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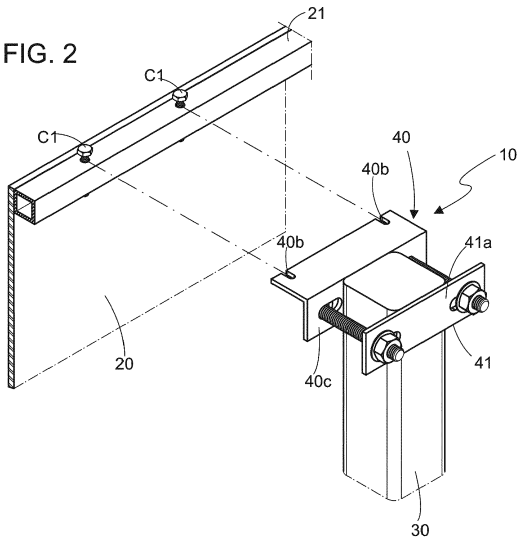
# (54) COLLAPSIBLE SECURING ELEMENT FOR A VERTICAL SIGNAGE PLATE

(57) The present securing element (10) pertains to devices and fittings used to mount road (20) and highway signage on posts (30); the collapsible securing element (10) comprises two basic members, namely a first, mounting member (40) based on an "L" profile, i.e. with a branch (40a) provided with at least one pair of cutouts (40b) of oblong format made in the elongate free edge (40c) and an orthogonal branch (40c) provided with at least two oblong orifices (01); a second member (41) for securing or locking the collapsible securing element (10) is obtained from a straight profile (41a) provided with at least a further two oblong orifices (02) that correspond axially to the orifices (01) of the orthogonal branch (40c) such that the latter is held parallel to the profile (41a) of the member (41); said orifices (01) and (02) are traversed by locking screws (PF1) such as to maintain an adjustable space (x) between the two, capable of receiving and of securing the members (40) and (41) to the post (30) by washer (A1) and nut (P1) means; to supplement the collapsible securing element (10), provision is made for at least one pair of screw (PF2) and nut (P2) assemblies, which are secured to the cross member or frame (21) of the signage plate (20) such as to maintain a space (y) corresponding to the thickness of the branch (40a).

FIG. 2




EP 3 825 463 A1

## Description

### TECHNICAL FIELD

**[0001]** The present invention patent deals with a collapsible securing element applied to a vertical signage plate, more specifically to the type of signage for urban roads and/or highways where, notably, one or more innovative securing elements is designed for the fastening of the signage plate vertical to the support, preferably provided for in document no. BR10.2014.018190-3 or equivalent, in order to keep said plate fixed and rigidly positioned in relation to the support post, being able to be exposed to its own loads and efforts under the action of the wind or other inclement weather; the intrinsic and innovative characteristics of the securing element in question allow for its immediate collapse when a vehicle crashes into one of the support posts of the plate, thus ensuring that when the aforementioned collision occurs, the post/support and part of the collapsible securing element are totally detached from the plate, which, in turn, is maintained supported by the other post, preventing the plate from falling on the hood or roof of the vehicle and causing greater damage to the vehicle's body and its occupants, as well as preventing the signage from bending and hitting pedestrians near the event site.

### BACKGROUND OF THE INVENTION

**[0002]** The increase in the fleet of vehicles in circulation requires public safety and maintenance actions to guarantee reduction of the mortality of drivers/passengers on highways, as well as the predictability of containment devices installed in highways to protect the user by containing, redirecting vehicles and/or absorbing energy from the impact, thus reducing the severity of the accident.

**[0003]** The NBR15486 traffic safety standard of 03/2016 establishes collapse device design guidelines for reducing the severity of impact using an appropriate collapsible device and containment devices to protect the hazard from the obstacle with a lateral containment device, or with an impact attenuator device, as well as acceptance criteria for these devices by means of impact tests, in order to guarantee their performance. This technical standard applies to all new road projects, duplications, reconstructions or geometrical adjustments.

**[0004]** Thus, the standard considers that road containment devices, in general, may be necessary due to the existence of fixed obstacles, the existence of critical, non-recoverable and non-overpassing slopes, lateral drainage structures, the presence of vulnerable users, such as pedestrians and cyclists, and any other situation that requires the containment of errant vehicles.

**[0005]** In the same way, vehicular circulation also requires signposts to inform drivers about road conditions, prohibitions, restrictions or obligations, such as vertical signage, which is a subsystem of road signage and uses signs fixed on plates secured in the vertical position, on the side or suspended on the road, transmitting messages of a permanent or, eventually, variable character, by means of pre-established and legally established symbols and/or captions.

**[0006]** The most suitable materials to be used as substrates for making signage signs are steel, aluminum, reinforced plastic and immunized wood, while the supports can be made of steel and immunized wood or other materials that have physical and chemical properties that guarantee their original characteristics throughout their useful life in any climatic condition. As an example of a plate support post, the support of the same applicant, part of the document no. BR10.2014.018190-3 that deals with support for vertical signage plate obtained from the composition of recycled high-density polyethylene - HDPE-, ground rubber obtained by recycling tires, and 'XLPE' from recycling of electric cables, being that these elements can be aggregated in different proportions composing at least three formulas.

**[0007]** Another extremely important factor refers to the configuration of the current means of fixing the signaling plate to the support/post, since, as is known, the fixing elements must be constituted with a certain rigidity in order to prevent the release or displacement of the identification plate involuntarily, such as by means of winds. Thus, some conventional securing elements are formed by a steel bar fixed by means of screws on the surface of the plate and where a part of the receiver clamp of the other part is welded when mounted on the post.

**[0008]** However, a current problem consists in the fact that the securing elements do not collapse during the possible impact of a vehicle on the signage against the support post, allowing such post to simply bend, bringing with it the aforementioned plate that, naturally, tends to fall on the body of the car or can even enter through the windshield of the impacted vehicle, thus causing serious injuries or even the death of the vehicle's occupants.

**[0009]** Undoubtedly, conventional fixing elements of signage to posts do not prevent the sign from coming off the post at the moment of a possible impact, thus increasing the probability of serious accidents.

**[0010]** Likewise, in the event that the plate, support and fixing element components give in during the possible impact of a vehicle, the deceleration obtained does not present levels acceptable to the International Passive Safety Standards.

### BACKGROUND OF THE PRIOR ART

**[0011]** In research carried out in specialized databases, documents were found referring to signage fixing elements, such as document No. MU 8201513-9, which deals with a set for securing a signage plate to a post or other; the plate is made of fiberglass; the plate securing set in the implantation medium is essentially comprised of a "C" section profile(s), the outer face of which is glued to the back face of the plate without the need for drilling it; by two sets of screw, nut and sliding washer; fixed by

locking the profile in "C"; by a clamp in the form of a belt that girds the support medium and is provided with receptive holes at the ends of the respective screws that receive the nut and washer sets; said means of support being used in any signage plates that are in public places and similar, such as poles, spikes, frames and others.

**[0012]** Document No. PI 9103972-0 deals with support for fixing signage and panels and displaying visual information, consisting of a monoblock piece, where a signage plate or panel is inserted, fixed by a pin and cotter pin or screw and plug in a hole in the wall or by screw and plug in a hole in the wall or ceiling.

**[0013]** Document No. GB1461111 deals with a clamp to mount the road sign plate on a support; it is similar to a clamp with flexible strap, clamping screw and other hardware.

**[0014]** The documents mentioned in the paragraphs above serve as examples of the current state of the art and, therefore, do not represent impediments in relation to the object now improved, thus ensuring that the said collapsible securing element meets the legal requirements for patentability.

## OBJECTIVES OF THE INVENTION

**[0015]** It is, therefore, objective of the present invention patent to present a collapsible securing element for a vertical signage plate, of the type of signage for urban roads and/or highways, that aggregates both the fixation to the pole in a permanent and appropriate position, in orderto withstand its own loads and efforts under the action of wind or other weather conditions, as well as allowing its immediate collapse in the event of impact caused by a vehicular accident or similar, guaranteeing the immediate detachment of the signage plate attached to the support preferably provided for in document No. BR10.2014.018190-3 or equivalent.

**[0016]** It is the objective of the patent to present a collapsible securing element with innovative and simplified construction characteristics that allows for easy installation on pre-existing posts and signage plates.

**[0017]** It is the objective of the patent to present a collapsible securing element resistant to wind forces.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0018]** To complement the present description in order to obtain a better understanding of the characteristics of the present invention and according to a preferred embodiment thereof, attached is a set of drawings, where, in an exemplified, though not limiting, way, its operation was represented:

Figure 1 represents an exploded perspective view of the component parts of the collapsible securing element in question;
Figure 1A represents a perspective view of the assembled securing element with an amplified securing screw;
Figure 2 shows a perspective view of the assembled securing element and amplified in relation to the signage post;
Figure 2A represents a perspective view of securing elements applied to posts and signage plates;
Figure 2B shows a perspective view of the securing element applied to the pole and signage plate;
Figure 2C shows sectional view A.A indicated in the previous figure;
Figure 3 shows a side view of the securing element applied to the signage plate and post and respective detail enlarged;
Figure 3A shows a top view of the securing element installed on the post and plate;
Figure 4 shows a perspective view of the impact of a vehicle on the pole and the collapse of the securing elements in relation to the plate;
Figures 5, 5A and 5B show side views of the vehicle's impact on the pole illustrating the collapse of the securing elements;
Figures 6 and 6A represent enlarged details of the securing elements after collapse and the securing screw attached to the structural frame of the plate.

## DETAILED DESCRIPTION OF EMBODIMENTS

**[0019]** With reference to the illustrated drawings, the present invention patent refers to a "COLLAPSIBLE SECURING ELEMENT FOR A VERTICAL SIGNAGE PLATE", securing element (10) pertaining to devices and fittings used to mount road (20) and highways signage on posts (30) as foreseen in document No. BR10.2014.018190-3.

**[0020]** According to the present invention, the securing element (10) is collapsible (see figures 5 to 6A) when a vehicle (VL) hits the post (30), immediately detaching the signage plate (20) from the post (30) preventing it from falling on the impacted vehicle (VL).

**[0021]** Said collapsible securing element (10) comprises two basic members made of galvanized steel or similar, namely a first mounting member (40) based on an "L" profile, that is, with a branch (40a) provided with at least at least one pair of cutouts (40b) of oblong format made in the elongate free edge (40c) and an orthogonal branch (40c) provided with at least two oblong orifices (O1); a second member (41) for securing or locking the collapsible securing element (10) is obtained from a straight profile (41a) provided with at least a further two oblong orifices (02) that correspond axially to the orifices (O1) of the orthogonal branch (40c) such that the latter is held parallel to the profile (41a) of the member (41). Said orifices (O1) and (02) are traversed by locking screws (PF1) such as to maintain an adjustable space (x) between the two, capable of receiving and of securing the members (40) and (41) on the post (30) by washer (A1) and nut (P1).

**[0022]** To supplement the collapsible securing element

(10), provision is made for at least one pair of screw (PF2) and nut (P2) assemblies, which are secured to the cross member or frame (21) of the signage plate (20) such as to maintain, between the head (CI) of the screw (PF2) and the upper wall of the frame (21), a space (y) (see Figures 2C and 6A) capable of receiving the oblong cutout (40b) of the branch (40a).

**[0023]** Thus, with the securing element (10) mounted on the post (30) by locking screws (PF1) and on the signage plate (20) by screws (PF2), any eventual vehicle collision (VL) on the post to the point of breaking or bending it (see figures 4, 5, 5A, 5B and 6A), the securing element (10), by means of the oblong cutouts (40b) detaches from the screws (PF2) fixed to the frame (21), allowing the rest of the fixture to follow the displacement of the post (30). The other pole (s) (30) that did not receive the impact of the vehicle keeps its securing elements (10) firmly positioned, guaranteeing the stability of the signage plate (20), thus avoiding the plate to fall on the vehicle.

**[0024]** It is certain that when the present invention is put into practice, modifications can be made with respect to certain details of construction and shape, without any implications to the fundamental principles that are clearly substantiated in the claim framework, thus being understood that the terminology used was not intended to be limiting.

## Claims

1. **"COLLAPSIBLE SECURING ELEMENT FOR A VERTICAL SIGNAGE PLATE",** securing element (10) pertaining to devices and fittings used to mount road (20) and highway signage on posts (30); ***characterized*** **by** collapsible securing element (10) comprises of two basic members, namely a first, mounting member (40) based on an "L" profile, i.e. with a branch (40a) provided with at least one pair of cutouts (40b) of oblong format made in the elongate free edge (40c) and an orthogonal branch (40c) provided with at least two oblong orifices (O1); a second member (41) for securing or locking the collapsible securing element (10) is obtained from a straight profile (41a) provided with at least a further two oblong orifices (02) that correspond axially to the orifices (O1) of the orthogonal branch (40c) such that the latter is held parallel to the profile (41a) of the member (41); said orifices (O1) and (02) are traversed by locking screws (PF1) such as to maintain an adjustable space (x) between the two, capable of receiving and of securing the members (40) and (41) to the post (30) by means of washer (A1) and nut (P1); to supplement the collapsible securing element (10), provision is made for at least one pair of screw (PF2) and nut (P2) assemblies, which are secured to the cross member or frame (21) of the signage plate (20) such as to maintain a space (y) corresponding to the thickness of the branch (40a).

2. **"COLLAPSIBLE SECURING ELEMENT FOR A VERTICAL SIGNAGE PLATE"**, according to claim 1, ***characterized*** **in that** the securing element (10) is installed between the post (30) and the signage plate (20).

3. **"COLLAPSIBLE SECURING ELEMENT FOR A VERTICAL SIGNAGE PLATE"**, according to claim 1, ***characterized*** **in that** the collapsible securing element (10) when receiving an impact, keeps the members (40) and (41) mounted to the post (30).

4. **"COLLAPSIBLE SECURING ELEMENT FOR A VERTICAL SIGNAGE PLATE"**, according to claim 1, ***characterized*** **in that** the collapsible securing element (10) when receiving an impact, keeps the screws (PF2) attached to the frame (21).

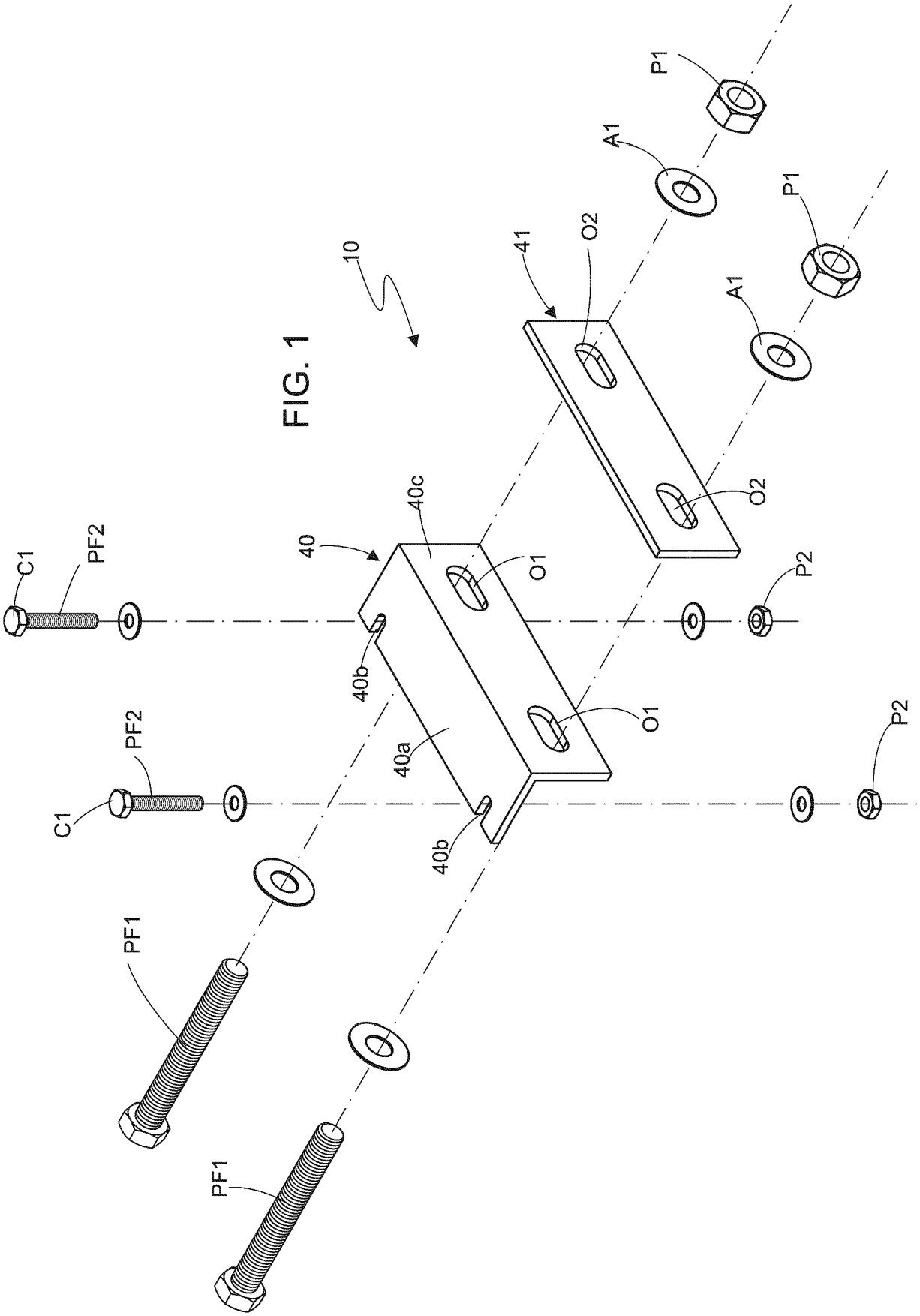



FIG. 1

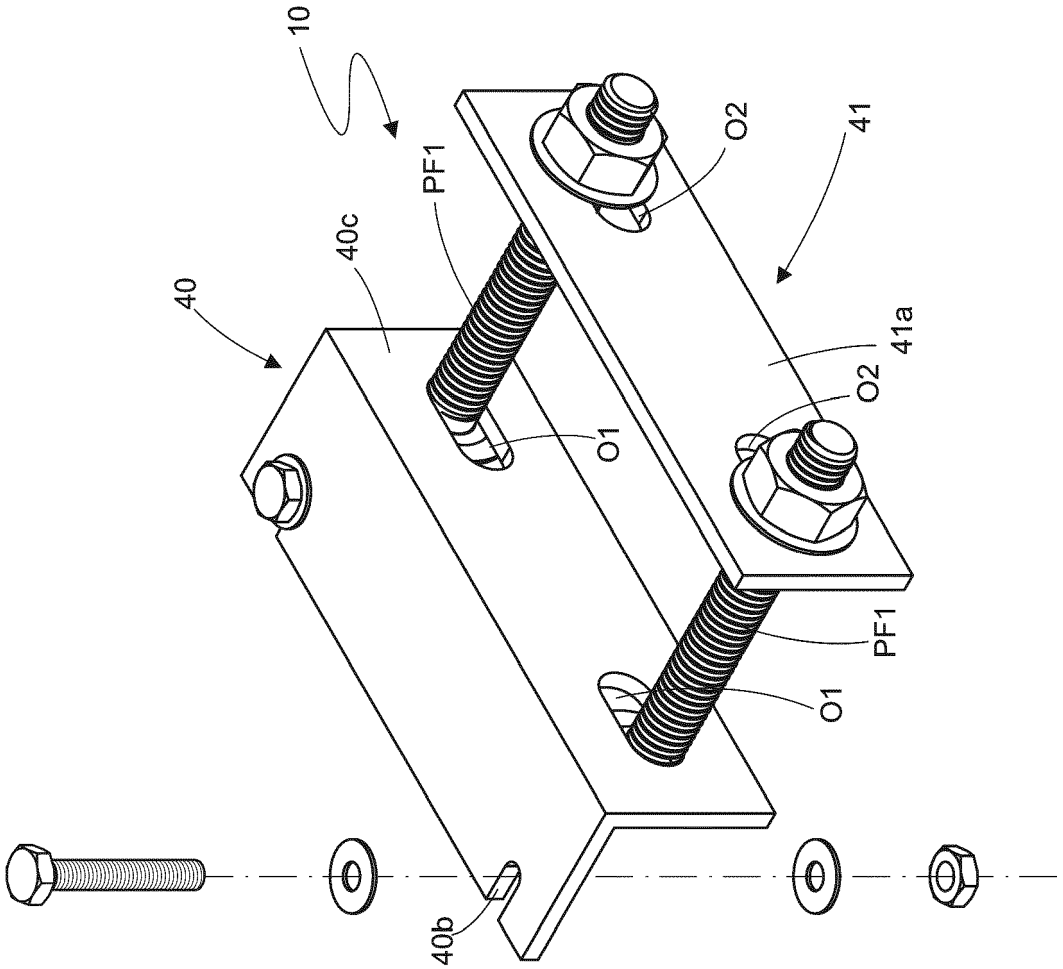



FIG. 1A

FIG. 2A

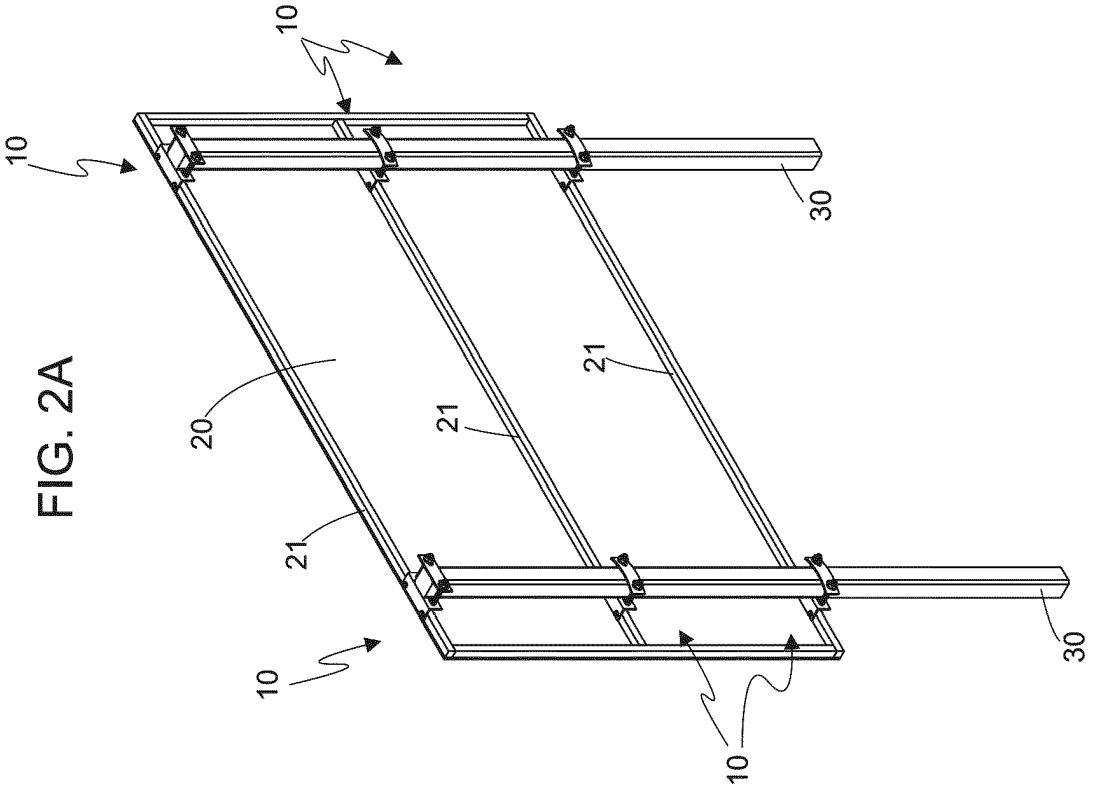



FIG. 2

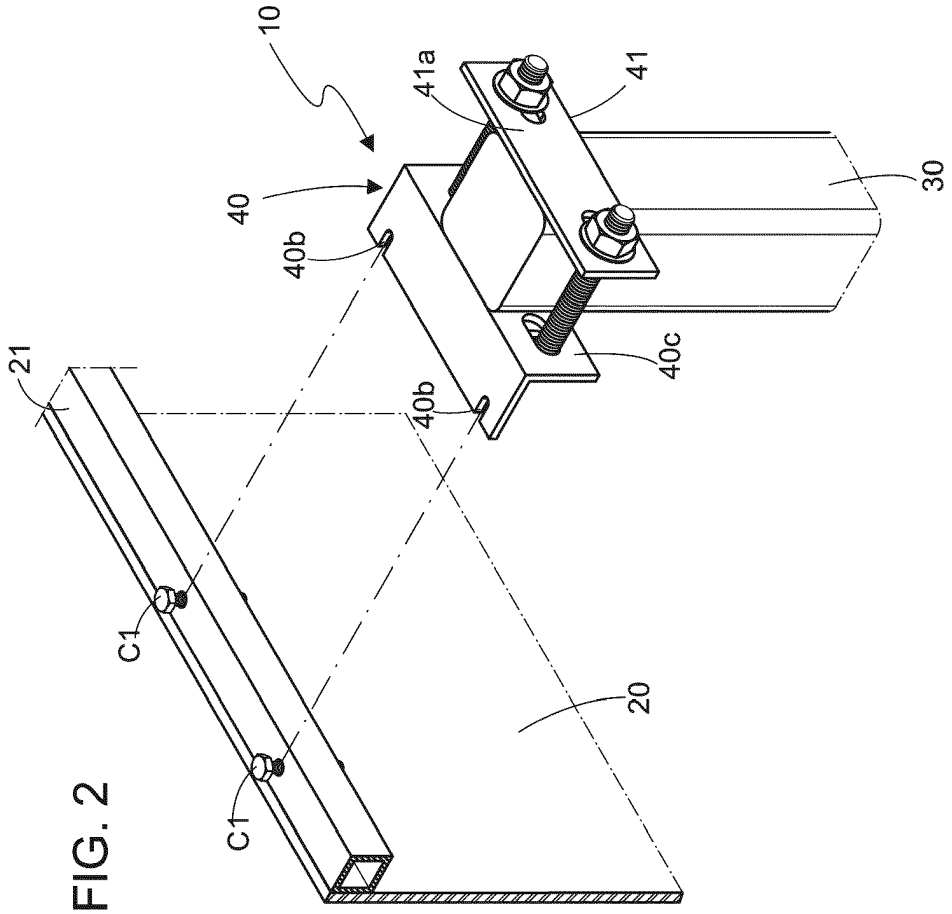


FIG. 2B

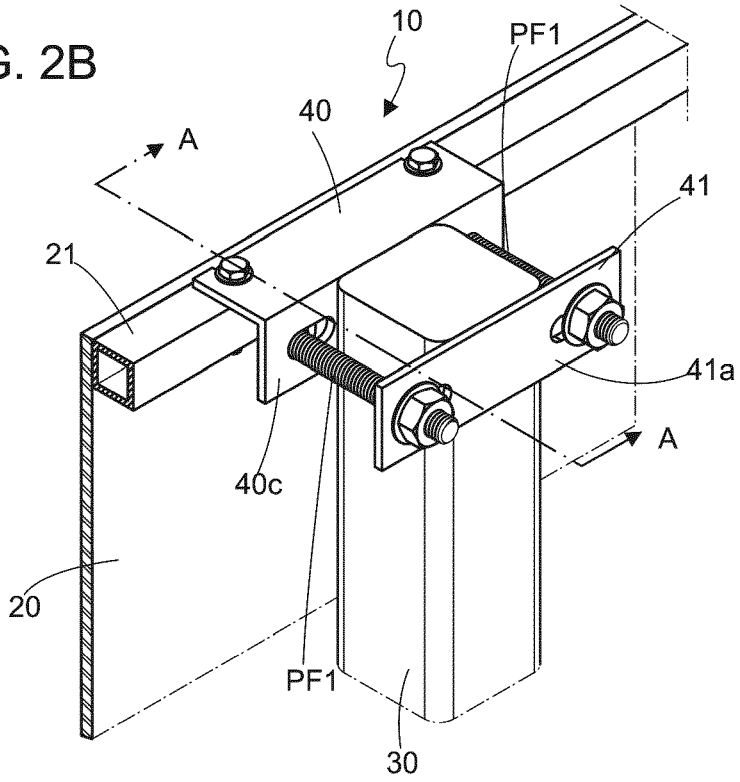
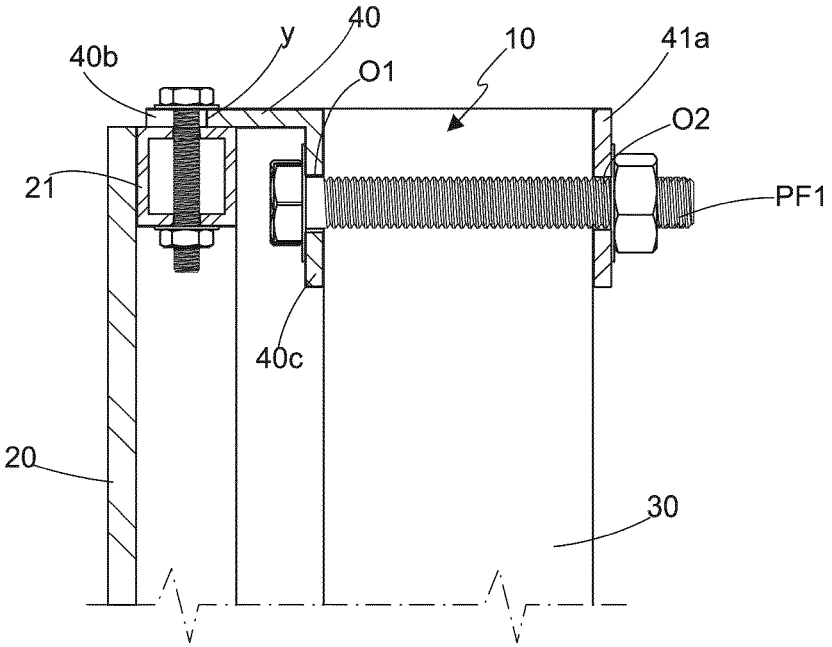



FIG. 2C
Cross Section AA



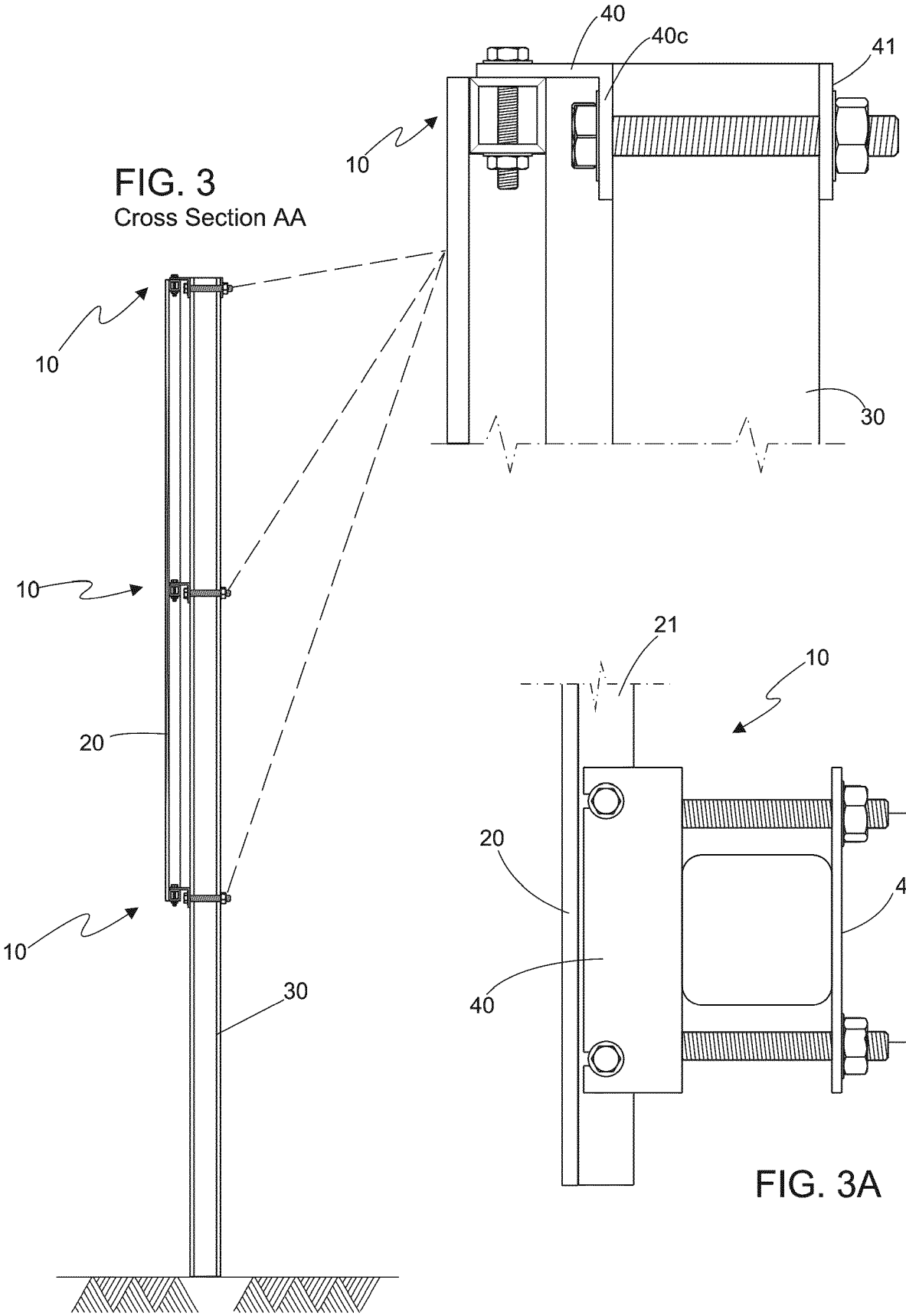



FIG. 3
Cross Section AA




FIG. 3A

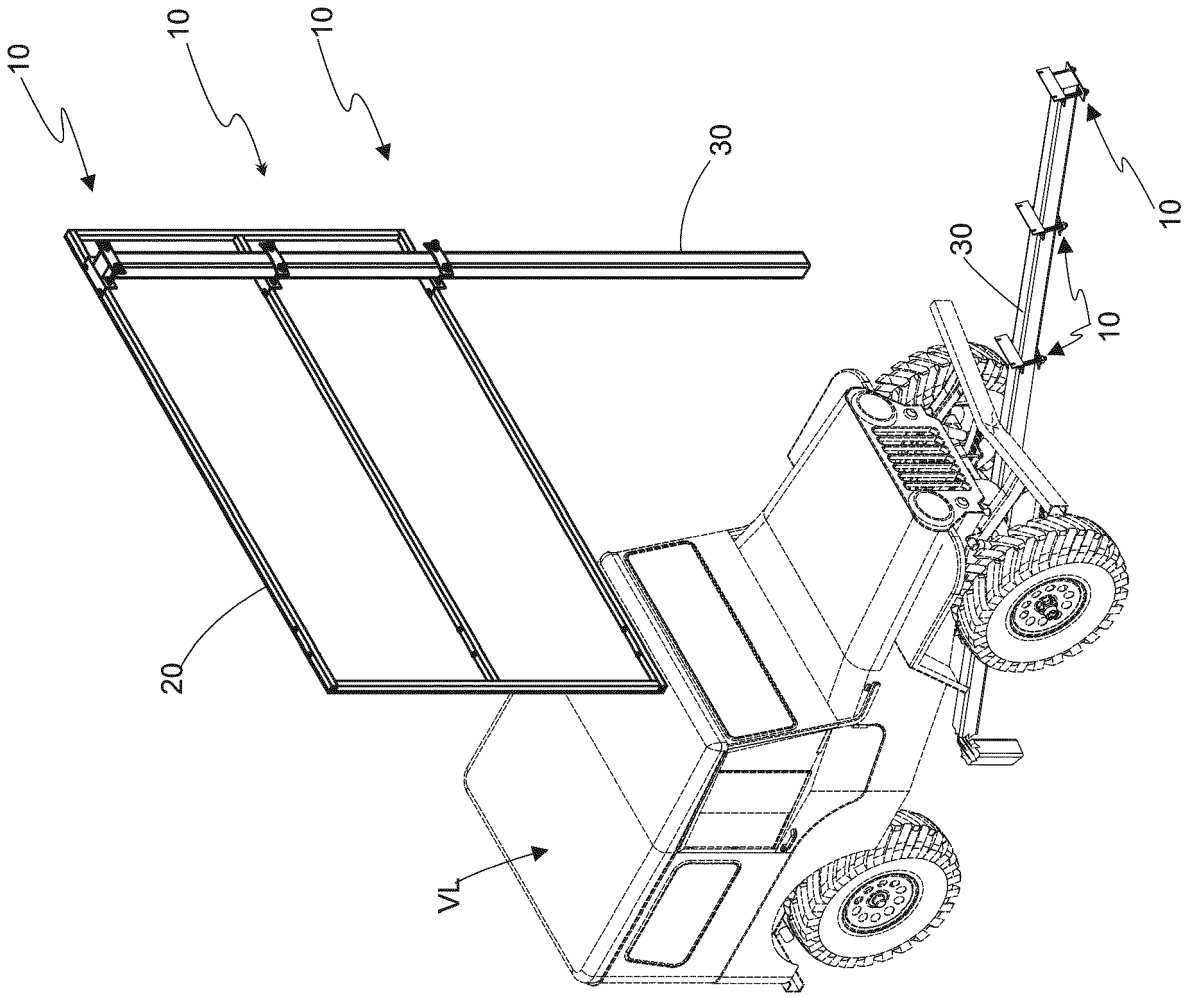



FIG. 4

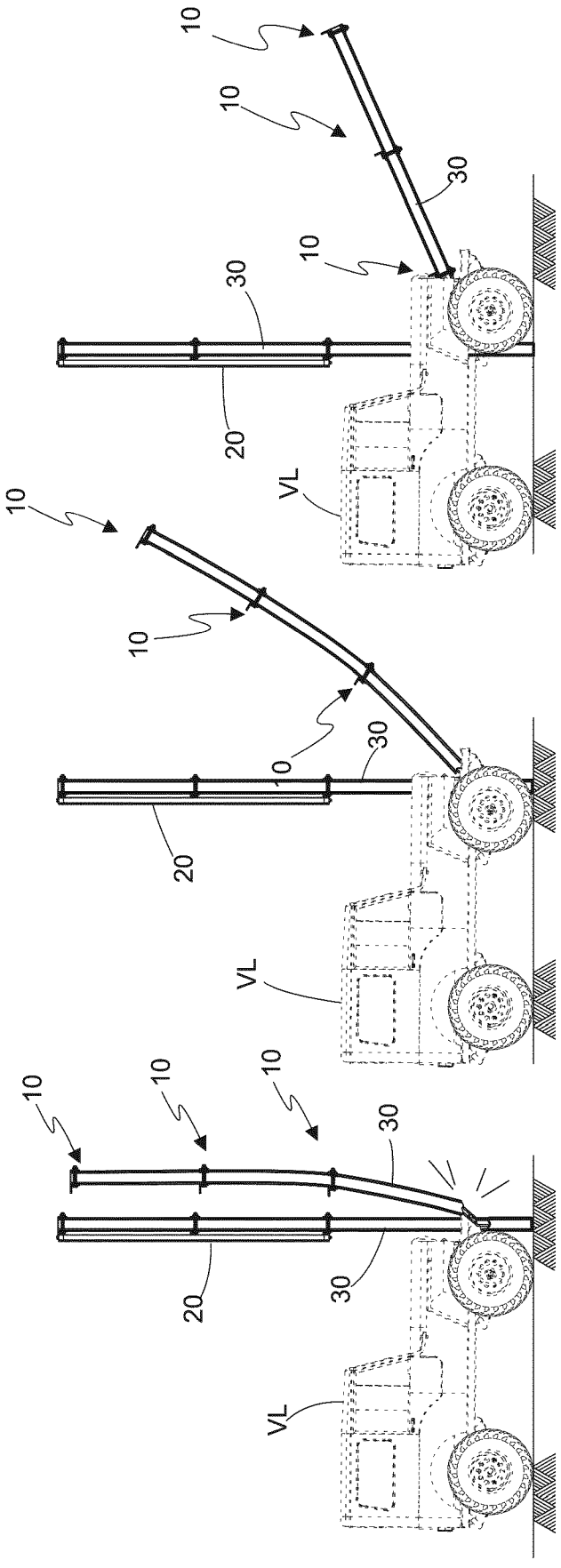
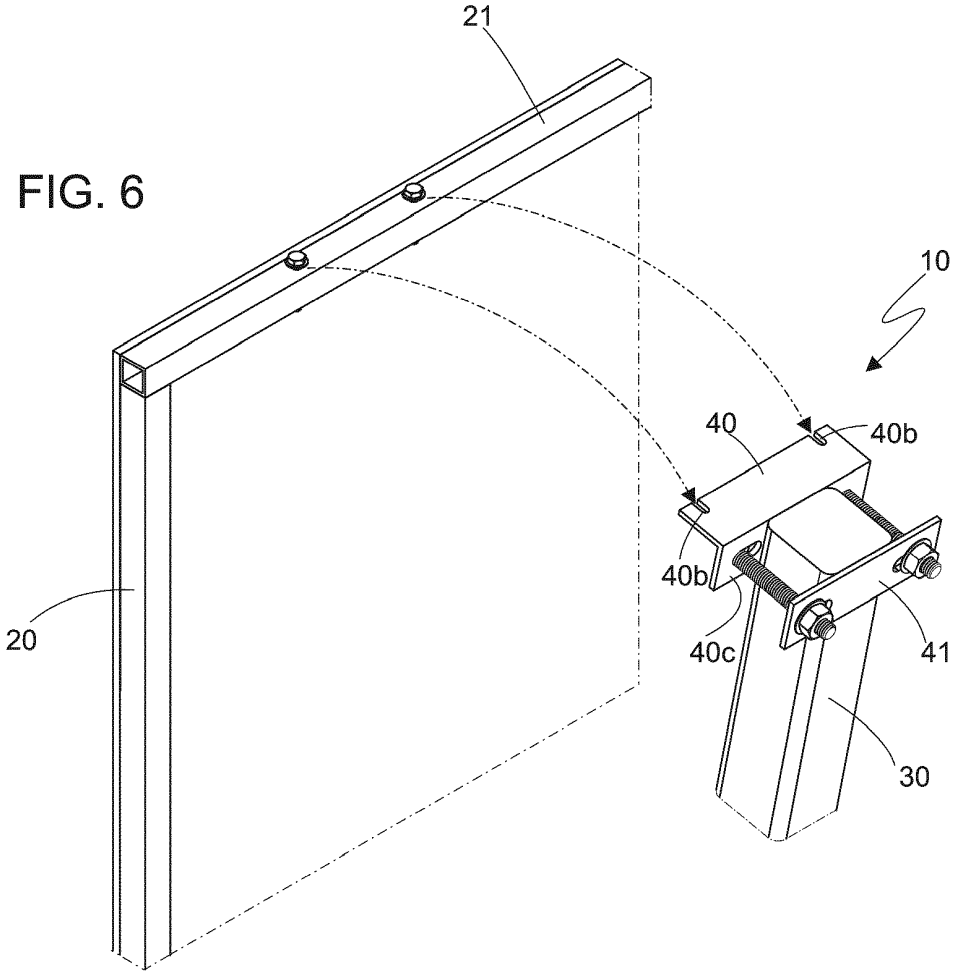



FIG. 5B

FIG. 5A

FIG. 5

FIG. 6



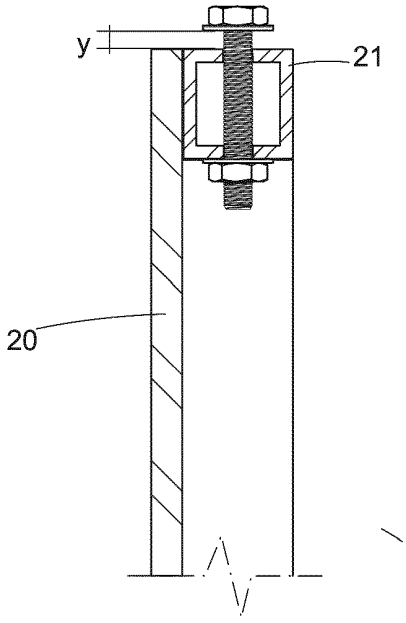
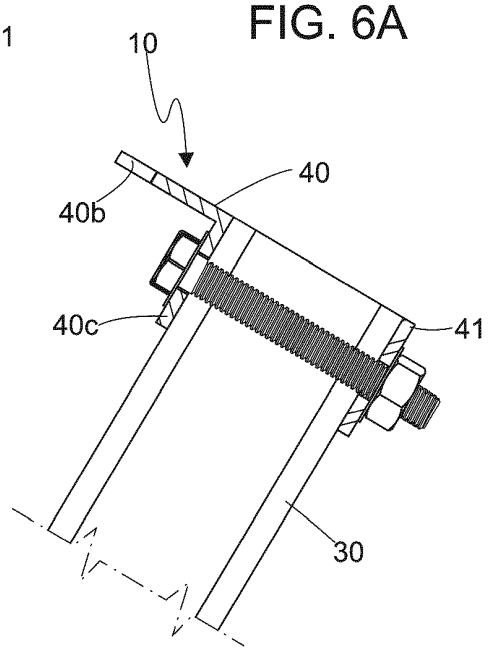




FIG. 6A



**INTERNATIONAL SEARCH REPORT**

International application No.
PCT/BR2019/050192

A. CLASSIFICATION OF SUBJECT MATTER

**E01F9/658 (2016.01), E01F9/681 (2016.01)**

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)

**E01F**

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

**Banco de Patentes do INPI-BR (SINPI)**

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**Derwent Innovation Index**

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|---|---|---|
| X | CN 207582353 U (SHENZHEN JIAOYUN ENG GROUP CO LTD [CN])<br>06 July 2018 (2018-07-06)<br>(Abstract; figures 2, 3) | 1 – 4 |
| X | CN 203966468 U (HUNAN XIANGXU LIGHTING HI TECH CO LTD [CN])<br>26 November 2014 (2014-11-26)<br>(Abstract; figures 1, 3, 5) | 1 – 4 |
| A | GB 2462145 A (SIGNPOST SOLUTIONS LTD [GB])<br>03 February 2010 (2010-02-03)<br>(the whole document) | |

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents:

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"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 | Date of mailing of the international search report |
|---|---|
| **16/09/2019** | **20/09/2019** |
| Name and mailing address of the ISA/<br>INSTITUTO NACIONAL DA PROPRIEDADE INDUSTRIAL<br>Rua Mayrink Veiga nº 9, 6º andar<br>cep: 20090-910, Centro - Rio de Janeiro/RJ<br>Facsimile No. +55 21 3037-3663 | Authorized officer<br>**Rogerio Barbosa dos Reis**<br>Telephone No. +55 21 3037-3493/3742 |

Form PCT/ISA/210 (second sheet) (January 2015)

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
PCT/BR2019/050192

| | | | |
|---|---|---|---|
| CN 207582353 U | 2018-07-06 | NONE | |
| CN 203966468 U | 2014-11-26 | NONE | |
| GB 2462145 A | 2010-02-03 | NONE | |

Form PCT/ISA/210 (patent family annex) (January 2015)

## REFERENCES CITED IN THE DESCRIPTION

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### Patent documents cited in the description


- BR 1020140181903 **[0001] [0006] [0015] [0019]**
- WO MU82015139 A **[0011]**
- WO 91039720 A **[0012]**
- GB 1461111 A **[0013]**