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(72) Inventors:  
• **Baldero Ferrandiz, Alejandro**  
**08032 Barcelona (ES)**  
• **Baldero Ferrandiz, Eduardo**  
**08032 Barcelona (ES)**

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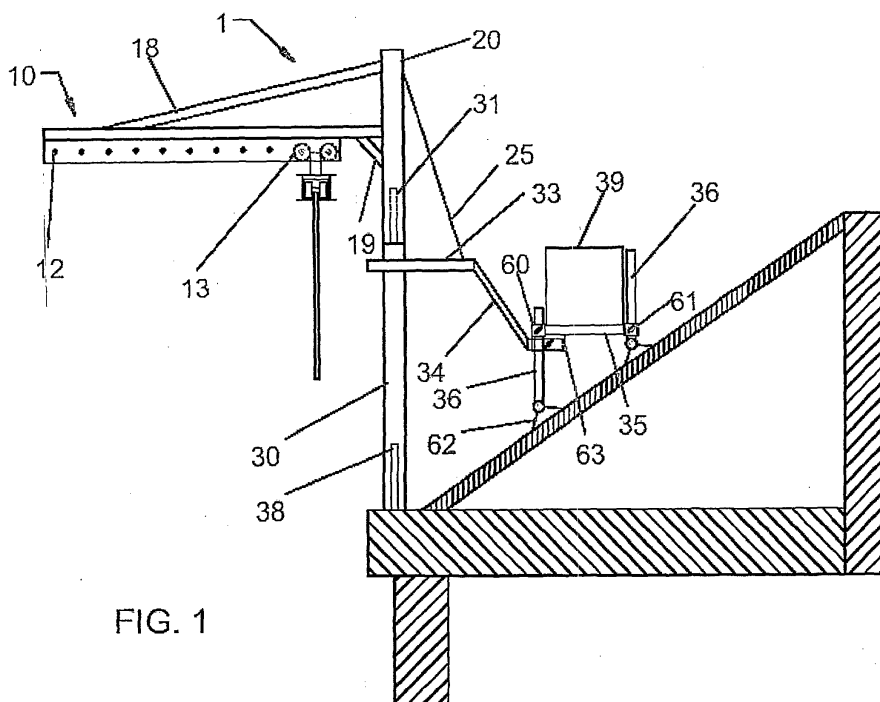
(71) Applicants:  
• **Baldero Ferrandiz, Alejandro**  
**08032 Barcelona (ES)**  
• **Baldero Ferrandiz, Eduardo**  
**08032 Barcelona (ES)**

(74) Representative: **Barlocchi, Anna**  
**Zea, Barlocchi & Markvardsen Patents**  
**C/Balmes, 30**  
**08007 Barcelona (ES)**

**(54) SUSPENDED SCAFFOLDING STRUCTURE FOR WORKS IN FACADES**

(57) It comprises two support assemblies (1) intended to be installed in the roof of a building, each of which has an anchoring system (35, 36, 39, 33, 34, 30) to the roof and a cantilevered arm (10) projecting perpendicular to the facade. The structure comprises a transversal

guide (45) which is associated with the arms (10) of the two assemblies (1) and which is placed horizontally and parallel to the facade, and a carriage (46) which can be moved along said transversal guide (45), and from which a harness for an operator is hung who therefore can be moved sideways along the facade.



**FIG. 1**

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## Description

**[0001]** The present invention relates to a suspended scaffolding structure, of the type used for carrying out painting, restoration works or the like in building facades.

**[0002]** Several disadvantages have been found in standard scaffoldings for carrying out works in building facades resting on the ground and allowing the operators to climb up: for example, the space taken up in the public way, the cost of the materials and the assembly or the risk that non authorised people can climb up the scaffoldings.

**[0003]** To avoid these disadvantages suspended scaffoldings have been developed having a structure which is much simpler and quicker to assemble and which do not require to be resting on the sidewalk, with the resulting advantages as for security.

**[0004]** One example of suspended scaffolding is described in the Spanish utility model application 200101733. The scaffolding described in this model consists of a frame resting on the building flat roof and onto which an appropriate counterweight is provided, and a structure with a vertical girder resting on the cornice and it is fastened to the frame by means of bars; a cantilevered arm is supported by the vertical girder, and the arm is provided with a hook from which an appropriate harness is suspended. With this harness, the operator can be lowered from the roof of a building and painting or restoration works may be carried out on the facade.

**[0005]** However, it has been found that this scaffolding suffers from a number of disadvantages: on the one hand, it can not be installed in buildings having sloped roofs and, on the other hand, it does not allow working in a satisfactory way on the whole facade since areas far from the scaffolding can only be reached by the operator by swinging herself/himself sideways.

**[0006]** The object of the present invention is to provide a suspended scaffolding having the advantages pointed out relative to the standard scaffoldings but not having the limitations described in connection with said utility model 200101733.

**[0007]** According to this object, the suspended scaffolding structure for works in facades in accordance with the present invention comprises at least one support assembly intended be installed in the roof of a building, each assembly comprising an anchoring system for anchoring to the roof and a cantilevered arm projecting perpendicular to the facade, and it is characterized in that it also comprises a transversal guide, associated with the arm and arranged horizontally and parallel to the facade, and a carriage which can be moved along said transversal guide and from which a harness for an operator is hung.

**[0008]** Due to the presence of the transversal guide, the operator can be moved sideways along the facade, so that a wide area thereof can be reached by her/him more easily without disassembling the scaffolding.

**[0009]** Advantageously, said arm comprises a front

guide, that is arranged horizontally and perpendicular to the facade, along which a carriage from which a support for said transversal guide is suspended can be moved.

**[0010]** Due to said front guide, displacement perpendicular to the facade is further possible allowing balconies and similar obstacles to be overcome.

**[0011]** According to a preferred embodiment of the invention, the structure comprises at least two of said support assemblies, installed at a distance from one another, the transversal guide being coupled to said supports in said support assemblies.

**[0012]** This scaffolding formed with several support assemblies and a transversal guide allows the operator to be moved to any point of the facade, and therefore carrying out all type of operations of maintenance and restoration.

**[0013]** In one embodiment, the support for the transversal guide comprises two I-shaped section bars defining a prismatic housing for the transversal guide, and means for tightening and splitting the section bars to one another at will.

**[0014]** This structure allows the guide to be assembled without requiring to be slid sideways from one end, so that the assembly of the structure is simplified.

**[0015]** Said means for tightening and splitting the section bars to one another at will may comprise respective corner pieces, each one being integral with one section bar, and one bolt for tightening the two corner pieces to each other.

**[0016]** According to one embodiment, the transversal guide is formed with several sections which are joined to each other by means of a joining piece; the different sections may be thus easily handled and the length of the facade which can be covered by the scaffolding is not limited.

**[0017]** Preferably, the arm is integral with a post that is pivotally fitted on a pivot provided at the end of a vertical girder in the anchoring system.

**[0018]** In this way, assembly of the arm is more comfortable and safer: in effect, the post can be placed on the pivot before placing the cantilevered arm and subsequently the arm can be rotated outwards.

**[0019]** In accordance with one advantageous embodiment, said anchoring system for anchoring to the roof comprises a frame with legs intended to support a counterweight, said legs being adjustable in height relative to the frame.

**[0020]** Leg adjustment in height allows the support assembly to be installed in any roof, even those having a steep slope.

**[0021]** For further understanding to what it has been set up, some drawings are herein accompanied in which, diagrammatically and only by way of non limitative example, a practical case of embodiment is shown.

In the drawings:

**[0022]**

Figure 1 is a side view of a support assembly in a suspended scaffolding according to one embodiment of scaffolding structure in accordance with the invention;

Figure 2 is a closer view of the suspended portion of the assembly in Fig.1; and

Figure 3 is a diagrammatic front view of a scaffolding according to the invention, installed on a flat roof with two support assemblies as those shown in Fig. 1.

**[0023]** According to one embodiment of the invention, a support assembly 1 in a scaffolding structure comprises a cantilevered, horizontal arm 10 welded to a post 20; the post is pivotally fitted on a pivot 31 provided at one end of a vertical girder 30. In order to safely support the arm 10 sideplates 18 and 19 are provided welded between it and the post 20.

**[0024]** The vertical girder 30, which may be provided with side bearing counterforts 38 coupled thereto, rests in the vicinity of the edge of the building flat roof, and it is secured in the manner that will be described below.

**[0025]** With the purpose of securing the vertical girder 30 a horizontal frame 35 is provided onto which an appropriate counterweight is placed 39; the frame 35 rests on legs 36, which may be telescopic or vertically slidable relative to the frame 35, for being adapted to sloped roofs, as shown in the figure 1, and having means for fastening them in a given position.

**[0026]** In the figure one embodiment can be seen in which legs 36 slip into square section bars 60 integral with the frame 35, and they can be secured by means of screws 61. Legs 36 are provided, at the lower end thereof, with feet 62 adjustable in slope.

**[0027]** A bar system 34 and 33 allows the vertical girder 30 and the frame 35 to be coupled to each other; for example, the bars 34 may be provided, at the free end thereof, with a horizontal extension that is coupled and secured to a housing 63 provided to that effect in the frame 35, while the bars 33 are rigidly coupled to the vertical girder 30 to the corresponding height, for example by means of screws.

**[0028]** A strut 25 extends from the bars 33 to the upper end of the post 20, for providing it with anchorage. For higher security, anchoring struts can extend from the upper portion of the post 20 to the building.

**[0029]** It is to be emphasized that this frame assembly system, which allows to be installed in a sloped roof, can be applied to any type of suspended scaffolding, for example the one described in said utility model 200101733.

**[0030]** The arm 10 and the suspended portion of the support assembly 1 will be described with more detail below in connection with the figure 2.

**[0031]** The arm 10 comprises a first Klein guide 11 (visible in the figure 3), horizontal and perpendicular to the building facade, along which a first carriage 13 moves and from which a support 40 is hung which, as it will be

seen further on, is intended to support a second Klein guide 45 arranged horizontally and parallel to the building facade.

**[0032]** As it will be seen, the first guide 11 will allow the operator a front displacement, that is to say, perpendicular to the facade, while the second guide 45 will allow her/him a lateral or transverse displacement, parallel to the facade.

**[0033]** A number of holes 12 are formed in the guide 11 into which a bolt (not shown) may be fitted acting as an abutment for the carriage 13.

**[0034]** The support 40 comprises two I-shaped section bars 41 defining a rectangular cross section prismatic housing for the guide 45. Each section bar 41 has a corner piece 42 and the two corner pieces 42 are joined through a bolt 43, allowing the two section bars 41 to be split up so that the guide 45 can be put into and extracted from the prismatic housing defined by them and then the section bars 41 to be securely tightened to each other, for safely securing the guide 45.

**[0035]** As it can be seen from the figure 3, for assembling the transversal guide 45 at least two support assemblies 1 are installed on the roof of a building as the one described in the preceding paragraphs, distanced from one another, so that the guide 45 rests on two or more supports 40. A second carriage 46 moves along the guide 45, from which a climber harness is hung for the operator who must carry out the works in the facade. As with the guide 11, the guide 45 has, in the vicinity of the ends, adjustable means for restraining the displacement of the carriage 46 in its interior.

**[0036]** The assembly has been shown in the figure 3 installed on a flat roof for a greater clarity; the assembly on a sloped roof would be similar.

**[0037]** In practice, the guide 45 is formed with approximately three meter long sections, each one of which is suspended from a support assembly 1 in the same manner which has been described. For attaching the different sections of the guide 45 to each other, joining pieces 50 have been provided (figure 3) which configuration is similar to that of the supports 40: that is to say, consisting of two I-shaped section bars, each one with a couple of corner pieces attached to each other by bolts allowing opening and closing the support.

**[0038]** The assembly of this scaffolding structure is carried out as follows.

**[0039]** First, two or more support assemblies 1 are installed in the roof, depending on the facade length where it is desired to work on. This assembly is carried out in the manner described below.

**[0040]** First the frame 35 is mounted and levelled by means of the adjustable legs 36; the frame 35 is fastened to the roof by means of struts or the like, and a counterweight 39 is placed thereon.

**[0041]** Subsequently, with a portion of the structure already anchored to the roof, the vertical girder 30 is placed in an upright position and it is fastened to the frame 35 by means of the bars 33 and 34.

[0042] Subsequently, the assembly formed by the post 20, the arm 10 and the support 40 is installed on the pivot 31; this operation is carried out in a simple and sure way, since it can be done with the arm 10 directed toward the interior of the roof. Then the arm 10 is taken outwards rotating the post 20 on the pivot 31, and the strut 25 and the other anchoring struts are fastened to the roof (not shown).

[0043] When two or more support assemblies 1 have been installed, it is proceeded to place the sections of the guide 45 in the supports 40 and to join them by means of the joining piece 50.

[0044] Once the scaffolding structure has been assembled, the operator puts on the harness suspended from the guide 45 and she/he can already be hung to carry out the works on the facade, with the advantages that the displacement of the first carriage 13 along the guide 11 allow her/him to overcome balconies and the displacement of the second carriage 46 along the guide 45 allows her/him to be moved horizontally along the whole facade. For this displacement the operator leans on with her/his feet against the facade.

[0045] The invention has been described relating to a particular embodiment, but those skilled in the art will be able to easily imagine variations and modifications of particular aspects of the invention which will be also included within the scope of protection defined by the appended claims.

[0046] For example, for the assembly of the support assemblies 1 in walled or handrailed roofs it may be provided that the vertical girder 30 rests against the wall for the outside, instead of resting on the roof, in a like manner to that described in the previously mentioned utility model 200101733. Other possible variants are the particular shapes of the different bars in the structure, as well as the means for mutually attaching them.

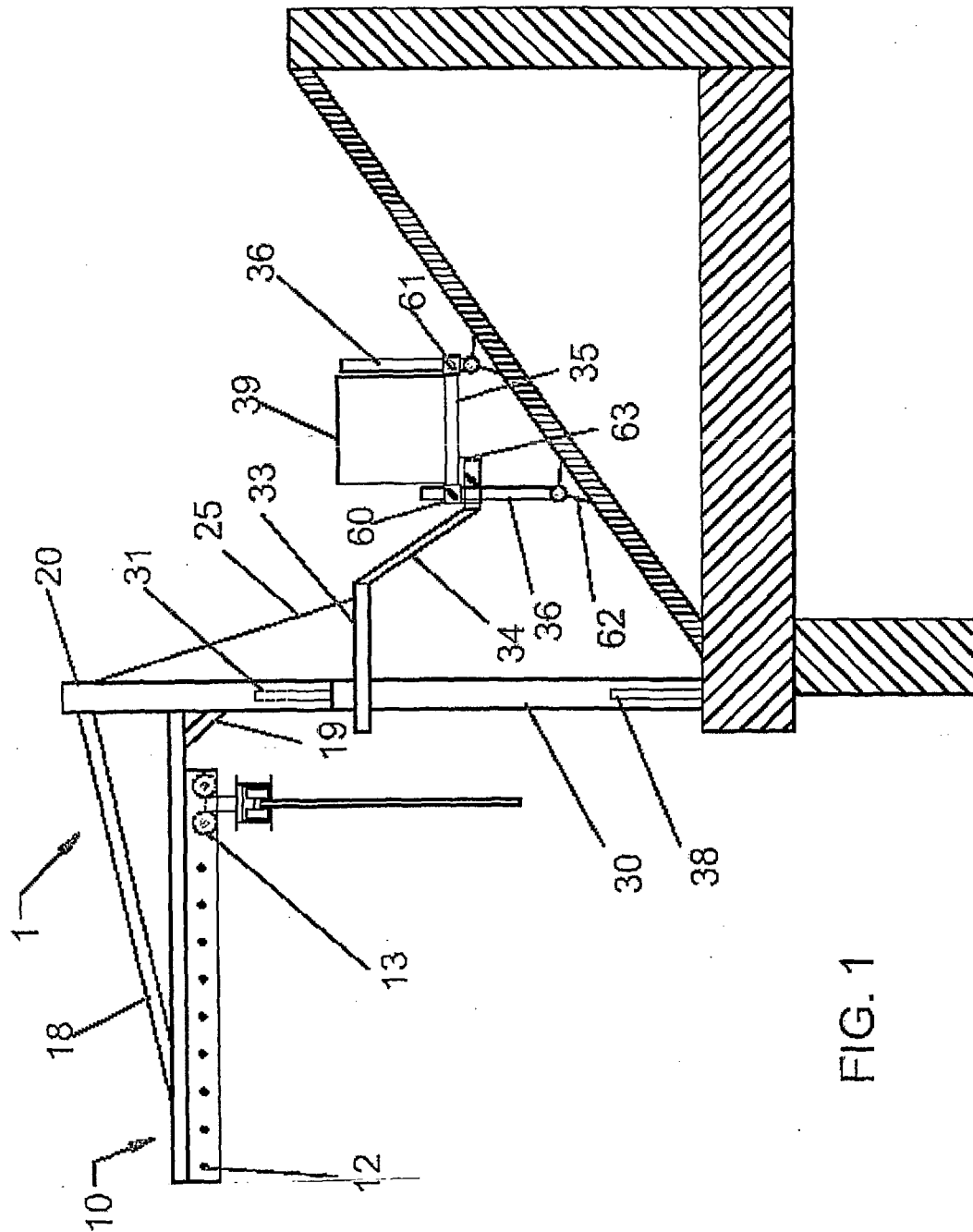
[0047] Finally, it is necessary to highlight that the anchoring system for anchoring to the roof which has been described comprising the frame 35 with legs 36 intended to support the counterweight 39, the legs 36 being adjustable in height relative to the frame 35, although its use has been envisaged in combination with the scaffolding structure according to the present invention, it could be further applied to any other type of structures intended to be mounted in sloped roofs, such as cranes or the like.

## Claims

1. Suspended scaffolding structure for works in facades comprising at least one support assembly (1) intended to be installed in the roof of a building, each assembly (1) comprising an anchoring system (35, 36, 39, 33, 34, 30) for anchoring to the roof and a cantilevered arm (10) projecting perpendicular to the facade, **characterized in that** it also comprises a transversal guide (45), associated with the arms (10)

of this assemblies (1) and being placed horizontally and parallel to the facade, and a carriage (46) which can be moved along said transversal guide (45) and from which a harness for an operator is hung.

2. Structure as claimed in claim 1, **characterized in that** said arm (10) comprises a front guide (11) that is arranged horizontally and perpendicular to the facade, along which a carriage (13) may be moved from which a support (40) for said transversal guide (45) is suspended.
3. Structure as claimed in claim 2, **characterized in that** it comprises at least two of said support assemblies (1), installed at a distance from one another, said transversal guide (45) being coupled to said supports (40) of said support assemblies (1).
4. Structure as claimed in any of the claims 2 or 3, **characterized in that** said support (40) for the transversal guide comprises two I-shaped section bars (41) defining a prismatic housing for the transversal guide, and means (42,43) for tightening and splitting the section bars (41) to one another at will.
5. Structure as claimed in claim 4, **characterized in that** said means (42,43) for tightening and splitting the section bars (41) to one another at will comprises respective corner pieces (42), each one being integral with one section bar (41), and a bolt (43) for tightening the two corner pieces (42) to each other.
6. Structure as claimed in any of the preceding claims, **characterized in that** the transversal guide (45) is formed with several sections which are joined to each other by means of a joining piece (50).
7. Structure as claimed in any of the preceding claims, **characterized in that** the arm (10) is integral with a post (20) that is pivotally fitted on a pivot (31) provided at the end of a vertical girder (30) of the anchoring system (35, 36, 39, 33, 34, 30).
8. Structure as claimed in any of the preceding claims, **characterized in that** said anchorage system for anchoring to the roof comprises a frame (35) with legs (36) intended to support a counterweight (39), said legs (36) being adjustable in height relative to the frame (35).



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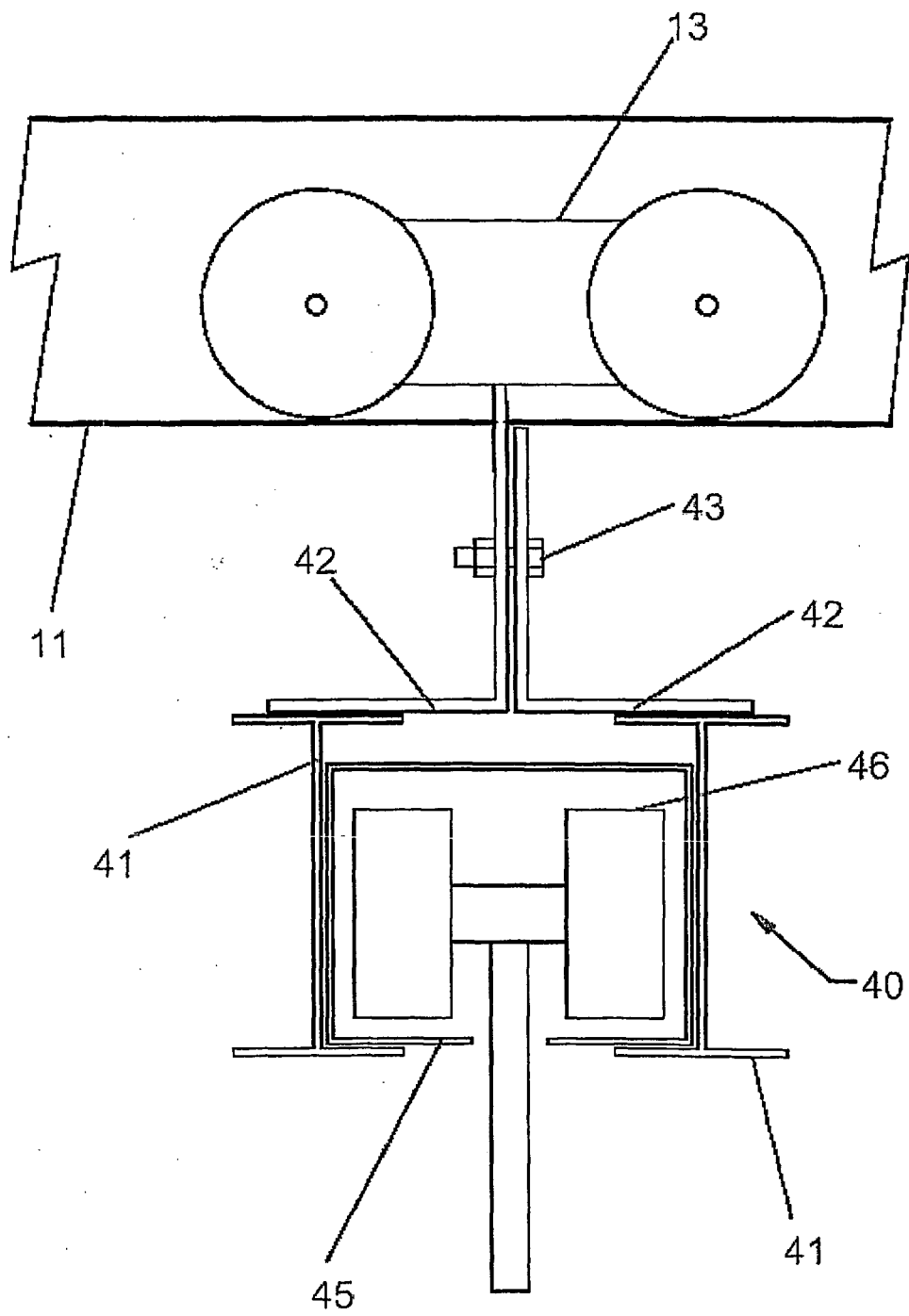


FIG. 2

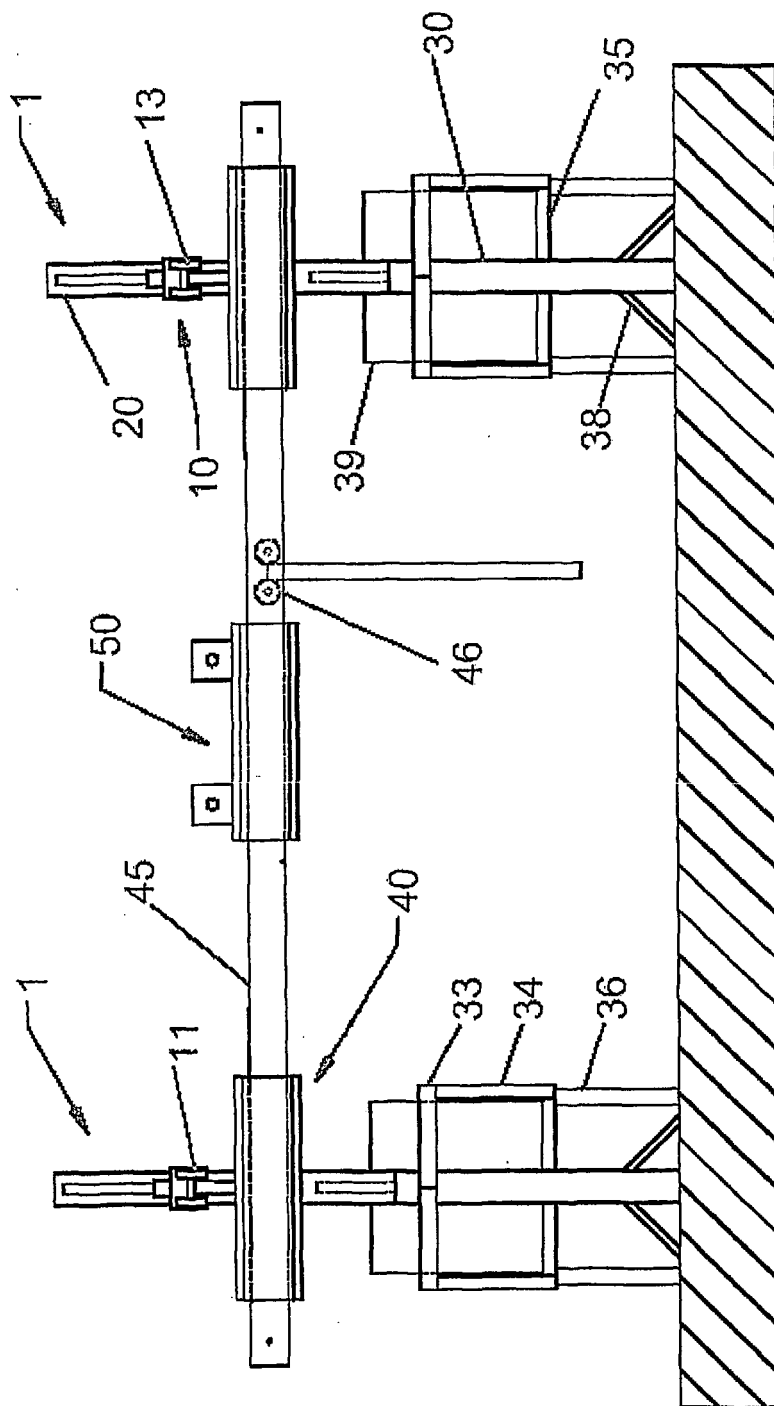


FIG. 3

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/ ES 2004/070038

A. CLASSIFICATION OF SUBJECT MATTER		
IPC7 E04G3/10		
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)		
IPC7 E04G3/10		
Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched		
Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)		
CIBEPAT,EPODOC, PAJ, CIBEPAT, COUNTERWEIGHT,COUNTERBALANCE, ROOF, TERRACE,		
C. DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	CH355599A 15.07.1961 BITTEL. Abstract, figures.	1-4,8
A	JP7081894A TOSHISUKE 28.03.1995 (abstract) (online) (retrieved 21.07.2004) Retrieved from EPO PAJ Database.	1,2
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A	FR1289700A 06.04.1962 FOSSIER&ALLARD Whole document.	
A	DE29517097U 15.02.1996 MANNESMANN Figures.	
A	DE3201073A 21.04.1983 MANNESMANN Abstract, figures.	
<input type="checkbox"/> Further documents are listed in the continuation of Box C. <input checked="" type="checkbox"/> See patent family annex.		
* Special categories of cited documents: "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art "&" document member of the same patent family		
Date of the actual completion of the international search 27 July 2004 (27.07.04)		Date of mailing of the international search report 02 August 2004 (02.08.04)
Name and mailing address of the ISA/ S.P.T.O.		Authorized officer
Facsimile No.		Telephone No.

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**INTERNATIONAL SEARCH REPORT**  
 Information on patent family members

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