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(54) **Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof**

(57) The invention relates to elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof, which is essentially based on prefabricated metal elements which are divided into three basic assemblies which are the struts, the body of the element to be made, whether it is a railing or a fence, and the articulated anchoring foot. The struts, one of them being square and the other one being rectangular, are profiles with longitudinal grooves on three and two faces

respectively, for the assembly by insertion of the body, and provided with a batten to cover the unused grooves. The body is formed by hollow vertical metal bars with a square or rectangular section which are introduced by sliding in their respective stringers, which are also metal profiles provided with a longitudinal groove on one of their faces, a pivoting clipping bolt, an assembly terminal and a batten which is clipped between each bar. Finally, there is the anchoring foot which is an articulated element.

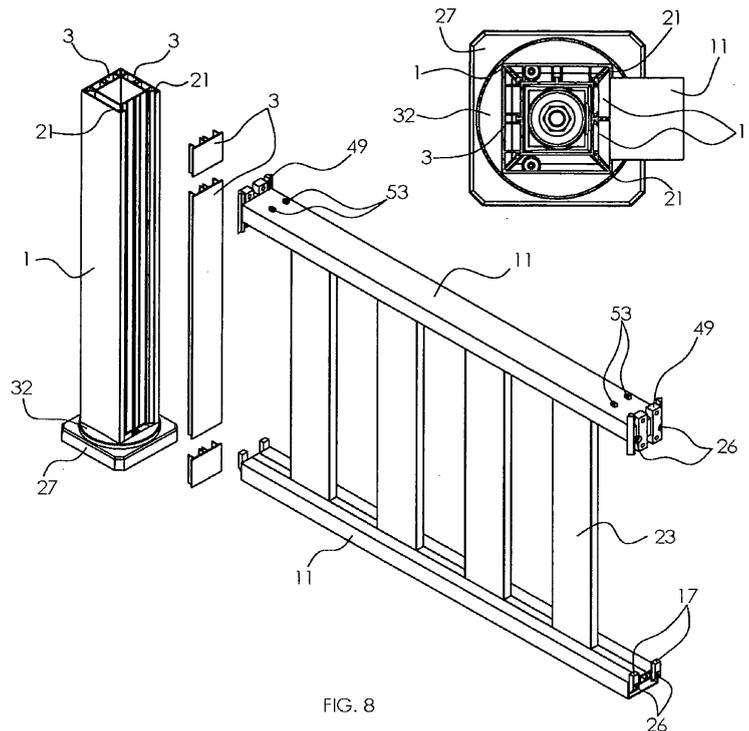


FIG. 8

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Description

Object of the Invention

[0001] The invention relates to an assembly of modular metal elements for constructing prefabricated fences and railings with traditional bars which can be directly assembled to one another on-site without needing welds, screws or rivets as a result of the fact that the particular geometry of the elements and the different mechanisms forming it allow firm and long-lasting mechanical attachments. The use of screws is only necessary for the final fixing of the assembly to the ground or to the walls. The invention consists of tubular profiles and their specific machinings, assembly and fixing parts, anchorings to walls and to floors, and the assembly of all the elements to one another.

Background of the Invention

[0002] The currently known systems of metal fences and railings with traditional bars are solved with metal profiles which are attached to one another by means of welds, screws or rivets, therefore others similar to the object of this invention are not known. For said purposes, reference is made to the following patents belonging to the same inventor, M. A. Bermejo, E 1 614 826 B1 of Trenzmetal, S.A. for: REMOVABLE MODULAR URBAN RAILINGS; E 0004 380114/1 of Natural Faber, S.A. for: DEMOUNTABLE ARTICULATED TUBULAR STRUCTURE FOR RAILINGS AND THE JOINTING AND FIXING COMPONENTS THEREOF and E 0006 380207/ 8 of Natural Faber, S.A. for: ENSAMBLE ARTICULÉ DE BARRIÈRES DE PROTECTION.

Inventive Step

[0003] As can be summarized from the disclosure referred to the object of the invention in the preliminary paragraphs of this specification, the advantageous purpose of such invention is to provide prefabricated and preassembled elements the final on-site assembly of which is carried out without fixing elements such as welds, screws, rivets or glues, which only require being screwed in order to fix them to the ground or to the walls with a high capacity of adaptation to the latter due to their articulated anchoring elements, facilitating the installation and reducing the assembly time.

Description of the Invention

[0004] As a result, the invention is essentially based on prefabricated metal elements which are divided into three basic assemblies which are the struts, the body of the element to be made, whether it is a railing or a fence, and the articulated anchoring foot. The struts, one of them being square and the other one being rectangular, are profiles with an inner chamber, with longitudinal grooves

in three and two faces respectively, for the assembly by insertion of the body, and provided with a batten to cover the unused grooves. The body is formed by hollow vertical metal bars with a square or rectangular section which are introduced by sliding in their respective stringers, which are also metal profiles provided with a longitudinal groove in one of their faces, a pivoting closing bolt, an assembly terminal and a batten which is clipped between each bar. Finally, there is the anchoring foot which is an articulated element.

In the drawings:

[0005] Figure 1 is a front perspective view of the square strut (1), of the rectangular strut (2) and of the strut batten (3).

[0006] Figure 2 is a front perspective view of the stringers (10) and (11) for square bars (22) (Figure 5) and rectangular bars (23) (Figure 5) respectively, and stringer battens (14).

[0007] Figure 3 is a front perspective view of the bolt (17) and of the screw (26).

[0008] Figure 4 is a front perspective view and another rear view of the assembly terminal (49), of the studs (53) and of the screws (26).

[0009] Figure 5 is a front perspective view of the square bar (22) and of the rectangular bar (23).

[0010] Figure 6 is a perspective view of the system for assembling the body of the railing or fence formed by the stringers (10), the square bars (22), the stringer batten (14), the bolts (17), the assembly terminals (49), the studs (53) and the screws (26).

[0011] Figure 7 is a perspective view of the system for assembling the body of the railing or fence formed by the stringers (11), the rectangular bars (23), the stringer batten (14), the bolts (17), the assembly terminals (49), the studs (53) and the screws (26).

[0012] Figure 8 is a perspective view of the system for assembling the body of rectangular bars of Figure 6 with the square strut (1) of Figure 1 and a fixing detail for fixing the baseplate (27).

[0013] Figure 9 is a front perspective view of the anchoring base (27).

[0014] Figure 10 is a front perspective view, another lower view and another vertical sectional view of the strut-holder (32) and of the studs.

[0015] Figure 11 is a front perspective view and another rear view of the cap (41).

[0016] Figure 12 is a cross-section of the assembly of the articulated foot formed by the elements of Figures 8, 9 and 10 with the stabilizing studs (39), the receiving rod (48) and the lock nut (47).

Description of a Preferred Embodiment of the Invention

[0017] This description is focused on the corresponding illustration of the depictions of the invention, based on the following:

The struts (Figure 1), both the square strut (1) and the rectangular strut (2) are metal profiles provided with three and two longitudinal grooves (5) respectively, to assemble by sliding or insertion the prefabricated assembly of the body (Figure 8), in which there are ribs (6) on each side and a T-shaped central rib (7) for clipping the strut batten (3) which is longitudinally provided with two side ribs (8) and a central channel (9), all of them finished with a tooth which is clipped in ribs (6) and (7) respectively.

The stringer (11) (Figure 2) for the rectangular bar (23) (Figure 5) and the stringer (10) (Figure 2) for the square bar (22) (Figure 5) are metal profiles, with a central longitudinal groove (12) provided with two ribs (13) for clipping or inserting the batten (14) for the stringer, which in turn has two side ribs (15) finished in the form of a tooth. The stringers (10) and (11) consist of two open tubular channels (16) in which the screws (26) (Figure 3 and 4) are threaded to assemble the bolt (17) (Figure 3) provided with a borehole (18); or the assembly terminal (49) (Figure 4) provided with boreholes (52).

The bars, the square bar (22) and the rectangular bar (23), both in Figure 5, have a grooving (24) and (25) respectively for the installation in their stringers. The prefabricated body of the square bar of Figure 6 is assembled by sliding or inserting the square bar (22) in the groove (12) of the stringer (10) and which is turned 45°, fitting its groove (24) in the flange (20) of the stringer (10). For the assembly of Figure 7 of the prefabricated body with rectangular bars, the rectangular bars (23) are introduced by sliding, fitting their groove (25) in the flange (20) of the groove (12) of the stringer (11) Both for the body of square bars (22) and for that of rectangular bars (23), the space between the bars is covered by the clipping of the batten (14) for stringers longitudinally provided with two side ribs (15) finished with a tooth which are clipped in the ribs (13) of the stringers (10) and (11). To complete the assembly of both bodies in order to subsequently assemble them in the struts, the bolts (17) or the anchoring terminals (49) or both elements can be used as shown in Figure 8. The bolts (17) are fixed to the stringers (10) and (11) with the screws (26), leaving them perpendicular for their subsequent assembly (Figure 8) to the square strut (1) or rectangular strut (2) and the anchoring terminals (49) are fixed to the stringers (10) and (11) with the screws (26). The preassembled body enters by sliding or insertion in the groove (5) of the struts and is firmly secured to the struts by turning the bolts (17) 90°, which bolts with their wedge-shaped inclined plane (19) press inside the longitudinal slots (21) of the struts, and by fitting the tabs (50) of the anchoring terminal (49) in the grooves (21) of the strut, which tabs exert a locking by means of the studs (53)

threaded in the boreholes (51).

The articulated anchoring foot is formed by a base (27) (Figure 9), the strut-holder (32) (Figure 9) and semi-spherical cap (41) (Figure 11), providing it, once assembled, with five axes of movements, four of which are angular and one of which is rotating. As can be seen in Figure 11 of the assembled articulated foot, the base (27) is seated on the ground, being coplanar therewith, and has at its center a ball joint (29) with an also spherical indentation (31) and a central borehole (28). The strut-holder (32) has a base (40) which is a spherical sector comprised between two parallel planes that are symmetrical in relation to the spherical center fitting in the inner semi-spherical wall (30) of the base (27) and at its lower part it has a spherical indentation (46) fitting with the surface (29) of the base (27) and a central ball joint (36) seated in the indentation (31) of the base (27), in addition to a central borehole (37). At its upper part it has three threaded boreholes (38) for housing the studs (39) (Figure 12) for adjusting it on the base (27) and has a square section (33) to fit in the inner section (4) (Figure 1) of the strut (1), with gaps or hollows (34) on each of its faces and inside which there is a spherical projection (35) on which the cap (41) is coupled, which cap is a ring with two spherical faces (42) and (43) with a central borehole (44) and a planar support face (45). Once the assembled foot has been placed and seated, it is fixed by means of an axial stud (48) received in the ground and which, with a nut (47) seated on the plane (45) of the cap (41), presses the assembly.

Claims

1. Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof which are prefabricated modular metal elements for constructing fences and railings ready to be assembled to one another without needing welds, screws or rivets, which are **characterized by** being formed by:
 - a set of tubular square struts (1) and rectangular struts (2) which are metal profiles provided with three and two longitudinal grooves (5) respectively.
 - a set of stringers (10) and (11) and corresponding bolts (17) and anchoring terminals (49) for the attachment of the preassembled body.
 - a set of vertical tubular square bars (24) and rectangular bars (25) respectively, which are assembled in the mentioned stringers (11) and (10), also respectively.
 - an articulated anchoring foot formed by a base (27) which, once assembled, would be provided

- with five theoretical axes of movement, four of which are angular and one of which is rotating.
2. Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof according to claim 1, wherein the square struts (1) and rectangular struts (2) are **characterized in that** they are metal profiles with two channels (21) on each side where the stringers (10) and (11), the bolts (17) and the anchoring terminals (49) for the attachment of the preassembled body are housed.
 3. Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof according to claims 1 and 2, wherein the strut is **characterized in that** in the grooves (5), it has a rib (6) on each side and a T-shaped central rib (7) and has a strut batten (3) which is longitudinally provided with two side ribs (8) and a central channel (9), all of them finished with a tooth for the clipping or insertion in the ribs (6) and (7).
 4. Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof according to claim 1, wherein the body is **characterized in that** it is formed by rectangular bar stringers (11) or square bar stringers (10) which are metal profiles, with a central longitudinal groove (12) provided with two ribs (13) and two open tubular channels (16) to be used as a housing for the screws (26) securing the bolts (17) and the anchoring terminals (49).
 5. Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof according to claims 1 and 4, wherein the assembly of the body is **characterized in that** the square bars (22) and rectangular bars (23) have a grooving (24) and (25), respectively, for the assembly of the square bar (22) which is carried out by sliding or insertion in the groove (12) of the stringer (10) and which is turned 45°, fitting its groove (24) in the flange (20) of the stringer (10), and for the assembly of the rectangular bar (23) which is introduced by sliding, fitting its groove (25) in the flange (20) of the groove (12) of the stringer (11).
 6. Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof according to claims 1, 4 and 5, wherein the assembly of the body is **characterized in that** the space between the bars (22) and (23) is covered by a batten (14) for each stringer (10) or (11), longitudinally provided with two side ribs (15) finished with a tooth which are clipped in the ribs (13) of said stringers (10) and (11).
 7. Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof according to claims 1, 4, 5 and 6, wherein the assembly of the body is **characterized in that** it has bolts (17) with a borehole (18) which are fixed perpendicularly with the screws (26) at the ends of the stringers (10) and (11) for subsequently assembling the body to the strut (1) or (2), where the latter enters by sliding or insertion in its respective grooves (5) and is firmly secured by turning the bolts (17) 90°, which bolts with their wedge-shaped inclined plane (19) press inside the longitudinal slots (21) of the struts (1) and (2).
 8. Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof according to claims 1, 4, 5, 6 and 7, wherein the assembly of the body is **characterized in that** it has anchoring terminals (49) at the ends of the stringers (10) and (11) which firmly attach the body to the strut with the tabs (50) fitting in the grooves (21) of the struts (1) and (2) and by means of the studs (53) threaded in the boreholes (51) exerting pressure on the bottom of the groove (5) thereof.
 9. Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof according to claim 1, wherein the articulated foot is **characterized in that** it is formed by a base (27), a strut holder (32) and the cap (41), providing it with the movements of a ball joint once it has been assembled.
 10. Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof according to claims 1 and 8, wherein the articulated foot and its assembly are **characterized in that** the base (27) is seated on the ground, being coplanar therewith, and has at its center a ball joint (29) with a spherical indentation (31) and a central borehole (28).
 11. Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof according to claims 1, 8 and 9, wherein the articulated foot is **characterized in that** the strut-holder (32) has a base (40) which is a spherical sector comprised between two parallel planes that are symmetrical in relation to the spherical center fitting in the inner semi-spherical wall (30) of the base (27) and at its lower part it has a spherical indentation (46) fitting with the surface (29) of the base (27) and a central ball joint (36) seated in the indentation (31) of the base (27), in addition to a central borehole (37), and has three threaded boreholes (38) for housing the studs (39) for adjusting it on the base (27) and has a square section (33) to fit in the inner section (4) of the strut (1), with a hollow (34) on each of its faces and inside which there is a spherical projection

(35) on which the cap (41) is coupled, which cap is a ring with two spherical faces (42) and (43) with a central borehole (44) and a planar support face (45).

12. Elements for forming metal fences and railings with traditional prefabricated bars and assembly thereof according to claims 1, 8, 9 and 10, wherein the assembly of the articulated foot is **characterized in that** once the assembled foot has been placed and seated, it is fixed by means of a stud (48) received in the ground and which, with a nut (47) seated on the plane (45) of the cap (41), presses the assembly.

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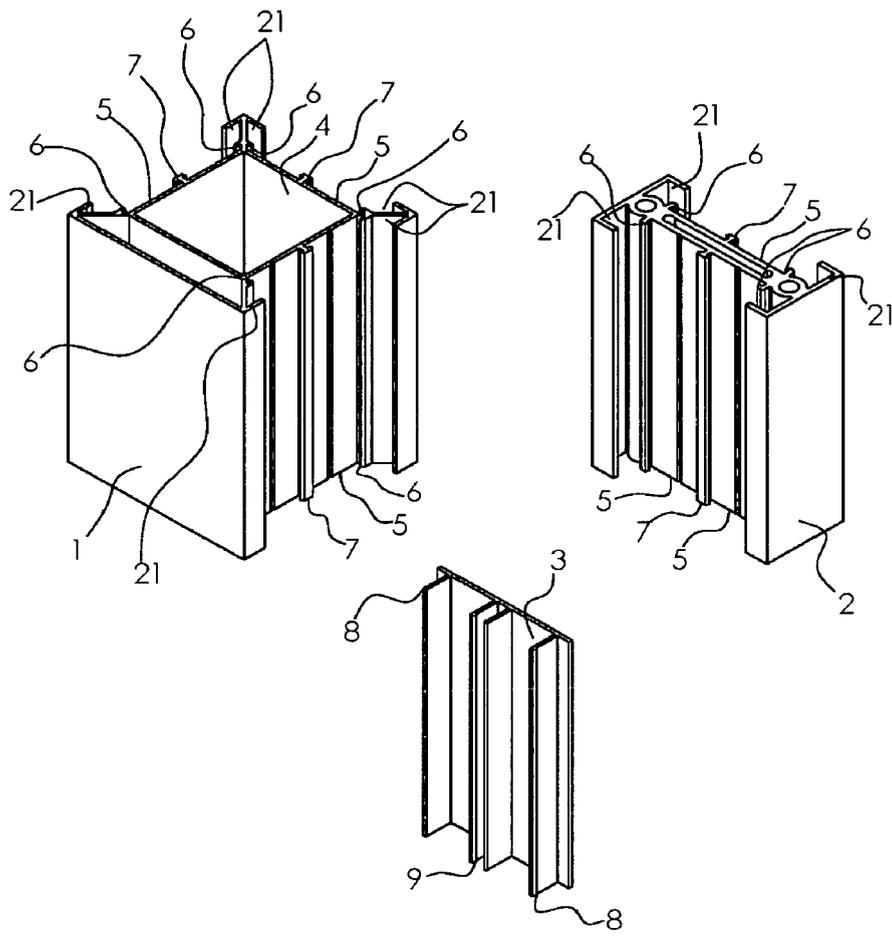


FIG. 1

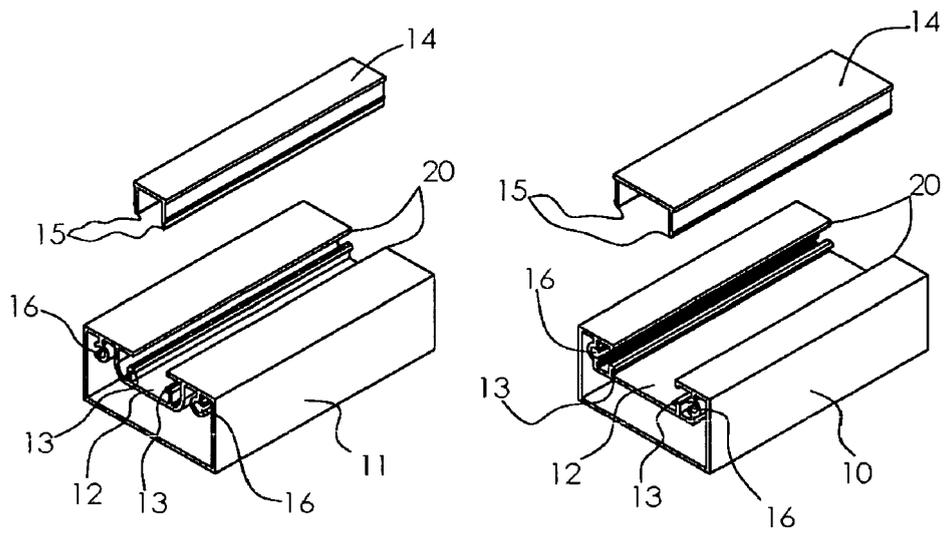


FIG. 2

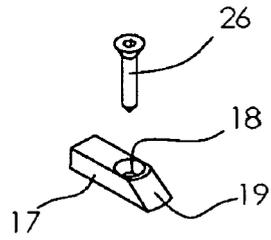


FIG. 3

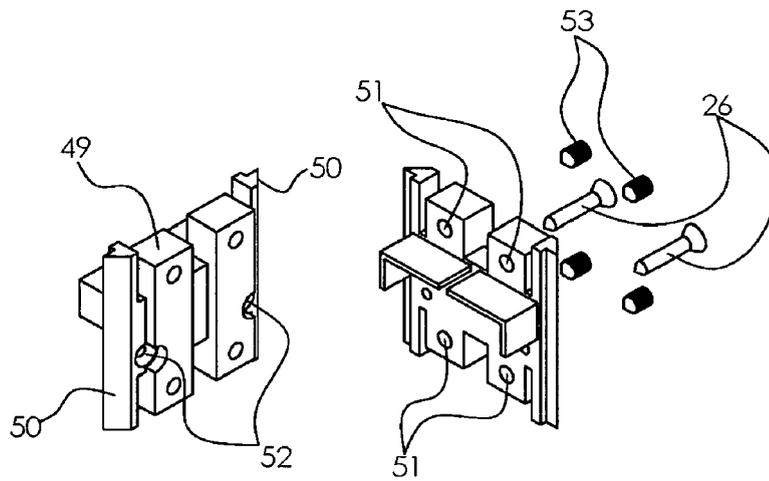


FIG. 4

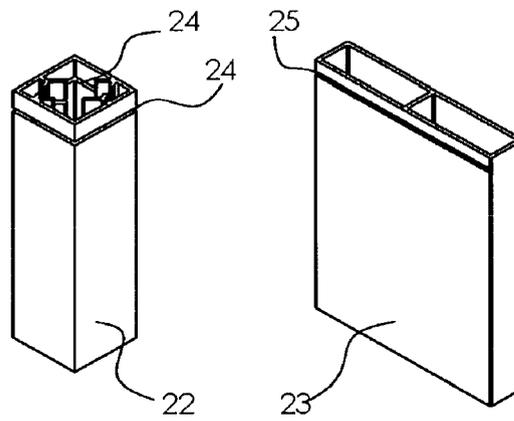


FIG. 5

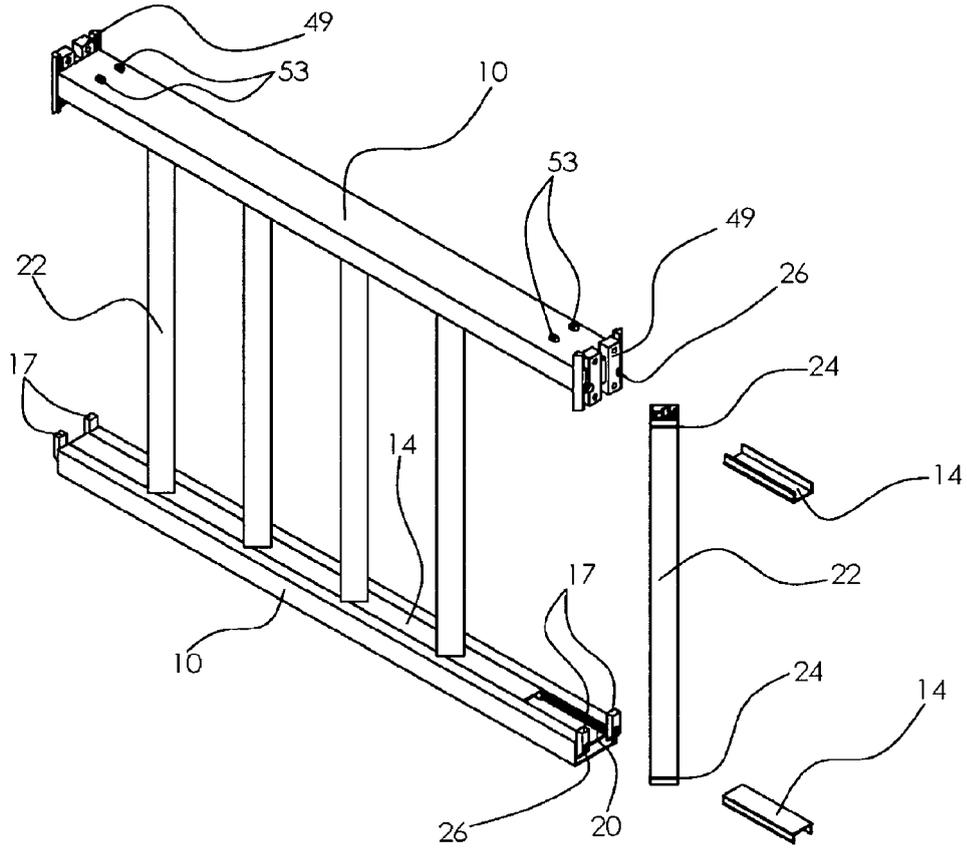


FIG. 6

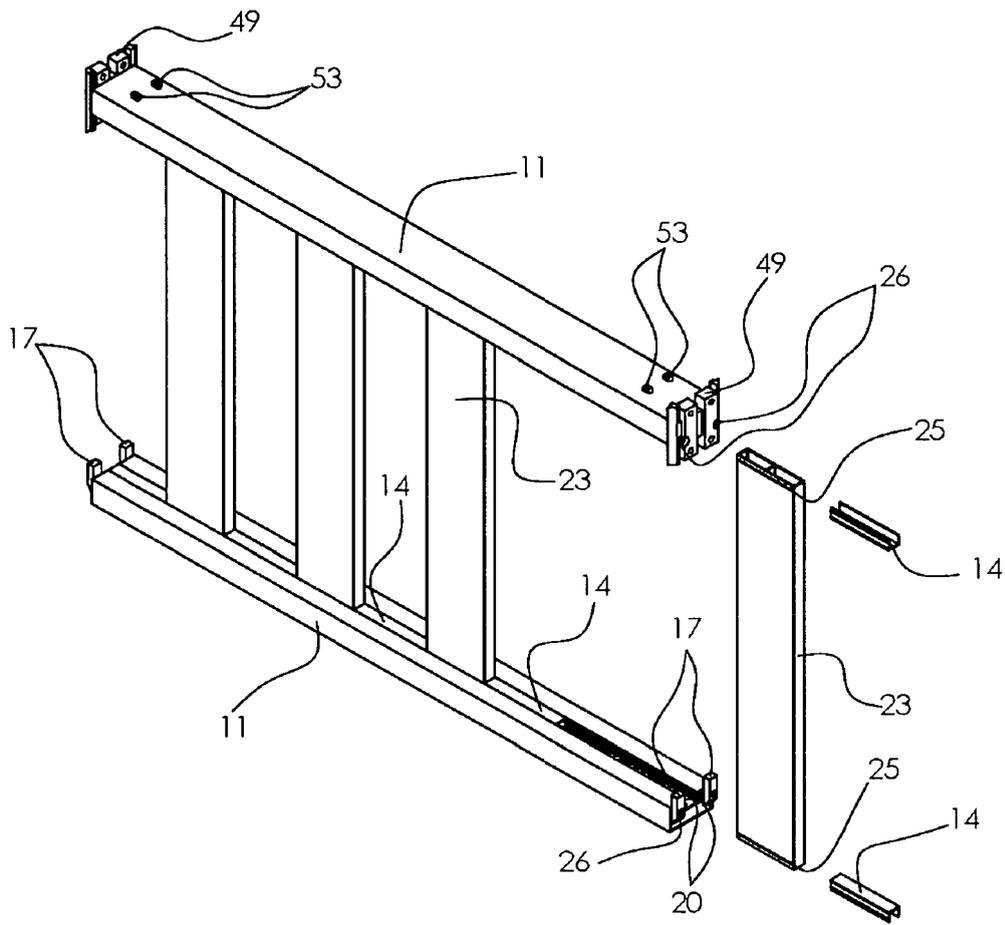


FIG. 7

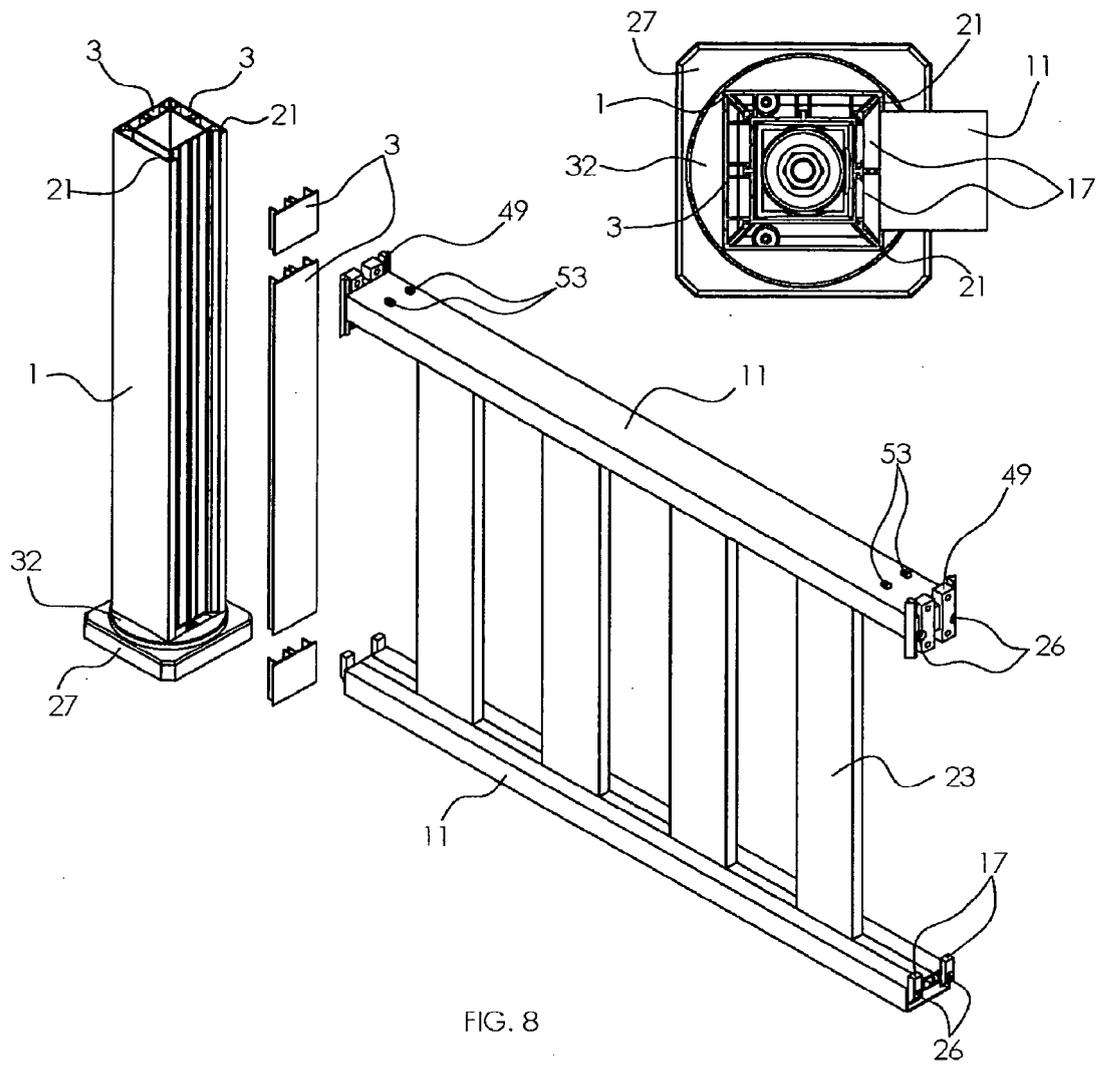


FIG. 8

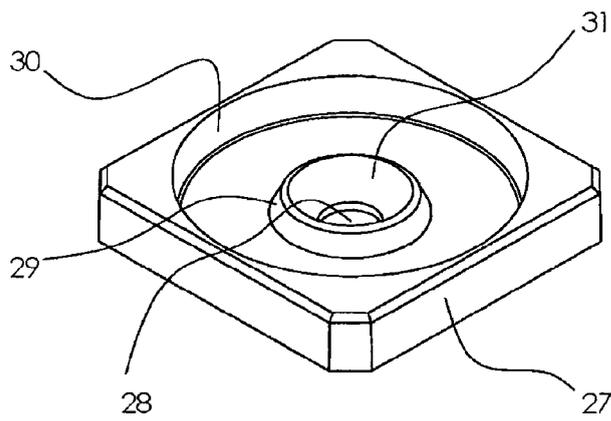


FIG. 9

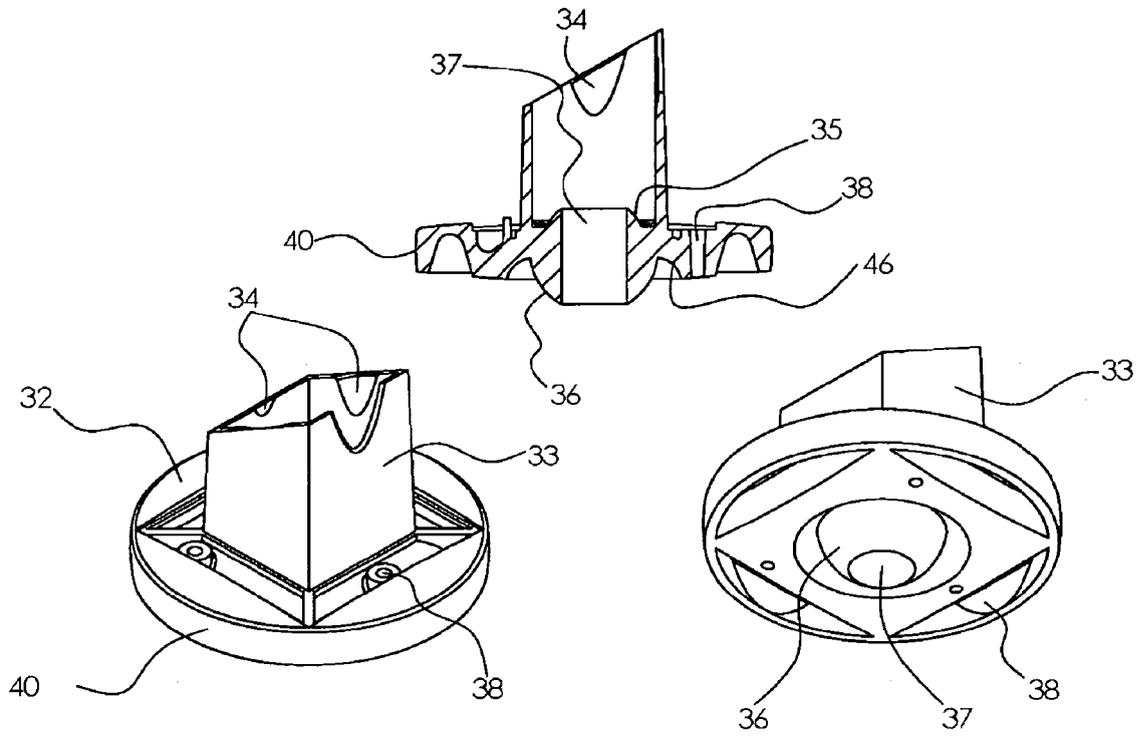


FIG. 10

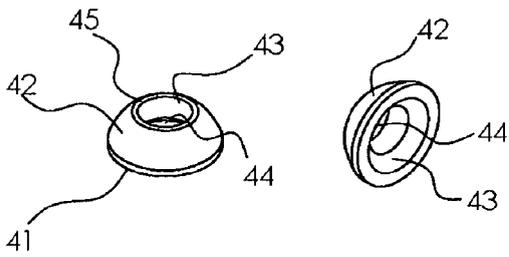


FIG. 11

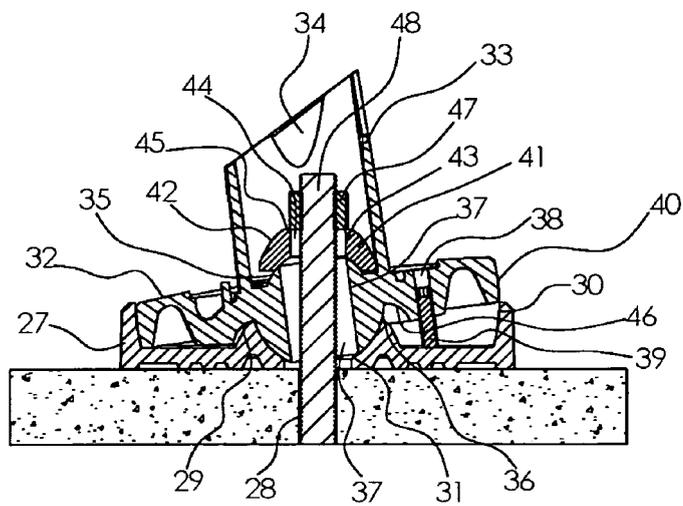


FIG. 12



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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 6 October 2008	Examiner Severens, Gert
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Place of search The Hague		Date of completion of the search 6 October 2008	Examiner Severens, Gert
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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