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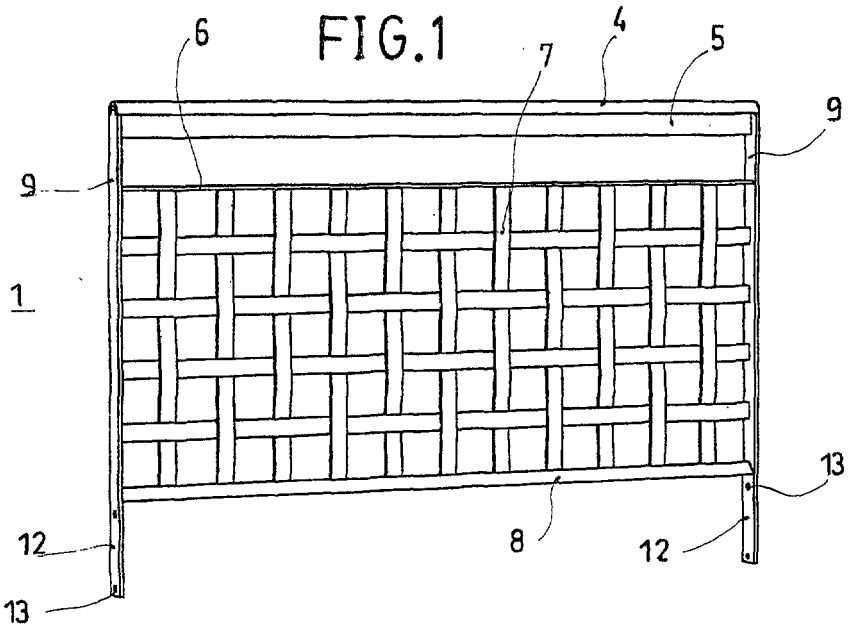
Claim 12 is deemed to be abandoned due to non-payment of the claims fee (Rule 31 (2) EPC).

(54) Removable modular urban railing

(57) REMOVABLE MODULAR URBAN RAILING integrated by a panel of braided mesh of a hot-rolling steel profile framed by vertical and horizontal members, having integrated or continuous handrails, with particularized and suitable support means for each case and sustained by a set of anchoring feet to which they are fixed by means of riveted anti-theft screws and in turn fixed on foot block, to the forged edge or received in the foot block, so that the railings are removable in all of its parts in all cases with the exception of the last, which are semi-removable.

FIG.1



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Description

[0001] The invention refers to a metallic railing of those used for urban protection, characterized by being of a modular structure, removable and of high protection for people for being very impact resistant, in addition to simply and rigorously satisfying the complex multitude of demands to be fulfilled by an urban protection railing, comprising maximum functionality for users and installers; long lasting, suitable aesthetic quality and visual impact; good exploitation qualities for the urban planning department; simple and minimum maintenance; compatible solidity and mobility, easy disassembly and replacement in view of provisional events and works; great versatility in terms of diversity of shapes, anchorings and accessories for other functions: handrails for the handicapped or for other purposes; adaptable to any plane: vertical, horizontal or inclined; and optimal acquisition and maintenance costs.

[0002] This type of railing can be installed as protection for people against falling from height on terraces, overlooks or any other pedestrian area being elevated from any other surface, such as stairs, ramps or other accesses and very especially as prevention and protection against traffic accidents on public roads, at intersections and in crosswalks, separating the sidewalk from the road and in exclusive reserved platforms: bicycle lane, bus lane, taxi lane or others. They are also used to delimit and protect areas such as: boulevards, streets, paths, plazas and other pedestrian spaces with restricted road traffic or pedestrian priority streets and in grassy areas.

[0003] The railing of removable modular structure according to the invention is basically composed of an anchoring element, and a railing body in two versions: with continuous handrail and with incorporated handrail. Both railing bodies have identical features except the handrail adaptation means. They are very strong railings, all the materials are solid and of great thickness and incorporate a braided grating composed of interlaced hot-rolling flat bars, they adapt to curves and slopes, are easy to assemble, maintain and replace.

[0004] The railing body of the first version is especially beneficial as it permits using the continuous handrail being able to cover various spans or railing bodies and can be of different materials: metals, wood, synthetics or others. The railing solved with this version is basically composed of three independent elements: handrail, railing body and anchoring foot, while the second version has two independent elements, the railing body and the anchoring foot. The fact that these parts are independent permits the individual or total disassembly and renovation of the railing spans with great ease, simply unscrewing and substituting the bodies, since they are always of the same measurement. The railing body is fixed to the anchoring foot by means of screws and the latter is fixed to the foot block, either being screwed or received in concrete.

[0005] According to the invention, a large variety of anchorings are established to permit the fixation on any plane, horizontal, vertical or inclined, and on different materials. They are also functional in terms of other types of requirements such as permitting maximum use of the spaces, foreseeing occasional disassemblies for unexpected reasons or facilitating the maintenance and replacement of the elements. For the latter, two forms of anchoring are established: removable, the railing can be completely disassembled due to the fact that the anchoring foot is screwed to the foot block by means of removable couplings; or semi-removable, the anchoring foot is received in concrete and only the railing and handrail bodies are disassembled.

[0006] The modular structure of independent elements according to the invention provides new and exceptional advantages to the urban railings.

[0007] Easy placement as the complete railing span can be placed on the pavement, provisionally screwing the elements together. This system permits sufficient mobility to look for the suitable alignment. When it is well aligned, the lock screws between modules are tightened and finally the feet are definitively fixed to the foot block.

[0008] Easy disassembly. It is enough to unscrew the anti-theft screws with the suitable tools. This provides big comfort in repairing. The easy disassembly and replacement of the railings of the invention permits the temporary disassembly for repairs, cleaning, painting treatments in a workshop or any other treatment requiring being applied in industrial facilities. While the restoration is carried out on one or several bodies, the railing can still be used since the bodies to restore can be substituted with others upon being removed. Re-using the restored body can be by means of replacement in the same place where it was previously assembled, in another module of the same reference or in spans of a new assembly.

[0009] Another detail of said railing is that since the braided grating used in the railing body is not limited to orthogonal cross-linkings, it permits variations in angle of up to 35° in the weft, it permits the vertical lines to conserve the verticality and the transversals to adapt to the slope, it results to be especially useful and indicated in ramps, stairs, planes with a continuous slope and planes with slopes varying by spans.

[0010] The railing of the invention is also adaptable to curve line layouts in curbs in traffic circles, intersections or others since the railing bodies can also be curved. The braided grating admits very sharp curves, up to a radius of 1.5 m, and bodies are manufactured with the radius and length suitable to the layout of the curb. For this, the invention has quadrangular section anchoring feet of an angle finished to size, thereby being able to form a broken curve in spans and using straight bodies and a standard foot of a tolerance of 4°.

[0011] Hexagonal nuts blocked with rivets or exclusive steal seals are used as fixing means of the removable anchoring feet, hindering the handling with common tools. The invention has nuts and rivets requiring special tools for their handling.

[0012] The assembly of the invention has great strength. All the elements are solid, there are no cold rolling tubes or profiles, and they are dimensioned so as to provide maximum resistance to the railing within the reasonable proportions for an urban fixture element. The handrail is highly resistant, it is integrated by a solid half round profile of hot-rolling, reinforced with an also solid rib forming a beam composed for supporting large loads without becoming deformed. This part also has other advantages over the hollow handrails: it does not dent, nor does it rust because of condensations, nor does it have welds in sight. It is fixed to solid struts. The braided grating is welded to the frame on all its ends forming a very rigid body and very resistant to deformation. The anchoring feet are solved with solid plates of suitable thickness.

BACKGROUND OF THE INVENTION

[0013] In the background of the invention we can find different metallic railing systems, some hollow and others solid of those which the generally predominating factor is usually the indissolubility between the anchoring foot and the railing body because it is all a single element, and its assembling manner is commonly by means of being received with cement in the foot block and subsequent in place welding of the handrail in long spans, which hinders their easy, fast and economic disassembly, the immediate substitution of the deteriorated elements being impossible.

[0014] Likewise, these types of railings are generally continuous, connecting the frames thereof by means of welding or other means even though the struts are shared by two frames or by contiguous frames due to this condition.

[0015] In another order, the frame is generally formed by simple geometric patterns or by vertical bars or by diagonal bars converging in a central intersection.

[0016] The minimum distribution of loads of said means make the structure vulnerable and not very resistant, therefore any impact, as weak as it may result to be, breaks or deforms a large span of the railing, obliging sawing and removing the entire deformed span, lifting the foot block, and somewhat more until reaching an intact part, assembling the necessary parts to complete the loosened span, completed railing and terminating it in place and closing the foot block, curb, paving-tiles and others again.

[0017] There are also other very lightweight and weak railings of hollow pipes having independent railing bodies screwed to a post of the same material received in the foot block in an unaesthetic and inefficient manner.

[0018] There are also railings basically having a cast iron post for being screwed or received in the foot block and horizontal pipe cross-beams whose ends are supported on said posts.

[0019] Referring to said background, the mesh composing the body of the invention is a mesh according to patent E 0000500123.5 "METALLIC MATERIAL AND MANUFACTURING PROCESS", dated 13-06-2000 of the same applicant, being constituted by flat, woven, hot-rolling metallic bars interlaced without welds between each other, being possible to adopt different straight or oblique cross-linkings of different shape and density, totally or partially covering the frame according to the versions of the industrial designs in ES I number 147,944, "URBAN BARRIER", dated 20-03-2000, also of the same applicant.

[0020] In addition, in said backgrounds the anti-theft lock means of those which the invention uses to fix the railings anchors are referred to riveted lock nuts and screws comprised in U ES number 200200125 "LOCK RIVET", dated 18-01-2002, of the same applicant and inventor and I ES number 153,187 "RIVETS", dated 18-01-2002, as well as the profiles of the integrated handrails contained in the industrial design ES I number 154,048 "HANDRAIL", dated 30-04-2002, of the same applicant.

INVENTIVE STEP

[0021] The aim of the invention according to what can be summarized from the exposition referring to the object of the invention in the preliminary paragraphs of this specification are those of providing a very heavy-duty metallic urban railing, integrally formed by solid metallic materials of hot-rolling steel in the fundamental elements for the protection, anchoring and railing body, and with a structure of wide versatility to be adapted to different planes and support materials, and to be able to easily and efficiently assemble, disassemble, maintain and replace so that they can be definitively, provisionally or temporarily disassembled without difficulty and especially be replaced in the affected part and measurement when common damages occur, generally by impacts, without needing to resort to the current, inflexible systems in these types of performances. A solution that is practically achieved with the same structure and with the same means, using two sole versions of railing body, according to wanting an integrated handrail or handrail.

DESCRIPTION OF THE INVENTION

[0022] The railing object of the invention is of a simple structure and is basically composed of a body integrating two vertical side struts having a support on their upper end to suitably assemble and support the handrail, being different according to if it is an integrated handrail or continuous handrail; a central plane of an interlaced rod mesh perimetrally welded to the struts on their vertical sides and longitudinally to two horizontal cross-beams, a lower one serving as a drip rail and an upper one forming the rectangle together with the struts, in which the mesh is framed and perimetrally welded on all its ends.

[0023] The struts, however, are extended above the upper cross-beam framing the mesh and below the lower cross-beam or drip rail. It is in the upper extension where

the ends of the handrail are fixed and in the lower extension is where the drill holes are located for fixing to the anchoring feet by means of through screws.

[0024] According to the invention, the anchoring feet have two fixation manners, one superficially on the foot block by means of riveted lock nuts and screws, and another for being received in the foot block by integration. The first can be totally disassembled as it is fixed on the foot block by means of screws, the railing body and the anchoring foot being removable, and the other is semi-removable, as the anchoring is received under the foot block, the railing body being completely removable, that is to say the assembly integrating struts, mesh, drip rail and handrail.

[0025] According to the invention, the option of the completely removable anchoring feet has five fixation possibilities on the foot block and three fixation possibilities to the forged edge; the semi-removable option has five possibilities of being received or integrated in foot block. Said anchoring feet on the foot block have a vertical prismatic pole with two through drills coupled to a flat foot on the lower end with two drill holes, one on each end; those of forged edge anchoring also have a prismatic pole with its respective drill holes and a tangentially located foot on the lower end of the pole, also with its two corresponding drill holes to screw to the wall; the feet of being received or integrated in foot block are also prismatic poles of equal profile and section, longer and cut by a transversal plate and provided with recess teeth in the lower, built-in part.

[0026] Said anchorings to be screwed to the forged edge and to be received or integrated to the foot block, according to the invention comprise a linking foot between two consecutive railing bodies; an edge foot at the end of the span; a corner and linking foot between two railing bodies forming a 90° angle; a quadrangular linking foot for angular links and a linking foot to assemble on a sloping span of a maximum of 35°. For the second case, a linking foot between two consecutive railing bodies; an edge foot at the right end of the span, and an edge foot at the left end of the span. For the third case, we have the same solution as for the first, and for the fourth case we also have the same solution as for the first and previous case.

[0027] Said anchoring foot. according to the invention in the disclosed versions have regular, vertical prismatic poles with flat linking sides and straight upper end in the linking feet between railings; with outward bevels in said upper end, according to its position in the edge feet of the end of the span and in the angular ones of 90° and an inclined base in the feet for sloping spans.

[0028] In the railings of the invention having integrated handrails in half round profile on a reinforced rib forming a "T-shaped" hand railing between them both, this rests on the upper ends of the struts having a special edge formed by a central crest of an arched quadrangular profile and upper concave foot so that its sides delimit arch support spaces adjusted to the handrail and the concave foot produces a hole or orifice permitting the evacuation of the liquids in the zinc galvanizing dip.

[0029] In the railings of the invention foreseen for circular section continuous handrails, this is assembled on arched supports in the shape of one or two sided tray, having a prismatic neck with an inner groove of arched sides assembled on said crest of the strut so that the lower convex arch of the tray coincides with the concave arch of the upper bar of said crest, forming a uniform seating for said continuous handrail bar, the arched part of the tray having countersink openings for optionally assembling rivets or lock screws.

[0030] The railings of the invention have a drip rail located on the lower edge of the mesh body. It is integrated by an angular profile in an inverted position so that its sheds downwardly flow. It has a short opening on its ends on the vertex, which permits evacuating the inside of the profile in the galvanizing dip process.

[0031] We will now carry out a broader idea of the features of the invention by referring to the sheets of the drawings accompanying this specification where the preferred details of the invention are shown in a schematic manner and only as an example.

IN THE DRAWINGS:

[0032] Figure 1 shows a perspective view of the railing of the invention with an incorporated handrail.

[0033] Figure 2 shows a perspective view of a barrier with the railing shown in figure 1.

[0034] Figure 3 shows a perspective view of the disassembled railing of the of the invention with a continuous handrail.

[0035] Figure 4 shows a perspective view of a barrier with the railing shown in figure 3.

[0036] Figure 5 shows a front elevational view of the railing shown in figure 1.

[0037] Figure 6 shows a profile elevational view of figure 5 at 90°.

[0038] Figure 7 shows a front elevational view of the railing shown in figure 3 with the assembled railing.

[0039] Figure 8 shows a profile elevational view of figure 7 at 90°.

[0040] Figure 9 shows a view equal to that shown in figure 5 without support feet.

[0041] Figure 10 shows a profile elevational view of figure 9 at 90°.

[0042] Figure 11 shows a vertical cross sectional view of figure 9.

[0043] Figure 12 shows a front elevational view of the strut of the railings of the invention.

[0044] Figure 12 shows an increased detail of the upper end of the strut support.

[0045] Figure 14 shows a profile elevational view of the railing drip rail.

[0046] Figure 15 shows a detail of the end of said drip rail.

[0047] Figure 16 shows an upper plan view of the drip

rail.

[0048] Figure 17 shows a perspective view of the set of support feet for fixation on the foot block.

[0049] Figure 18 shows a perspective view of the set of support feet for fixation to the forged edge.

[0050] Figure 19 shows a perspective view of the set of support feet to be received or incorporated in foot block.

[0051] Figure 20 shows an upper plan view of the continuous handrail simple support.

[0052] Figure 21 shows a side elevational view of the previous figure.

[0053] Figure 22 shows a side elevational view of figure 21 at 90°.

[0054] Figure 23 shows a lower plan view of the previous figure.

[0055] Figure 24 shows a perspective view in foreshortening of the simple support seen from above.

[0056] Figure 25 shows a view in foreshortening like that in figure 24 seen from below.

[0057] Figure 26 shows an upper plan view of the continuous handrail double support.

[0058] Figure 27 shows a side elevational view of figure 26 at 90°.

[0059] Figure 28 shows a side elevational view of figure 27 at 90°.

[0060] Figure 29 shows a lower plan view of figure 28.

[0061] Figure 30 shows a perspective view in foreshortening of the double support seen from above.

[0062] Figure 31 shows a view like that in figure 30 in foreshortening seen from below.

[0063] Figure 32 shows a partial elevational view of the railing with the incorporation of a special handrail at mid-height for the handicapped incorporating the double support.

[0064] Figure 35 shows a profile elevational view of the railing in figure 32.

[0065] Figure 34 shows a perspective view of the railing in figure 32.

[0066] Figure 35 shows a perspective view of an end support of the handrail for the handicapped.

[0067] Figure 36 shows a view like the previous one of an intermediate support.

[0068] Figure 37 shows a perspective view of the complete assembly-disassembly sequences of the incorporated handrail railings of figures 1, 2, 5, 6 and 17.

[0069] Figure 38 shows a perspective view of the complete assembly-disassembly sequences of the continuous handrail railings of figures 3, 4, 7, 8 and 17.

[0070] Figure 39 shows a perspective of the incomplete assembly-disassembly sequences of the railings of the invention (figures 1 to 8 and 19).

PREFFERRED EMBODIMENT OF THE INVENTION.

[0071] In relation to said representations, according to the idea of the invention two types of preferred embodiments of the railings are proposed in which essentially the body, structure, assembly and disassembly means do not vary, the adoption of handrails and the anchoring manners being optional according to the material and the features of the ground on which they are installed.

[0072] Thus to differentiate the railing of the invention depending on the type of handrail, it is indicated with (1) when it is incorporated, for example: figure 1; when it is a continuous handrail it is indicated with (2), for example; figure 3.

[0073] Said railing being constituted of a braided mesh body of capricious cross-linking (7) delimited by an upper bar (6) and a lower drip rail (8) comprised between a set of struts (9) being flat bars having a fixing extension or end (12) on the lower end with a set of holes (13) for fixing to respective anchoring feet and coupled to the integrated handrail (figures 1, 2; 5, 6 and 9 to 11) above on the upper ends or to the continuous handrail by means of the handrail support (figures 3, 4; 7, 8 and 11).

[0074] The first ones or incorporated handrails are formed by a "T-shaped" combination integrated by an upper bar with half round (4) profile or section and a lower bar longitudinally welded to the first on the inside of the half round in vertical position (5). On the ends of the handrails where it meets with the struts, there is an opening permitting the evacuation of gases and liquids in the galvanizing process. The second ones or continuous handrails are integrated by a cylindrical bar (10) resting on simple supports (11) according to if they are assembled on the ends, or doubles (11a), in the intermediates.

[0075] For the handrail arrangement in the first version, incorporated handrail, the struts (9) have supports on their upper end (figures 12 and 13) formed by extensions of smaller width than that of the strut in the shape of quadrangular shaped crests (15) delimiting spaces (16a) and curve-convex sides (16) on each side for adjusted adaptation to the inner half round profile of the handrail (4), making an evacuation chamber with a concave emptying (15a) provided on the upper base of the crest (15).

[0076] For the handrail arrangement in the second version (10), the simple(11) and double (11a) supports are constituted (figures 20 to 31) by a half round seating base (33) with a single extension (32) in the simple (11) case and with two extensions (32) and (32a) in the double case, one on each side, and a set of countersink holes (36) for a long bolt or fixing rivets to the handrail (10). Both are designed from a prismatic body (31) having a housing (34) in the form of a groove adjustable to the head (15) of the strut (9) so that its sides (35) are also arched with a curve adaptable to the profiles (16) of said head (15) and resting on the supports (16- 16a) of the struts (9).

[0077] The lower extensions (12) of said struts (9) are fixed through drill holes (13) to the feet supports (14) of figures 17 to 19 by means of riveted lock nuts (39) according to the versions of anchoring on foot block in figure 17; those in figure 18, on the forged edge; and

those shown in figure 19, received or built-in.

[0078] Those in figure 17 are constituted by:

- (14a) Linking foot for two consecutive railing bodies. It has a regular, vertical prismatic pole (19) with drill holes (23) for their fixation; a flat, oblong pedestal foot (24) with respective holes (26) for anchoring to the foot block.
- (14b) Linking foot at the end of the span. Like the previous one but with a bevel (22) on the upper end outwardly inclined from its assembly position.
- (14c) Linking foot between two railing bodies forming a 90° angle. Like the previous one but with two poles (19) and (20) at a right angle.
- (14d) Linking foot between two railing bodies forming an angle greater than 2° and less than 49°. Like the previous ones, constituted by a regular, vertical, quadrangular, prismatic pole (21).
- (14e) Linking foot between two railing bodies for assembling in a span with a slope, having a pedestal (25) inclined a maximum of 35°.

[0079] Those in figure 18 are constituted by:

- (14f) Linking foot for anchoring to the forged edge and linking between two consecutive railing bodies, analogous to the previous ones but with a tangential pedestal (27) of polygonal shape.
- (14g) Right edge foot at the end of the span of the right end, the upper end having a bevel (22) inclined to the right.
- (14h) Left edge foot at the end of the span on the left end, the upper end having a bevel (22) inclined to the left.

Those in figure 19 are constituted by:

- (14i) Linking foot to be received or incorporated in the foot block and linking between two consecutive railing bodies, analogous to (14a) but with a pedestal butt (30) and extended in jetty (28) with clamps (29).
- (14j) Edge foot to be received or incorporated in the foot block at the end of the span, analogous to (14b) but with a pedestal butt (30) and extended in jetty (28) with clamps (29).
- (14k) Corner foot to be received or incorporated in foot block and linking between two railing bodies in the shape of a 90° angle, analogous to (14c) but with a pedestal butt (30) and extended in jetty (28) with clamps (29).
- (141) Quadrangular linking foot to be received or incorporated in the foot block and linking between two railing bodies forming an angle greater than 2° and less than 49° but with a pedestal butt (30) and extended in jetty (28) with clamps (29).
- (14m) Inclined linking foot to be received or incorporated in the foot block and linking between two railing bodies to be assembled in a span with a maximum slope of 35° but with an inclined pedestal butt (30) and extended in jetty (28) with clamps (29).

[0080] A complementary option is that shown in figures 32 to 36, providing a handrail for the handicapped at an intermediate height of the railing (1) by means of a continuous handrail (10) arranged on supports (11) and (11a) located on props (37) on the ends and intermediate props (38) respectively located on an end strut (9) or between the struts (9) of two contiguous railings (1).

[0081] The complete or incomplete assembly-disassembly sequences shown in figures 37, 38, and 39 have the following operations:

Figure 37.-

- A) Assembly and display of the first module without screwing to the ground.
- B) Assembly of the second module and coupling to the first without screwing to the ground.
- C) Assembly, display, alignment and fixation of the complete span to the ground.
- D) Temporary or definitive disassembly of several modules.
- E) Replacement of one or several modules.

Figure 38.-

- A) Assembly and display of the first module without handrails and without screwing to the ground.
- B) Assembly of the second module and coupling to the first without screwing to the ground.
- C) Assembly, display and alignment of the complete span.
- D) Handrail assembly and fixation of the complete span to the ground.
- E) Replacement of one or several modules.

Figure 39.-

- A) Formation of vessels in the foot block, display, receiving anchoring feet and assembly of the first module.
- B) Display and receiving feet again, assembly of the second module and coupling of the latter to the first.

- C) Assembly, display, alignment and fixation of the complete span to the ground.
- D) Temporary disassembly of several modules.
- E) Replacement of one or several modules.

Claims

1. REMOVABLE MODULAR URBAN RAILING comprising a set of metallic railings (1) constituted by a braided mesh (7) body of hot-rolling profiles **CHARACTERIZED in that** they are framed by an upper longitudinal bar (6) and a lower drip rail (8) parallel to the former and laterally delimited by respective vertical struts (9) having a lower extension (12) with means (13) to be fixed to anchoring feet (14), on foot block or received, permitting removable and semi-removable options of the railings (1) comprising a version with an integrated handrail (4), another version with a continuous handrail (10) and another optional one with a handrail for the handicapped.

2. REMOVABLE MODULAR URBAN RAILING according to claim 1, the horizontal framing means of the braided mesh (7) of the railing are **CHARACTERIZED in that** the upper one is a solid flat bar (6) and the lower drip rail is an angular profile (8) assembled with the shed (18) going downwards and containing partial grooves (17) on each end and on the vertex of the profile (8) for evacuating gases and liquids.

3. REMOVABLE MODULAR URBAN RAILING according to claim 1, the integrated handrail (4) is **CHARACTERIZED in that** it is constituted by a solid half round profile longitudinally welded to a vertical rib (5) forming a "T-shaped" assembly with an evacuation chamber on the ends of the handrail (4) where the support or coupling to the upper end of the struts (9) occurs.

4. REMOVABLE MODULAR URBAN RAILING according to claim 1, the continuous handrail is **CHARACTERIZED in that** it is constituted by a solid cylindrical bar (10) assembled on simple supports (11) located on the ends and double supports (11a) located at intermediate points and adapted to the upper support points of the struts (9).

5. REMOVABLE MODULAR URBAN RAILING according to claim 3, said supports of the integrated (4) and continuous (10) handrail on the struts (9) are **CHARACTERIZED in that** they are constituted by a quadrangular crest (15) having convex arched sides (16) adjustable to the half round profile of the handrail (4) and they form side supports (16a) for the edges of the latter, a concave aperture (15a) being between the arch of the profile and the upper base of the crest (15), acting as a ventilation and evacuation chamber.

6. REMOVABLE MODULAR URBAN RAILING according to claims 4 and 5, said supports (11) and (11a) of the continuous handrail (10) assembled on said supports (15) are **CHARACTERIZED in that** they have a prismatic body (31) with a vertical housing (34) of a section adaptable to said quadrangular crest (15), for the purpose of providing convex arched sides (35) and comprising extensions (32) on one end on the simple support (11) and extensions (32) and (32a) on the double support (11a), having a transversal section of convex arch tray (33) adaptable to the concave base (15a) of the upright (9) support (15) extensions (32) and (32a), having countersink holes (36) for the entrance of locking long bolts to the handrail (10).

7. REMOVABLE MODULAR URBAN RAILING according to claim 1, the lower extensions (12) of the struts (9) of the railings (1) are **CHARACTERIZED in that** they have a set of holes (13) for assembly in the support feet (14) by means of riveted lock closures (39).

8. REMOVABLE MODULAR URBAN RAILING according to claims 1 and 7, the support feet (14) are **CHARACTERIZED in that** they comprise support feet (14) for completely removable fixation to the foot block (14a to 14e); removable support feet to the forged edge (14f to 14h); and fixed support feet received in the foot block (14i to 14m).

9. REMOVABLE MODULAR URBAN RAILING according to claim 8, according to their application, the support feet (14) are **CHARACTERIZED in that**:

In the version of removable fixation to the foot block, they are constituted by a vertical prismatic member (19) and a flat oblong pedestal (24) perpendicular to said prism (19) and provided with drill holes (23) for fixing to the struts (9) and drill holes (26) for fixing to the foot block or forged edge.

- In the version of removable fixation to the forged edge, it has the same vertical prismatic pole (19) but with a tangential pedestal (27) to it and a polygonal shape.
- In the version of fixation received in foot block it has the same prismatic pole (19), an intermediate pedestal butt (30) and a likewise prismatic lower extension (28) with side clamps (29) for clamping in the pavement mass.

10. REMOVABLE MODULAR URBAN RAILING ac-

cording to claims 8 and 9, in relation to their particular and independent function, the removable support feet (14) on the foot block, and fixed or received in the foot block, are **CHARACTERIZED in that** they comprise:

- Linking foot (14a) and (14i) for two consecutive railing bodies, a regular vertical prismatic pole (19).
- Linking foot (14b) and (14j) at the end of the span like the previous one, but with a bevel (22) on the upper end with an inclination towards the outside of the assembly plane.
- Linking foot (14c) and (14k) between two railing bodies forming a 90° angle composed by two squared prismatic poles (19) and (20).
- Linking foot (14d) and (141) between two railing bodies forming an angle of greater than 2° and less than 49° composed by a regular, quadrangular, vertical prismatic pole.
- Linking foot (14e) and (14m) between two railing bodies for assembling on a sloping span, having a pedestal (25) inclined a maximum of 35°.

11. REMOVABLE MODULAR URBAN RAILING according to claims 8 and 9, in relation to their particular and independent function, the semi-removable support feet (14) for fixation to a forged edge are **CHARACTERIZED in that** they comprise:

- Linking foot (14f) between two consecutive railing (1) bodies, a regular prismatic pole (19) and an irregular hexagonal tangential pedestal (27) on the side edge.
- Edge foot (14g) at the end of the span on the right end, like the previous one, having a bevel (22) on the upper end inclined to the right.
- Edge foot (14h) at the end of the span on the left end, like the previous one, having a bevel (22) on the upper end inclined to the left.

12. REMOVABLE MODULAR URBAN RAILING according to claim 1, the complementary option of the handrail for the handicapped is **CHARACTERIZED in that** it comprises a continuous bar of a circular section (10) assembled at mid-height of the railing body (1) on respective single (11) and double (11a) supports, respectively placed on props (37 and 38) assembled on the struts (9) of one end and between the struts (9) of two contiguous bodies (1).

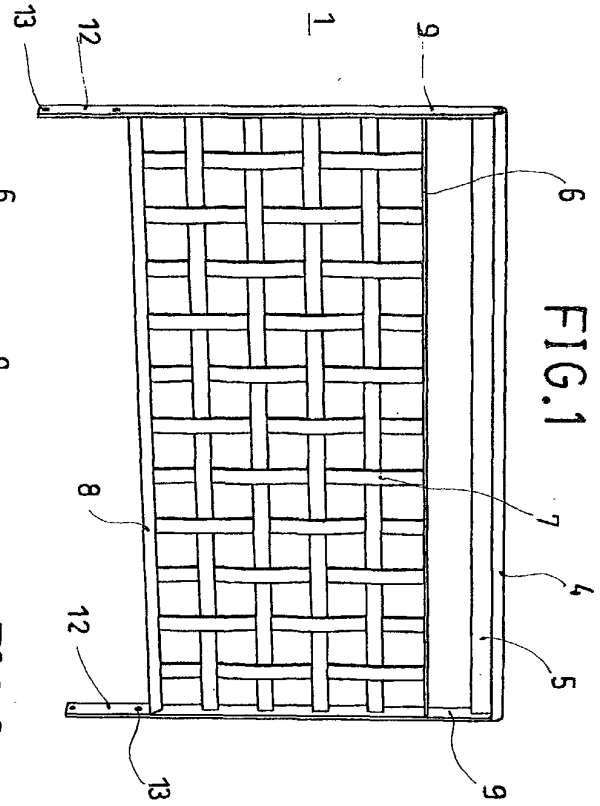


FIG.1

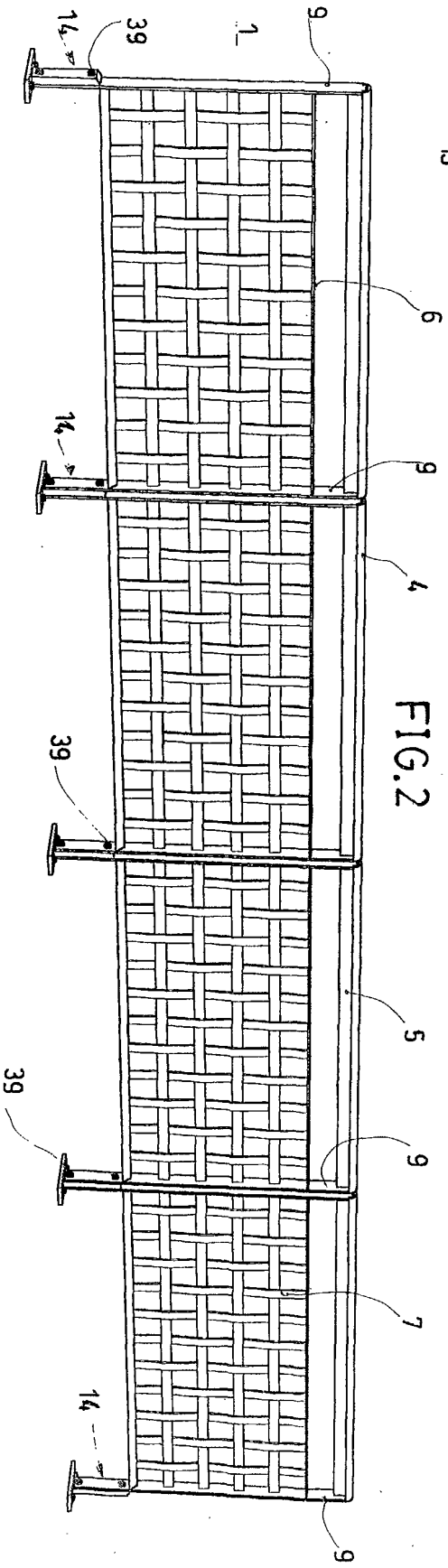


FIG.2

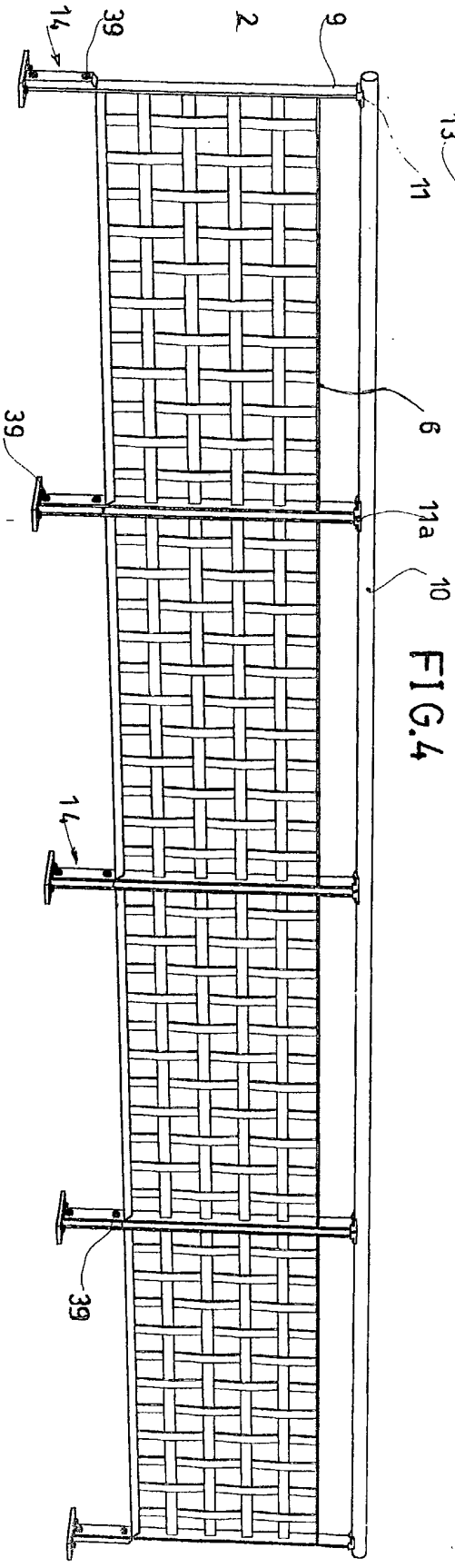


FIG.4

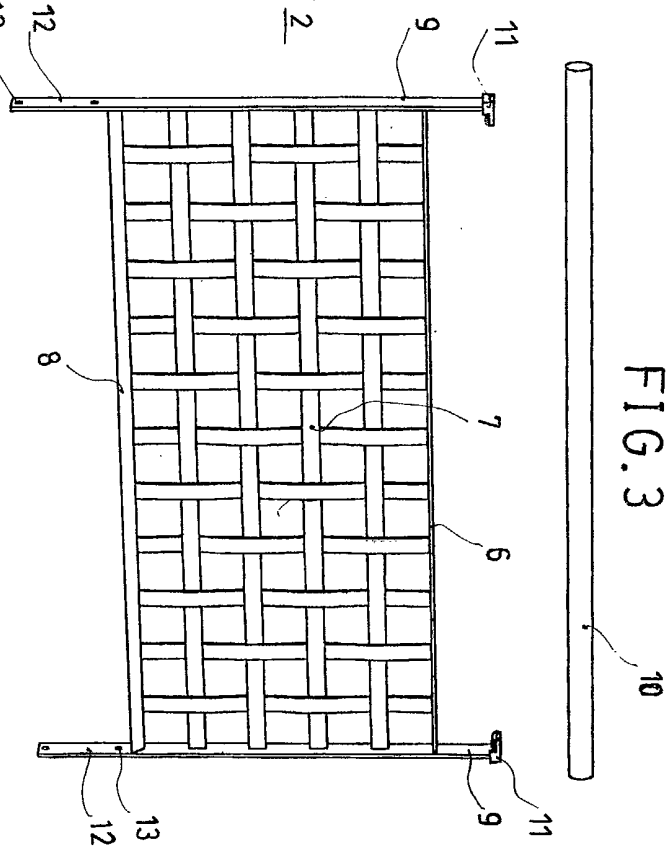


FIG.3

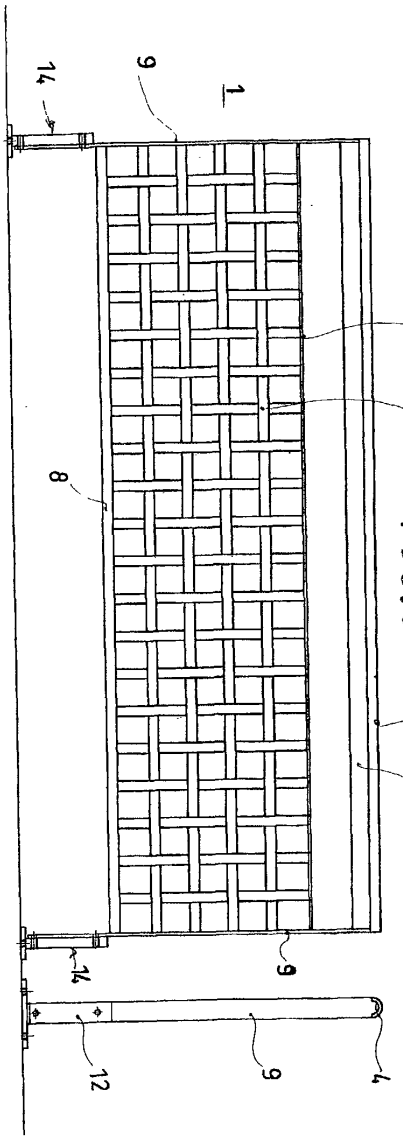


FIG.5

FIG.6

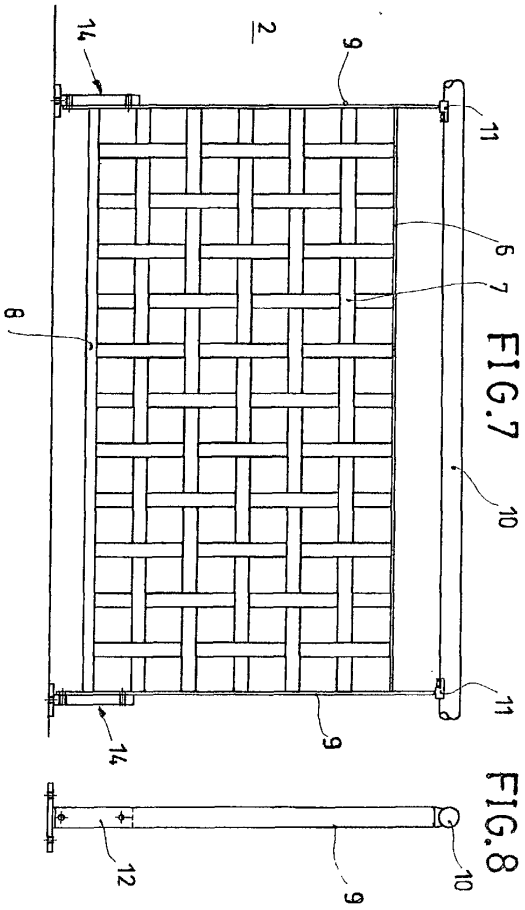


FIG.7

FIG.8

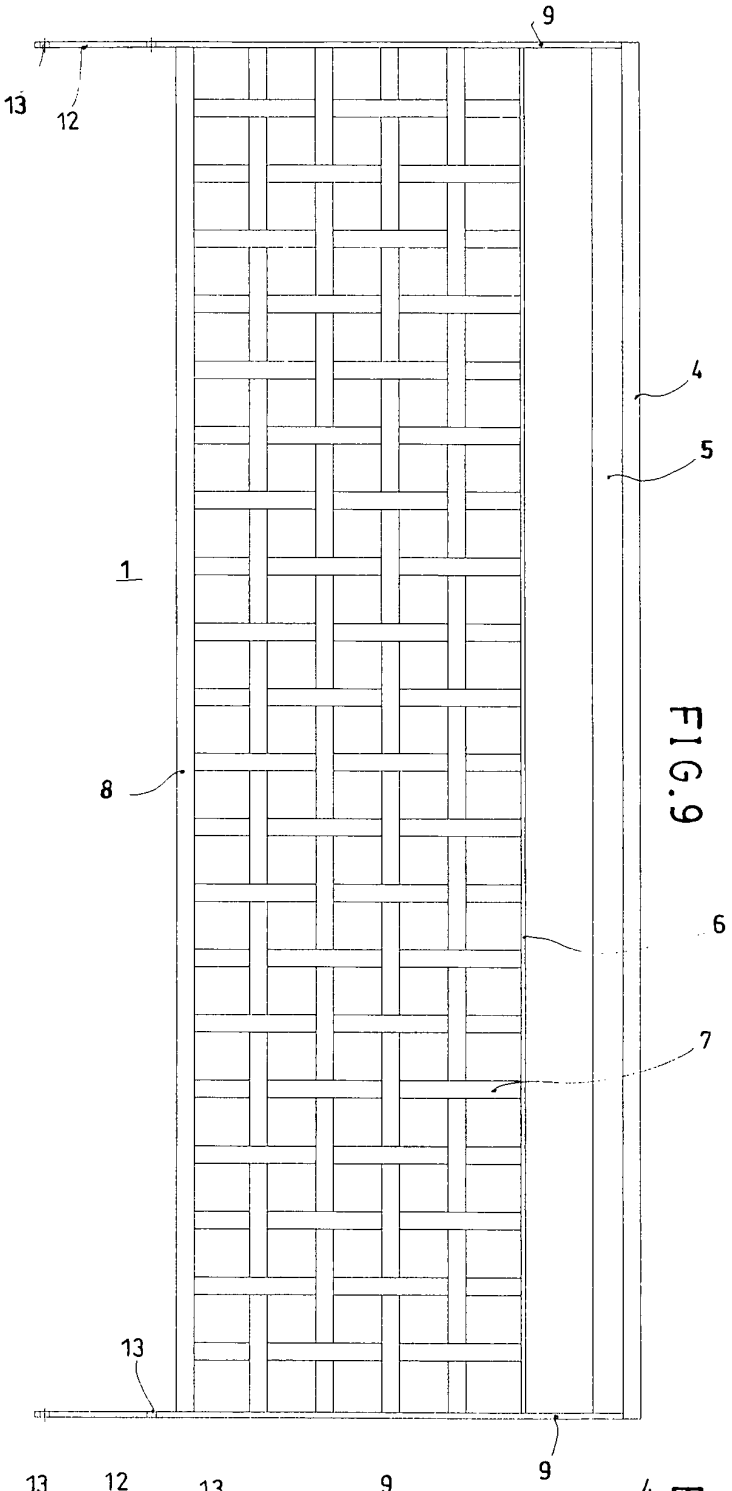


FIG.9

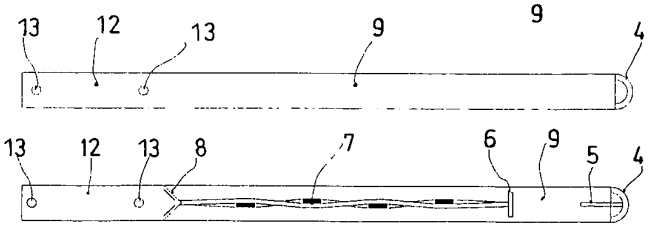


FIG.10 FIG.11

FIG.13

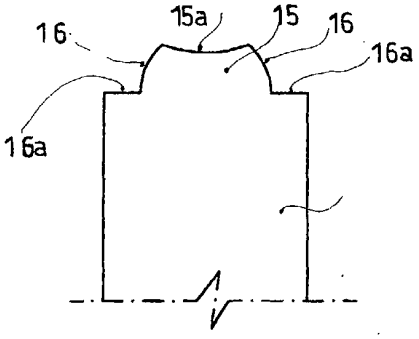


FIG.12

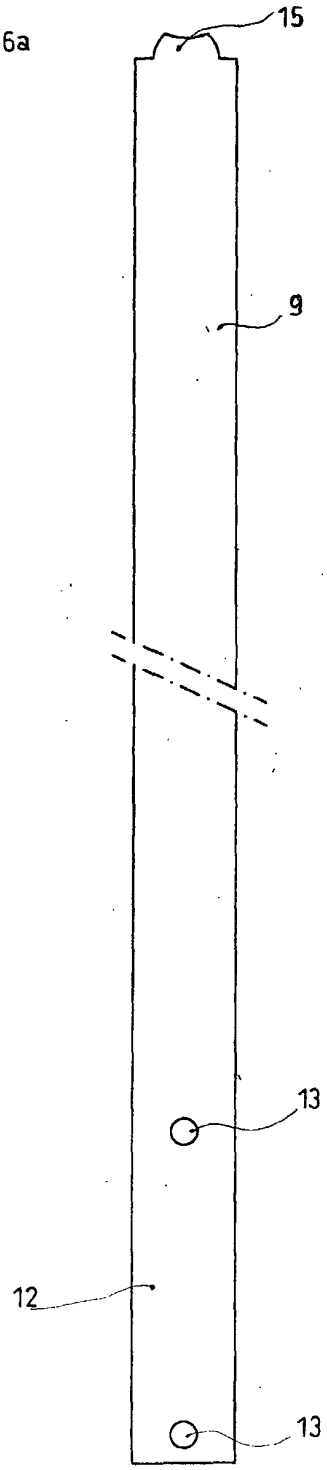


FIG.15

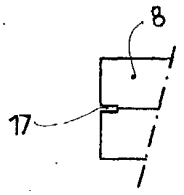


FIG.14

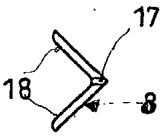


FIG.16

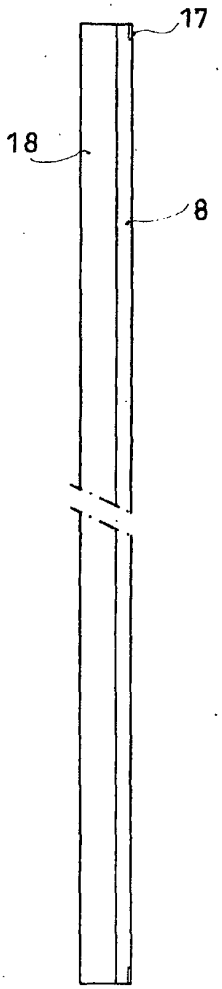


FIG.17

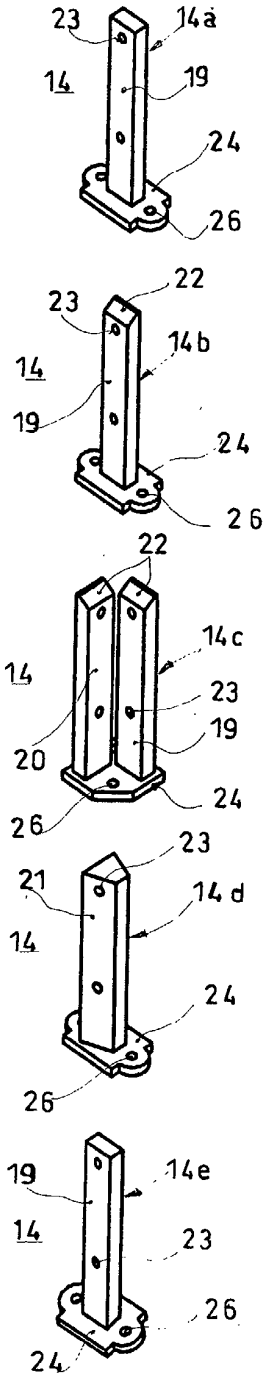


FIG.18

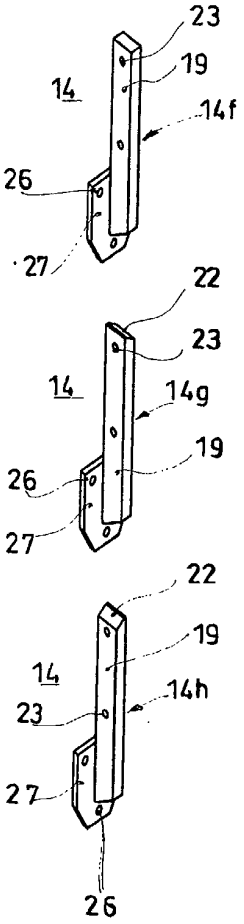


FIG.19

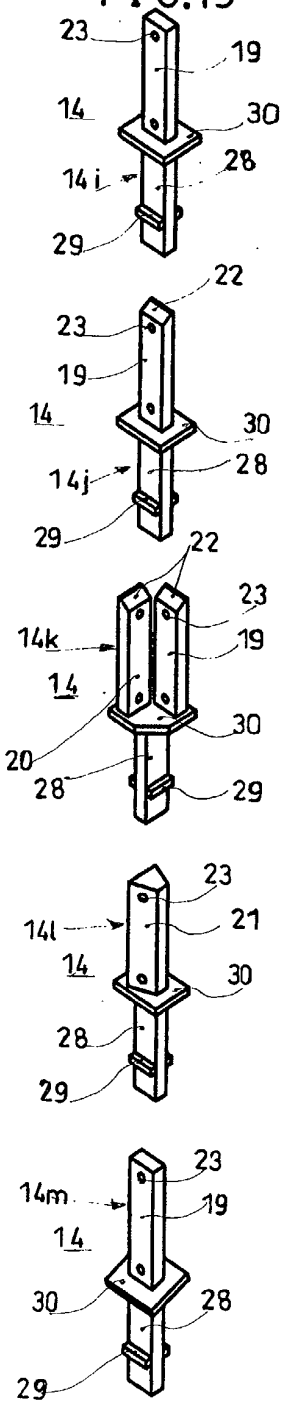


FIG.20

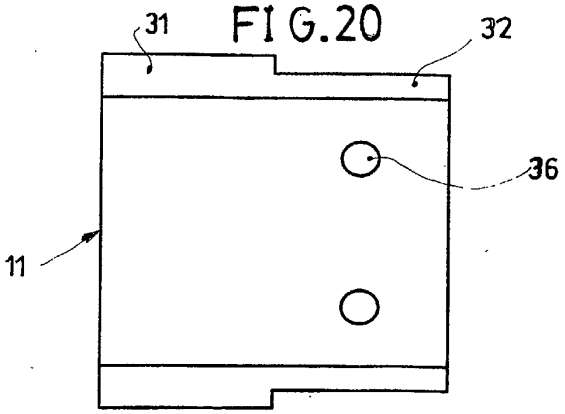


FIG.21

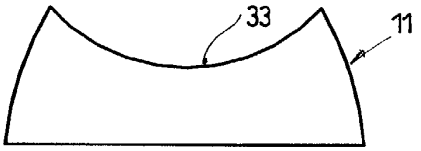


FIG.22

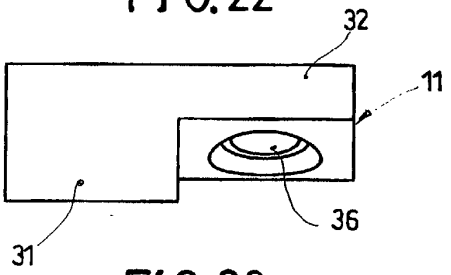


FIG.23

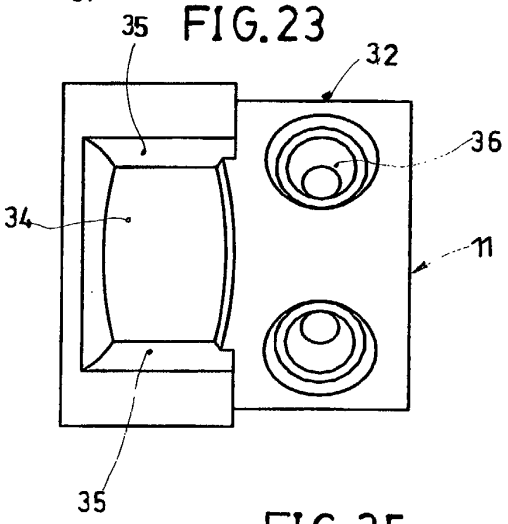


FIG.24

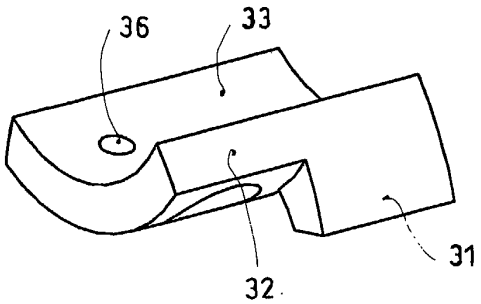


FIG.25

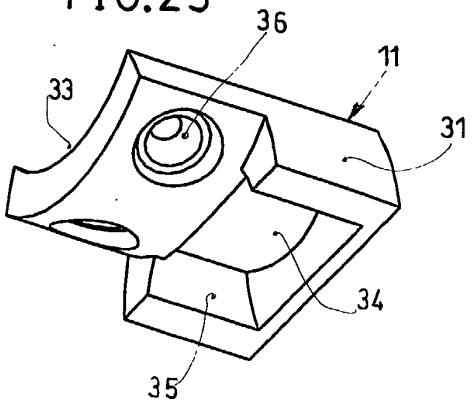


FIG.26

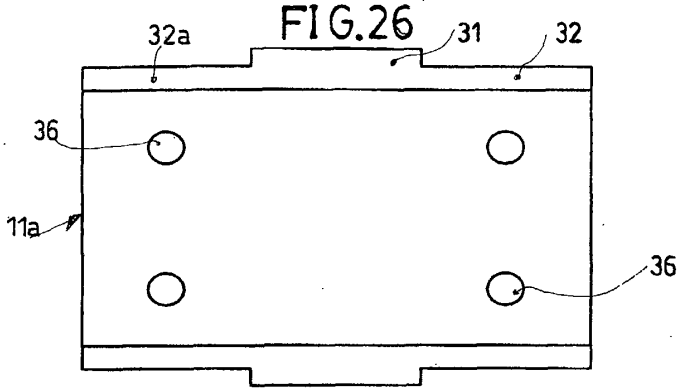


FIG.27

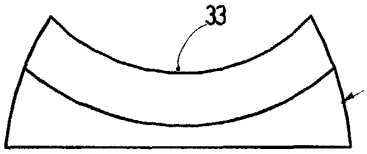


FIG.28

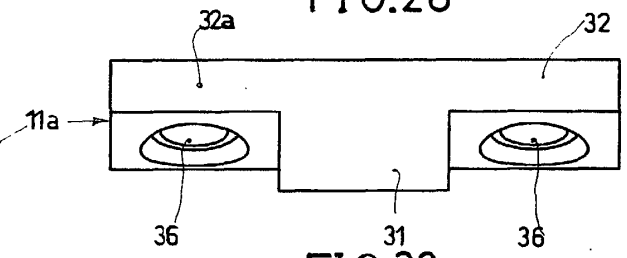


FIG.29

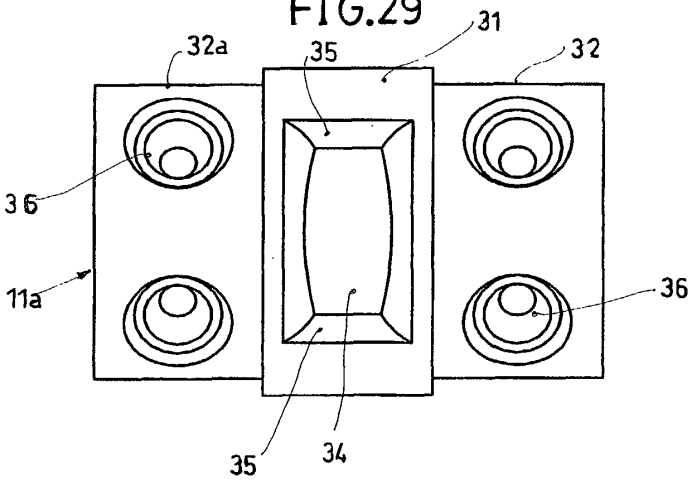


FIG.30

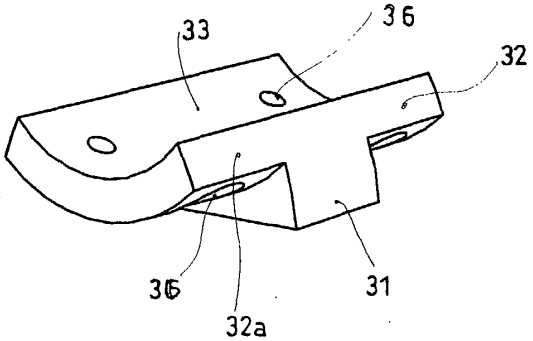
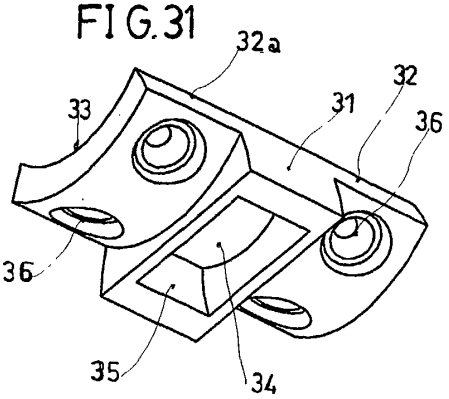


FIG.31



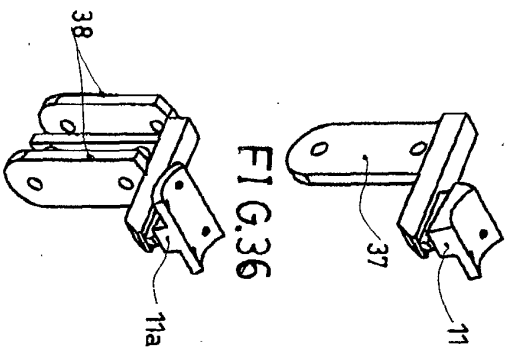


FIG.36

FIG.35

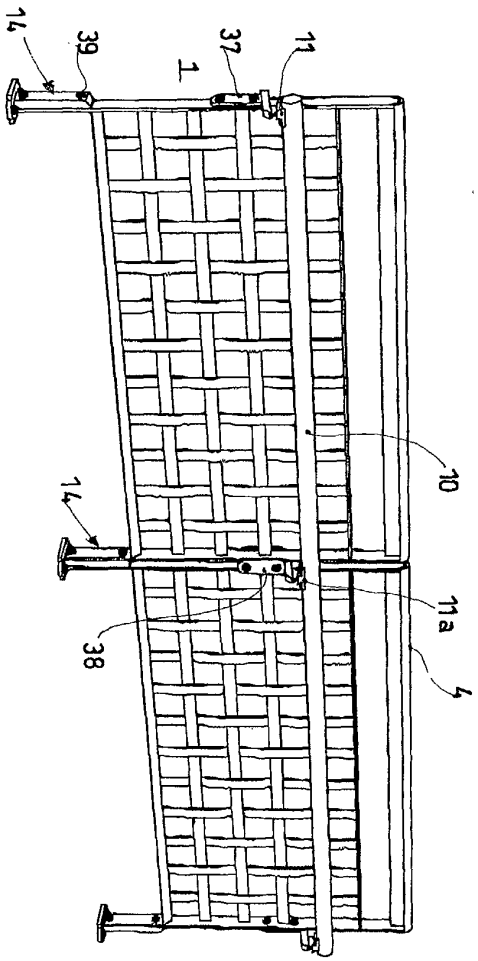


FIG.34

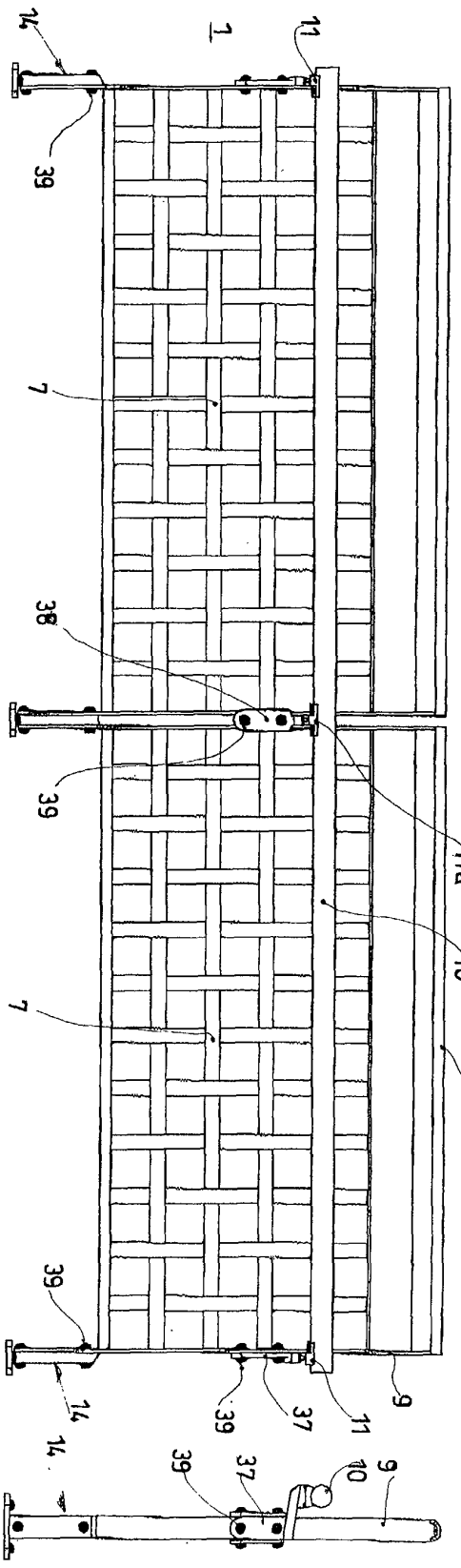


FIG.32

FIG.33

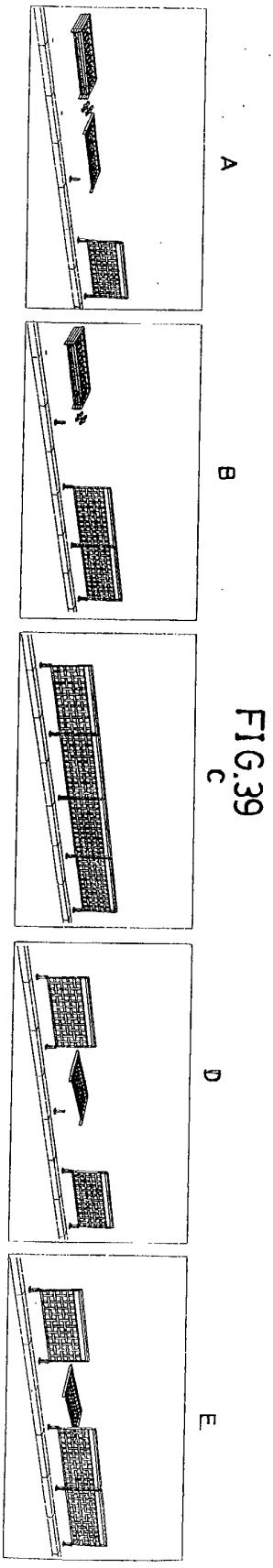


FIG.39

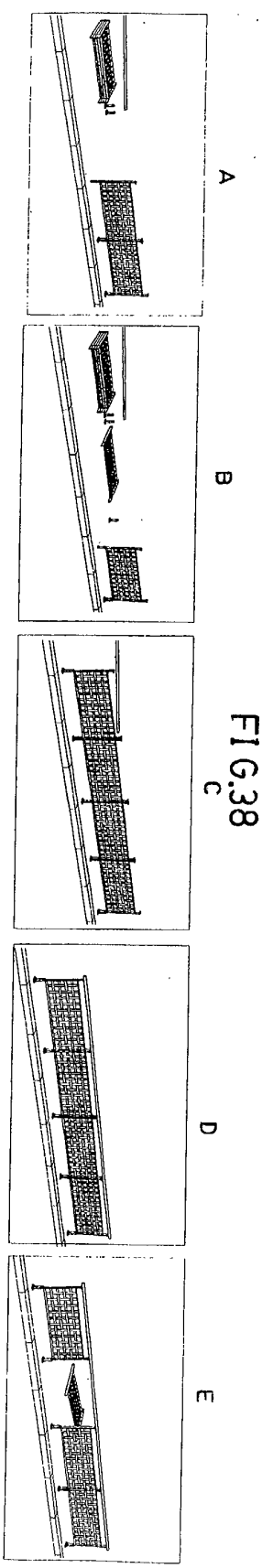


FIG.38

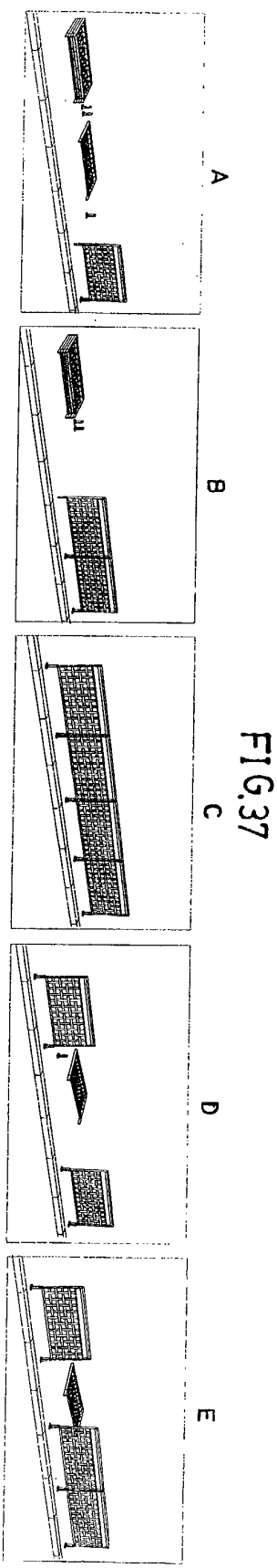


FIG.37

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 38 0130

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.7)
X	EP 0 651 112 A (HORIZAL) 3 May 1995 (1995-05-03) * column 4, line 52 - column 5, line 19 * * figures 1,2,4,8,9 *	1	E04F11/18 E01F13/04
Y		2	
A		4,7,12	

D,A	EP 1 083 251 A (TRENZAMETAL S L) 14 March 2001 (2001-03-14) * column 2, line 31 - column 3, line 15 * * figures 1-4 *	1	

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A	BE 1 011 490 A (JANSSENS FRANCOIS) 5 October 1999 (1999-10-05) * page 1, line 17 - line 21 * * figure 7 *	3	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 November 2002	Geivaerts, D

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2

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82