roberts** there is disclosed a road marker with a complex shape including skirts to protect the reflector elements. The  
15 marker body is formed of aluminium as a die-casting. This marker suffers from the disadvantage that due to its process of manufacture, it is relatively expensive and time-consuming to produce. Furthermore, the reflector elements are located too close to the road surface and soiling of the rather obscured reflectors can easily take place. Still furthermore,

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the skirts, in use, entrap dirt which is not readily removed by rain and/or traffic action.

In US Patents 4,521, 129 and 4,534, 763 to *Minnesota Mining and Manufacturing Company* there are disclosed road markers produced by an extrusion process from a resiliently flexible material. The reflector of the marker comprises a reflective film adhered to a surface of the marker body which, in use, faces oncoming traffic. It is believed that as a result of the deformation of the marker every time it is struck by a wheel of a vehicle, the marker body and/or film will be damaged. The marker is also highly susceptible to damage by vandals. Furthermore, the marker is clearly not suitable for use on roads carrying traffic in opposite directions.

#### **OBJECT OF THE INVENTION**

Accordingly it is an object of the present invention to provide a road marker, a body for such a marker and a method of producing same with which the applicant believes the aforementioned disadvantages will at least be alleviated.

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**SUMMARY OF THE INVENTION**

According to the invention there is provided a road marker comprising a body extruded from a rigid material and reflector means mounted on the body, the body comprising a base and interconnection means connecting  
5 the base to at least one overhang above the base, the reflector means being mounted between the overhang and the base, in use, to be exposed at an obtuse angle to approaching traffic.

In a first embodiment of the invention the marker may comprise a head formation and the interconnection means may comprise a neck formation  
10 extending away from the base to the head formation on another side of the base as a bottom surface of the base, at least part of the neck formation having a cross-sectional area in a plane parallel to said bottom surface less than a cross-sectional area of the head formation in a region thereof adjacent to the neck formation in a plane parallel to said bottom  
15 surface and also less than the cross-sectional area of said bottom surface, so that the body is substantially uniformly I-shaped in cross section and so that the head formation provides said at least one overhang above said base.

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The base may be rectangular and the neck formation may be elongated and may extend intermediate two opposed sides of the base from one end region of the base to an opposite end region of the base.

5 Sides of the neck formation facing said opposed sides of the base may slant from a relatively wider region of the neck formation towards one another in a direction towards the head formation to a relatively narrower region of the neck formation and a cross-sectional area of the neck formation in said wider region thereof is preferably less than 30% of that of the bottom surface of the base.

10 Opposed ends of the elongate neck formation may slant towards one another in a direction towards the head formation.

In a preferred form of the first embodiment of the invention any cross sectional area of the head formation parallel to the bottom surface of the base is less than 25% of that of the bottom surface of the base.

15 A top surface of the base may provide a rising ramp from each of said opposed sides of the base in a direction towards the neck formation.

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Opposed slots may be defined immediately adjacent the neck formation in the base and in said at least one overhang respectively, for locating said reflector means.

5 The reflector means may comprise a disc received in said opposed slots and which disc carries a plurality of reflective elements.

A plurality of slots may be provided in the bottom surface of the base to extend parallel to said opposed sides of the base, at least some of the slots having a dovetail shape in transverse cross-section with a narrower region of the slot located in a plane of the bottom surface of the base.

10 Anchor means may be provided in the bottom surface of the base to extend in a direction opposite the neck formation.

According to a second embodiment of the invention the road marker may comprise a convexo-concave base and the interconnection means may comprise integral rising formations extending beyond said concave surface of the base at opposed end regions of the base and said at least 15 one overhang may comprise first and second overhangs extending towards one another from said opposed rising formations respectively.

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According to another aspect of the invention a body for a road marker is extruded from a rigid material, the body comprising a base and interconnection means connecting the base to at least one overhang above the base, the body defining opposed slots in the base and in said at least one overhang, for slidably receiving reflector means.

According to yet another aspect of the invention a method of producing a road marker comprises the steps of extruding a non-resilient material into a marker body comprising a base and at least one overhang interconnected by interconnection means, so that said at least one overhang overhangs the base; and subsequently mounting reflector means on the body in opposed slots defined in the base and said at least one overhang.

The reflector means may be secured to the body by mechanically arresting it on the body. For example, the reflector means may be so arrested by local deformation of said at least one overhang beyond at least one end of said reflector means.



**BRIEF DESCRIPTION OF THE DIAGRAMS**

The invention will now further be described, by way of example only, with reference to the accompanying diagrams wherein:

figure 1 is a perspective view of a first embodiment of a road marker according to the invention;

figure 2 is a perspective view of the marker in figure 1, shown from a bottom thereof;

figure 3 is an exploded perspective view of a marker according to the invention, severed from an extrusion from which its body is formed;

figure 4 is a diagrammatic end view of a second embodiment of the road marker according to the invention; and

figure 5 is an end view of a third embodiment of the marker according to the invention.

**DESCRIPTION OF A PREFERRED EMBODIMENTS OF THE INVENTION**

In figures 1 to 3, a first embodiment of a cat's eye or road marker according to the invention is generally designated by the reference numeral 10.

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The marker 10 comprises a body 12 having a rectangular base 14 and an elongate head 16 interconnected by an elongate neck 18. The base 14, neck 18 and head 16 are integrally formed in a metal or rigid plastics extrusion 20 (shown in figure 3) and the marker body 12 is formed by severing it from the extrusion 20. The metal is preferably aluminium and the rigid plastic is preferably polycarbonate.

The neck 18 extends between two opposed ends 14.1 of the base 14 and is located halfway between two opposed sides 14.2 thereof.

The neck comprises two opposed elongate outer surfaces 18.1 and 18.2 sloping towards one another from a relatively wider region of the neck adjacent base 14 to a relatively narrower region adjacent head 16. The two opposed ends 18.3 and 18.4 of the neck 18 also slope inwardly towards one another.

The transverse cross-sectional area of the neck 18 on line A is less than that of bottom surface 14.3 of base 14 and less than that of the head 16 in a region thereof adjacent neck 18 in a plane parallel to that of bottom surface 14.3. Accordingly, the body 12 has a uniform generally I-shape when sectioned and viewed on line B and lines parallel thereto.

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The base 14 defines a plurality of parallel dovetail shaped slots 22 in a bottom surface 14.3 thereof. The narrower ends of slots 22 lie in the plane of bottom surface 14.3.

5 In a top region thereof, the base 14 provides ramps 14.4 extending away from the bottom surface 14.3 in a direction from the sides 14.2 of the base towards the neck 18. The minimum distance of the ramps 14.4 from the bottom surface 14.3 is typically 4mm and they form angles of in the order of  $51^{\circ}$  with the bottom surface 14.3.

10 In the top surface of base 14 and the lower surfaces of the overhangs 16.1 of head 16, adjacent each of surfaces 18.1 and 18.2, there are defined mutually facing elongate slots 24.1 and 24.2.

15 Carriers 26 for reflective elements 28 are removably and slidingly receivable in the open ended opposed slots to abut against surfaces 18.1 and 18.2 and to extend between the overhangs 16.1 and the base 14. The carriers 26 are mechanically arrested on the body by bending the overhanging regions 16.1 of the head outside the carriers 26 towards base 14.

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The markers are secured to a road surface (not shown) by a suitable adhesive which, when cured, forms a key in each of slots 22.

As best shown in figure 2, in the bottom surface 14.3 of base 14, there are also defined threaded holes 30. In use, bolts 32 may be threaded  
5 into the holes 30 to serve as additional anchors for the markers 10 in the road or pavement structure.

As shown in figure 3, the body 12 is formed by severing a selected length  $\underline{L}$  (100mm, 150mm, 200mm or 250mm or longer) from aluminium extrusion 20, thereby providing an integral structure. Thereafter the end  
10 regions 18.3 and 18.4 of the neck 18 and head 16 are machined away. As shown in figure 2, the dimension  $\underline{W}$  of the body along end 14.1 of the base 14, is typically in the order of 100mm and the dimension of the aforementioned wider region  $\underline{N_w}$  of neck 18 is typically less than 30% thereof.

15 The maximum cross sectional area of the head 16 in a plane parallel to the bottom surface 14.3 of the base is typically in the order of 20% of that of the rectangular area wherein bottom surface 14.3 of the base is located. With a base 14 of 100mm x 100mm or 150mm or 200mm, the

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distance between the top surface of the head and the bottom surface of the base is in the order of 22mm, according to the international standards.

It will be appreciated that with the relatively small head 16 (which comes into contact with vehicle wheels) compared to the base 14, rocking of the stud upon impact with a vehicle wheel is reduced. Furthermore, as a result of the wide and sloping base 14, the carriers 26 and reflectors 28 are further removed from the road surface as is the case with the prior art markers, so that damage and soiling of the reflectors are also reduced.

The method of manufacture and the marker 10 according to the invention and the marker system provide flexibility in that the marker size may easily be changed by severing shorter or longer bodies 12 from the extrusion 20. Furthermore, a large variety of known reflector carriers may easily and conveniently be mounted on the body, thereby to provide a customer with a wide selection at relatively low cost. Such reflector carriers include forty-three element carriers, twenty-three element carriers and seven element carriers of which the retro-reflective lenses may be

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any one of white, red, amber, green and blue in colour and which are being sold under the trade name "Swareflex".

In some embodiments, especially when a longer (250mm) body 12 is used, more than one reflector carrier 26 may be provided adjacent each of sidewalls 18.1 and 18.2 of the neck 18.

In figure 4, there is shown a second embodiment of the marker body according to the invention designated 112 and which is substantially similar to the body 12 of figures 1 to 3, except that the neck 118 connecting head 116 to base 114 is not located halfway between the two opposed sides 114.2 of base 114, but is located substantially at one side of the base 114.

In figure 5 there is shown a third embodiment of the marker according to the invention designated 210 and which embodiment is suitable for use on roads which are cleared by means of snowploughs. The marker 210 comprises a convexo-concave base extruded from a suitable metal or a rigid plastic material. In the convex surface 214.3 of the base 214, parallel dovetailed slots 222 are defined. Between opposed ends 214.1 of the base and along opposed sides 214.2 thereof, there are provided

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integral rising formations 234 and 236 providing inwardly facing overhangs 234.1 and 236.1 respectively. Opposed slots 224.1 and 224.2 are defined adjacent each of these rising formations in the base 214 and in overhangs 234.1 and 236.1 of the formations 234 and 236 respectively. Carriers 226 with retro-reflective elements 228 are slidably receivable in these opposed slots, so that the reflective elements adjacent formation 236 face traffic approaching from the direction of formation 234 and the reflective elements (not shown) adjacent formation 234 face traffic approaching from the opposite direction. The top surfaces 234.2 and 236.2 of formations 234 and 236 slope gradually upwardly from sides 214.2 to terminate in overhangs 234.1 and 236.1 respectively.

It will be appreciated that there are many variations in detail on the markers, the marker bodies, the method of producing same and the marker system according to the invention without departing from the scope and spirit of the appended claims.

**CLAIMS**

1. A road marker comprising a body extruded from a rigid material and reflector means mounted on the body, the body comprising a base and interconnection means connecting the base to at least one overhang  
5 above the base, the reflector means being mounted between the overhang and the base, in use, to be exposed at an obtuse angle to approaching traffic.

2. A road marker as claimed in claim 1 comprising a head formation and wherein the interconnection means comprises a neck formation extending  
10 away from the base to the head formation on another side of the base as a bottom surface of the base; and wherein at least part of the neck formation has a cross-sectional area in a plane parallel to said bottom surface less than a cross-sectional area of the head formation in a region thereof adjacent to the neck formation in a plane parallel to said bottom  
15 surface and also less than the cross-sectional area of said bottom surface, so that the body is substantially uniformly I-shaped in cross section and so that the head formation provides said at least one overhang above said base.



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3. A road marker as claimed in claim 2 wherein the base is rectangular, wherein the neck formation is elongated and extends intermediate two opposed sides of the base from one end region of the base to an opposite end region of the base.

5 4. A road marker as claimed in claim 3 wherein sides of the neck formation facing said opposed sides of the base slant from a relatively wider region of the neck formation towards one another in a direction towards the head formation to a relatively narrower region of the neck formation and wherein a cross-sectional area of the neck formation in  
10 said wider region thereof is less than 30% of that of the bottom surface of the base.

5. A road marker as claimed in claim 3 or claim 4 wherein opposed ends of the elongate neck formation slant towards one another in a direction towards the head formation.

15 6. A road marker as claimed in any one of claims 2 to 5 wherein any cross sectional area of the head formation parallel to the bottom surface of the base is less than 25% of that of the bottom surface of the base.

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7. A road marker as claimed in any one of claims 2 to 6 wherein a top surface of the base provides a rising ramp from each of said opposed sides of the base in a direction towards the neck formation.

5 8. A road marker as claimed in any one claims 2 to 7 wherein opposed slots are defined immediately adjacent the neck formation in the base and in said at lest one overhang respectively, for locating said reflector means.

10 9. A road marker as claimed in claim 8 wherein the reflector means comprises a disc received in said opposed slots and which disc carries a plurality of reflective elements.

10. A road marker as claimed in any one of claims 2 to 9 wherein slots are provided in the bottom surface of the base, each of said slots having a dovetail shape in transverse cross-section with a narrower region of the slot located in a plane of the bottom surface of the base.

15 11. A road marker as claimed in any one of claims 2 to 10 comprising anchor means provided in the bottom surface of the base to extend in a direction opposite the neck formation.

12. A road marker as claimed in claim 1 comprising a convexo-concave base and wherein the interconnection means comprises integral rising formations extending beyond said concave surface of the base at opposed end regions of the base and wherein said at least one overhang comprises first and second overhangs extending towards one another from said opposed rising formations respectively.

13. A body for a road marker extruded from a rigid material, the body comprising a base and interconnection means connecting the base to at least one overhang above the base, the body defining opposed slots in the base and in said at least one overhang, for slidingly receiving reflector means.

14. A road marker body extruded from a non-resilient material.

15. A method of producing a road marker comprising the steps of extruding a non-resilient material into a marker body comprising a base and at least one overhang interconnected by interconnection means, so that said at least one overhang overhangs the base; and subsequently mounting reflector means on the body in opposed slots defined in the base and said at least one overhang.

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16. A method as claimed in claim 15 wherein the reflector means is secured to the body by mechanically arresting it on the body.

17. A method as claimed in claim 16 wherein the reflector means is mechanically arrested by local deformation of said at least one overhang beyond at least one end of said reflector means.

5

18. A method as claimed in claim 15 also comprising the step of providing dovetail slots in a bottom surface of the base.

19. A method of producing a road marker comprising the steps of forming an extrusion of a non-resilient material, severing a marker body from the extrusion and mechanically securing reflector means on the body.

10

20. A road marker substantially as herein described with reference to the figures 1 to 3, or figure 4 or figure 5.

21. A road marker body substantially as herein described with reference to figures 1 to 3, or figure 4 or figure 5.

15

- 19 -

22. A method of producing a road marker substantially as herein described with reference to the accompanying diagrams.

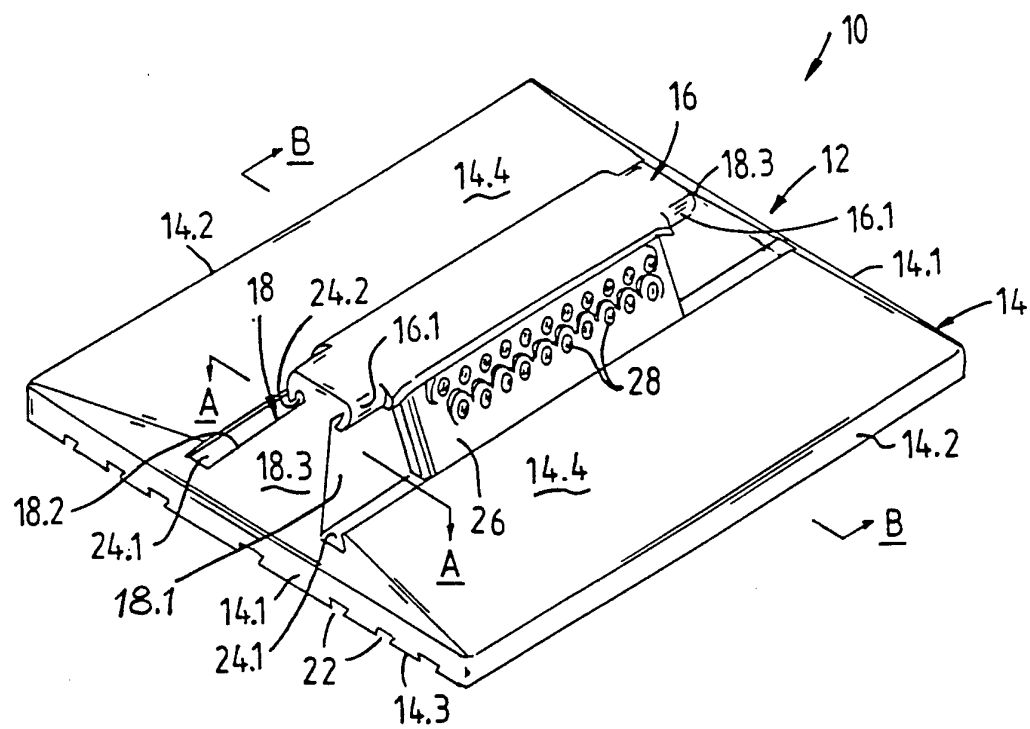
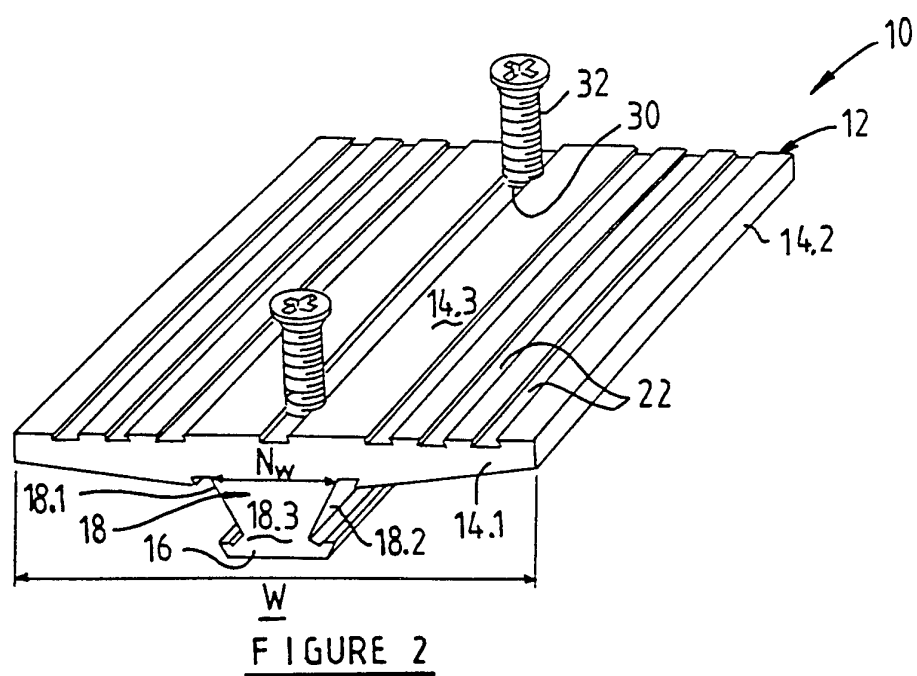
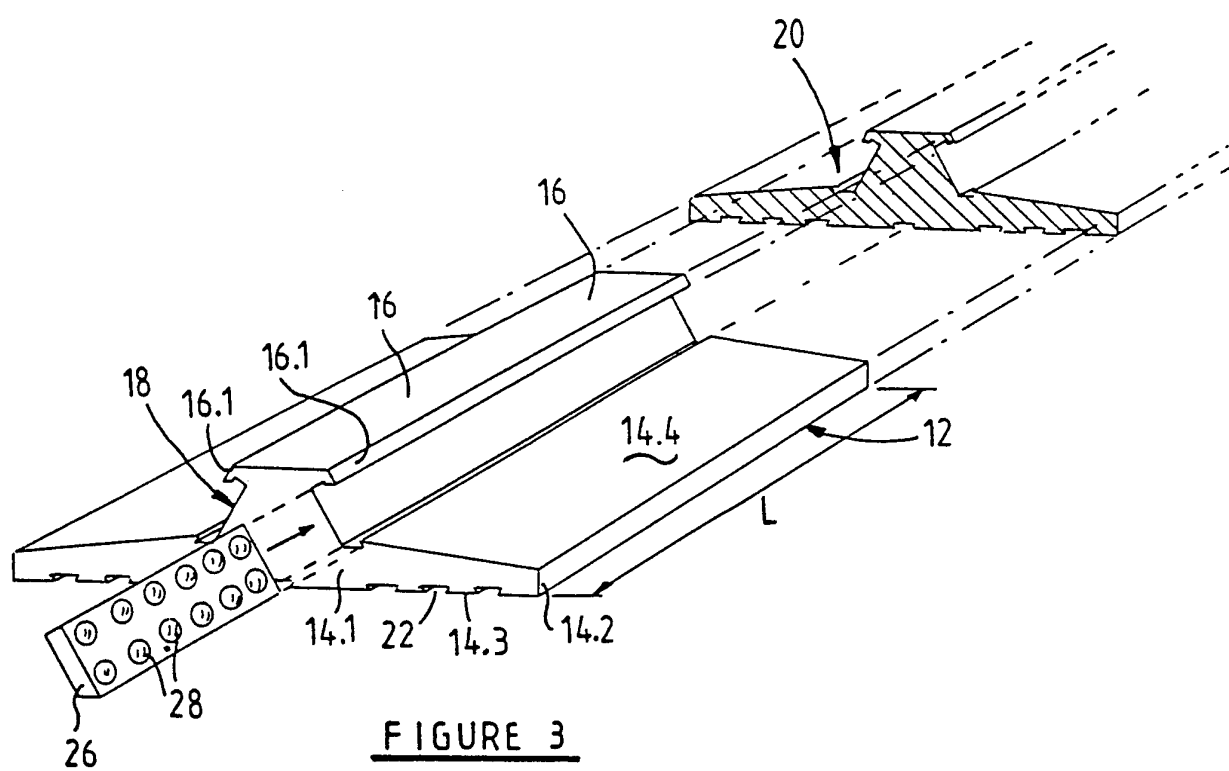


FIGURE 1







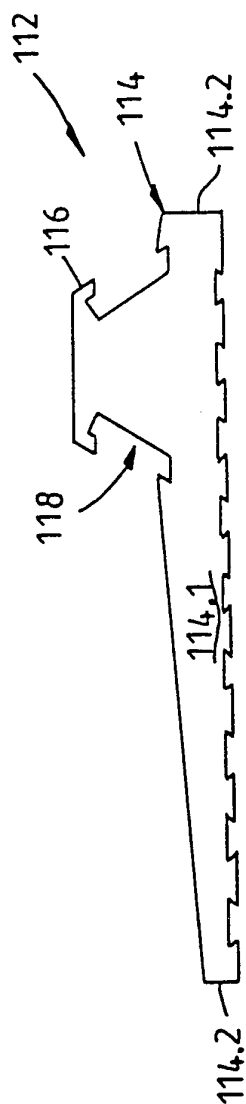


FIGURE 4

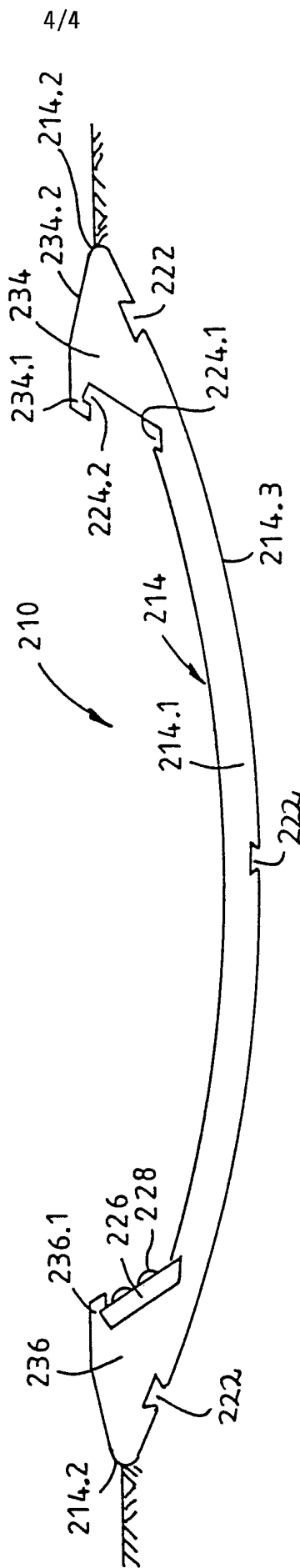


FIGURE 5

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 6 E01F9/06

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 E01F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR,A,1 572 079 (ELASTIC STOP NUT CORP.) 20 June 1969	1-8,11, 14-17, 19-22
Y	see page 13, line 42 - page 16, line 38; figures 8,9,12,14 ---	10,18
X	DE,C,873 224 (ERNST MICHEL) 14 August 1952  see the whole document ---	1-3,8,9, 11, 13-16, 19-22
Y	CH,A,323 261 (POLVA-MAROC) 14 September 1957 see page 2, column 1, line 27 - line 39; figures --- -/--	10,18

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

27 January 1995

Date of mailing of the international search report

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## INTERNATIONAL SEARCH REPORT

International Application No

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CH,A,375 747 (H. LEU) 30 April 1964 see figure 1	12
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Information on patent family members

International Application No

PCT/EP 94/03440

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		US-A- 3485148	23-12-69
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CH-A-323261		NONE	
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CH-A-375747		NONE	
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