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(54) **CLAMPING MECHANISM FOR SCAFFOLD SYSTEMS**

(57) The present invention relates to a clamping mechanism for scaffolds, basically consisting of a set comprised of a clamp (1) and a prop (2) suitable for use in scaffold systems mounted with modular elements. The prop (2) has at least one corner (8). The clamp (1) is comprised of a fixed sector (3) and a movable sector (4) having three toothed ends (5), for closing the clamp completely, by fitting the locking pin (7), furthermore presenting in its inner face a protrusion (6) which engages a corner (8) of the prop (2), thus securing the structures to which they are applied.

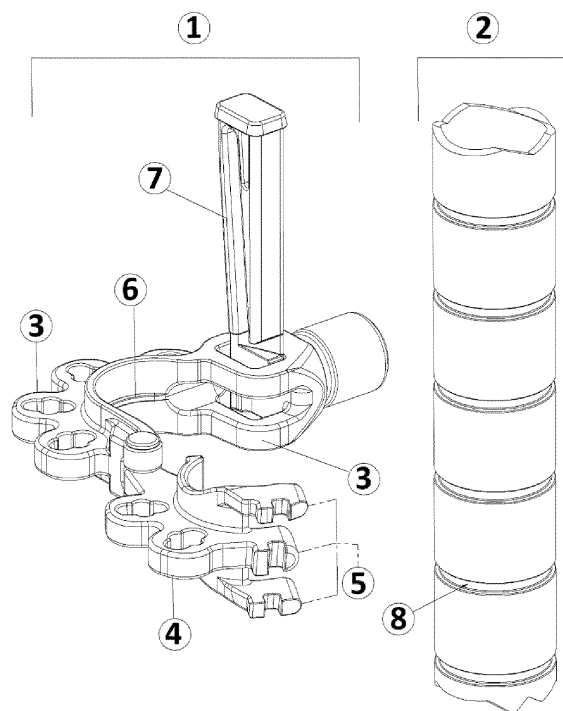


Fig. 1

Description

FIELD OF THE INVENTION

[0001] Generally, in scaffold systems, the fixation between the props and the horizontal beams or diagonal beams is made using eyebolts, screwed or welded, in the prop itself, or also with the use of fixed or removable clamps.

[0002] The clamping methods which are welded to the props allow the latter to be fastened with crossbeams, forming a right angle between them, and, with the use of clamps, if they are hinged, the diagonal crossbeams can also be fixed to the vertical props, forming any angle between them.

[0003] The clamping methods and clamps currently known and in use on the market are made from forged, tempered and quenched spring-steel weighing about 1.2 kg each, the clamp components being tightened or adjusted with (straight or curved) screws, and the clamp is closed and fixed to the prop or to the crossbeam, also using (straight or curved) screws, and sometimes with a fastening nut.

[0004] When mounting the scaffold structure, for safety reasons, the bolts cannot be tightened, they can only be adjusted on the component threads or to the clamp nuts, because there is always the risk of deforming the prop, deforming the crossbeam, or deforming the components of the clamp or, even worse, twisting, deforming and breaking the screw or, to say the least, damaging the thread fillets on the nut or the screw which, in the next use, when tightened by the operator, will be left falsely tightened, thus jeopardizing the safety of both the entire structure and the workers who are using it.

[0005] Considering the required precautions in tightening the screws, when fixing the clamps to the props and to the crossbeams (horizontal tubes joining the scaffold posts), it is easy to understand that clamping systems using fastening screws are pretty much unsafe and very defective concerning possible slides in the vertical props, and because of this, there are often safety failures, unevenness of scaffolds, and too many work accidents at height.

[0006] Furthermore, in the currently used scaffold systems, which are provided with fastening means welded to the props, the eyebolts for fixing the crossbeams are welded, spaced at intervals of 50 cm, not envisaging the need to mount scaffolds at intermediate heights which would be more suitable for the execution of the works. This deficiency of height in the scaffold induces the worker to use complementary crates or step-ladders supported by the scaffolds, this being a common and frequent situation which is much likely to lead to accidents.

[0007] In addition, in the metal structures of the currently used scaffold systems, the props are fitted into one another vertically in order to form several floors, which are necessary for the execution of the work, and since all the components are, in general, props and cross-

beams made from metallic materials, when, on any of the floors or on the base of the structure, there is inadvertently an electric or static current contact, all users of this structure are affected by the electric discharge, suffering the sometimes fatal consequences.

[0008] Therefore, for the reasons explained above, and given the technical and practical knowledge acquired over a few decades in monitoring the erection of metal structures, but more particularly the knowledge concerning the manufacture of components and accessories for systems of platforms, scaffolds and similar metal structures, the inventor, being fully aware of the deficiencies, difficulties and safety problems existing in the systems for assembly of metallic structures that are currently available on the market, has attempted to study, design and manufacture various experimental elements, accessories, components and clamps, with the aim of solving some of the existing problems and difficulties. The result of this attempt is the present invention, which relates to a clamping mechanism basically comprised of a clamp (1) and a prop (2), suitable for use in scaffold systems and mounted with prefabricated or modular elements.

PRIOR ART OF THE INVENTION

[0009] The present invention finds a closest prior art in the following patent documents: JP 2010019055 A and CN 204552060 U. However this invention has the following advantages comparatively to the aforementioned state of the art:

- correct and effective fastening between the various elements and components of a metal structure with several floors;
- possibility of forming floors at variable heights, and according to the heights required to carry out the works;
- possibility of erecting scaffold structures, not only in a straight line, but also with angular variations and deviations which are appropriate to the site, building or work.

SUMMARY OF THE INVENTION

[0010] It is thus the object of this invention a clamping mechanism, especially suitable for fixing scaffold systems, comprising a clamp (1) and a prop (2) simultaneously, which fit together by means of protrusions (6) and corners (8), wherein a plurality of the latter may be present, allowing several clamps to be used in the same prop.

DESCRIPTION OF FIGURES

Indication of reference numbers:

[0011]

- (1) Clamp;
- (2) Prop;
- (3) Fixed sector of the clamp (1);
- (4) Movable sector of the clamp (1);
- (5) Clamp's (1) locking and fixing teeth;
- (6) Lower diameter protrusion in the inner face of the clamp (1);
- (7) Clamp's (1) closure and locking pin;
- (8) Peripheral cavity or corner in the prop (2) for fitting the clamp's (1) protrusion (6);
- (9) Insulating sleeve applied to both ends of the prop (2);
- (10) Bolt for fitting, joining and attaching props (2);

Figure 1 - exploded and perspective view of the set consisting of the prop (2) and the clamp (1), wherein the prop (2) has several corners (8). In the clamp (1) there are visibly a fixed sector (3) and a movable sector (4) which has three toothed ends (5), for closing the clamp completely by fitting the locking pin (7), also comprising in its inner face a protrusion (6) which engages the corner (8) of the prop (2), thereby securing the structures to which they are applied.

Figure 2 - front and rear views of the set comprised of the clamp (1) and the prop (2) fixed to one another, or fitted together, where their constituent elements are represented in the said position.

Figure 3 - Isolated representation of the prop (2) and the constituent elements thereof, more specifically the insulating sleeve (9) at the ends and bolt (10).

Figure 4 - isolated representations of the clamp (1) and the constituent elements thereof, in both front and top views.

DETAILED DESCRIPTION OF THE INVENTION

[0012] The present invention relates to a clamping mechanism which is now described in detail and which essentially comprises a clamp (1), having on its inner face an inner protrusion (6), of a smaller diameter than the diameter of the outer face of the clamp (1); and a prop (2), having on its outer face at least one corner (8), wherein when the clamp (1) is closed, its inner protrusion (6) engages in the corner (8) of the prop (2). This form of engagement of the inner protrusion (6) of the clamp (1) in the corner (8) of the prop (2) effectively solves the problem concerning a stable attachment of the scaffold to the props, without any chance of vertical sliding.

[0013] In addition, the clamp (1) is comprised of a solid and fixed sector (3) which is complemented by a movable sector (4), the said movable sector (4) being attached to the fixed sector (3) by an axis of rotation, and the movable sector (4) terminates with three ends each with a tooth (5), so that when the clamp (1) is closed the teeth (5) remain secured with a locking pin (7). This pin (7) firmly

closes the clamp (1) and keeps the protrusion (6) of the clamp (1) fully engaged in the corner (8) of the prop (2).

[0014] The engagement of the inner protrusion (6) of the clamp (1) in the outer corner (8) of the prop (2) allows a solid positioning without vertical slides, but enabling horizontal rotation, if necessary, for angular adjustment in the alignment of the scaffold or of the structure.

[0015] Alternatively, the prop (2) can also have an internal insulating sleeve (9) at both ends, in which a metal bolt (10) is used for engaging the props. The present invention effectively solves the problem as regards the transmission of electric or static currents, in that the props (2) are isolated from one another by means of the insulating sleeve (9) applied inside the joining and engaging regions of the props (2), and if an electric or static contact occurs, the electric or static discharge is limited to the floor of the structure where the unexpected or accidental contact occurred.

[0016] Additionally, the prop (2) may have at least one corner (8), and preferably it may have at least two or more corners (8) spaced apart from each other by 5cm. This characteristic of a plurality of corners (8) in a same prop (2) solves the problem of poor fastening and fixing of the clamps currently used and also solves the problem of the use of complementary crates or step-ladders by workers on the scaffold floors.

[0017] As will be evident to a person skilled in the art, the present invention should not be limited to the embodiments described herein, and a number of changes are possible which remain within the scope of this invention. Of course, the preferred embodiments above described are combinable in the different possible forms, the repetition of all such combinations being herein avoided.

Claims

1. Clamping mechanism **characterized in that** it comprises a clamp (1) and a prop (2), the clamp (1) having in its inner face an inner protrusion (6) and the prop (2) having in its outer face at least one corner (8), in which when the clamp (1) is closed, the inner protrusion (6) of the clamp (1) engages the corner (8) of the prop (2) preventing the assembly of the clamp (1) and the prop (2) from moving horizontally and vertically.
2. Clamping mechanism according to the previous claim wherein the clamp (1) comprises a solid and fixed sector (3) which is complemented by a movable sector (4), said movable sector (4) being attached to the fixed sector (3) by an axis of rotation, and the movable sector (4) terminates with three ends each with a tooth (5), so that when the clamp (1) is closed the teeth (5) remain secured with a locking pin (7) which locks the clamp (1) and keeps the inner protrusion (6) of the clamp (1) fully engaged in the corner (8) of the prop (2).

3. Clamping mechanism according to the previous claim wherein the prop (2) has on its ends an internal insulating sleeve (9) and a metal bolt (10) for fitting between several props (2).

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4. Clamping mechanism according to the previous claim wherein the prop (2) has at least two corners (8) spaced apart from each other by 5cm.

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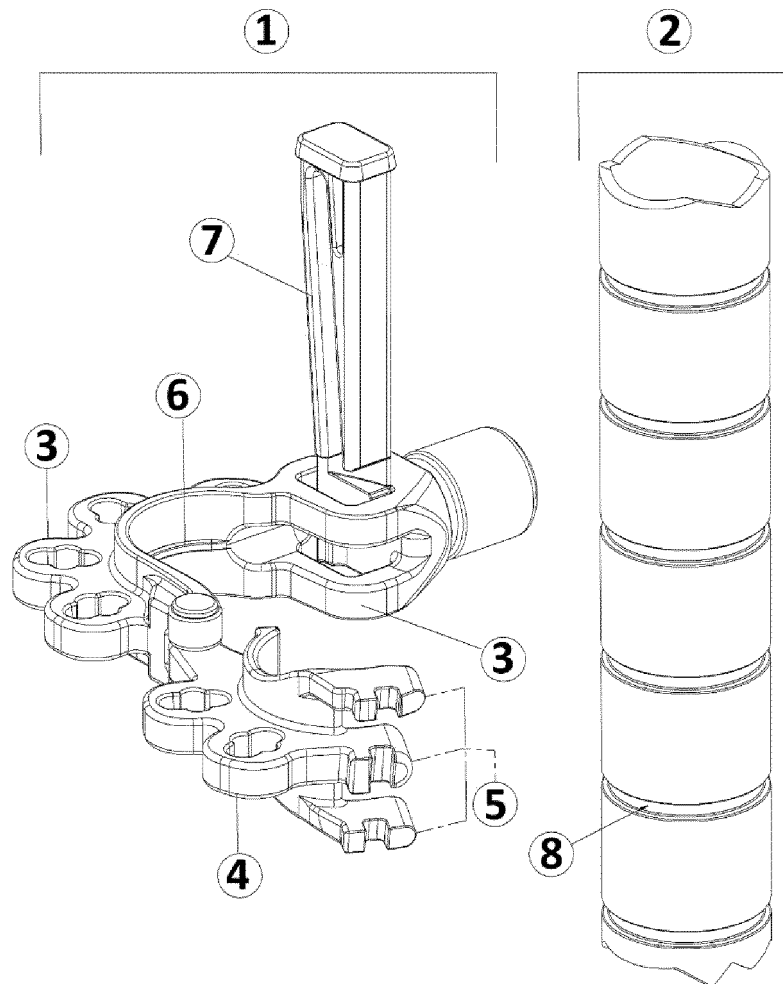


Fig. 1

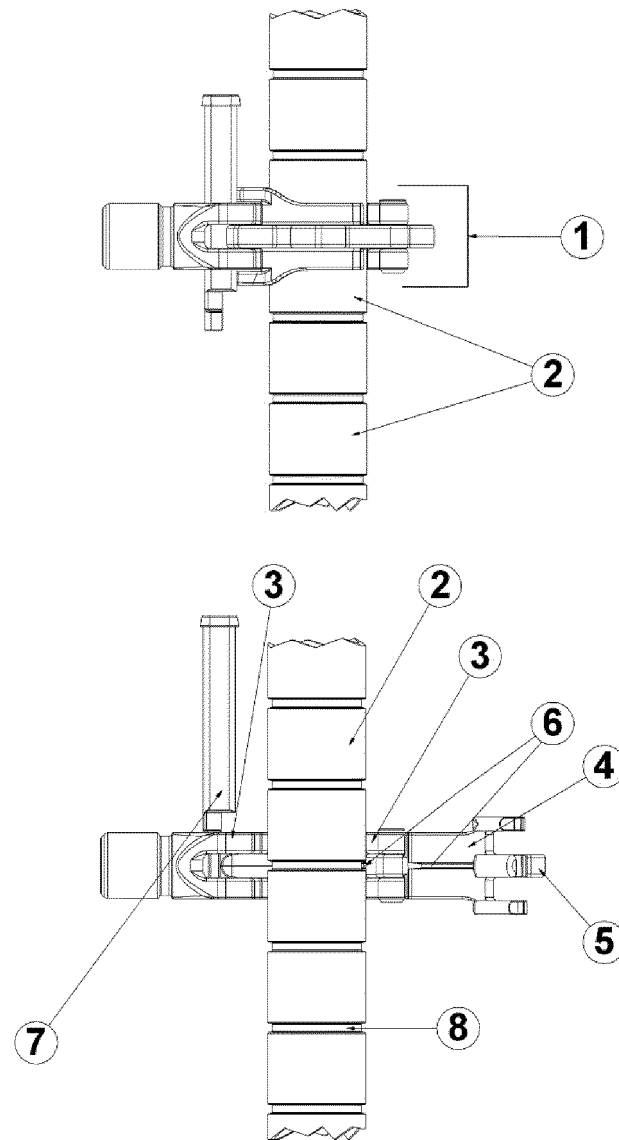


Fig. 2

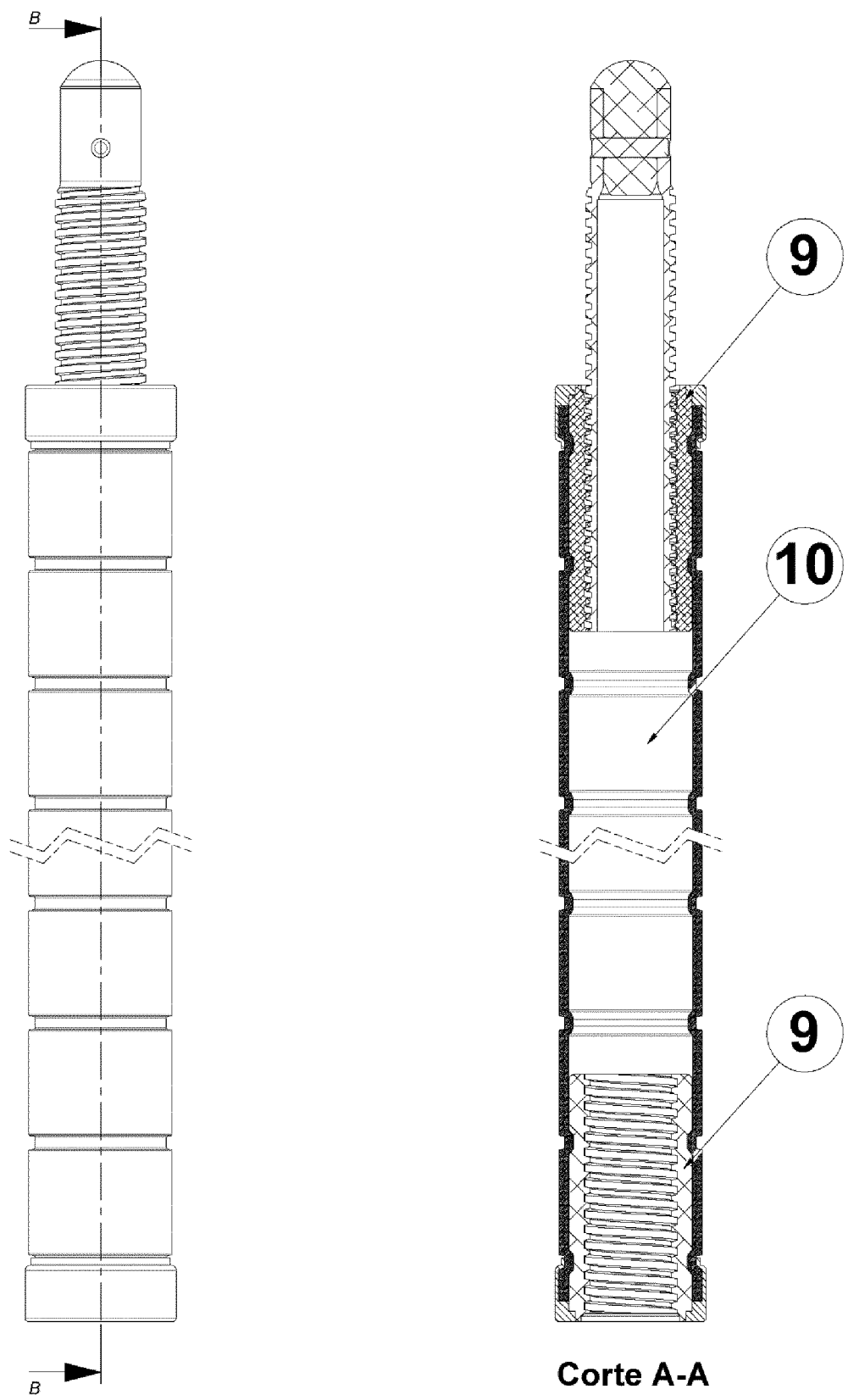


Fig. 3

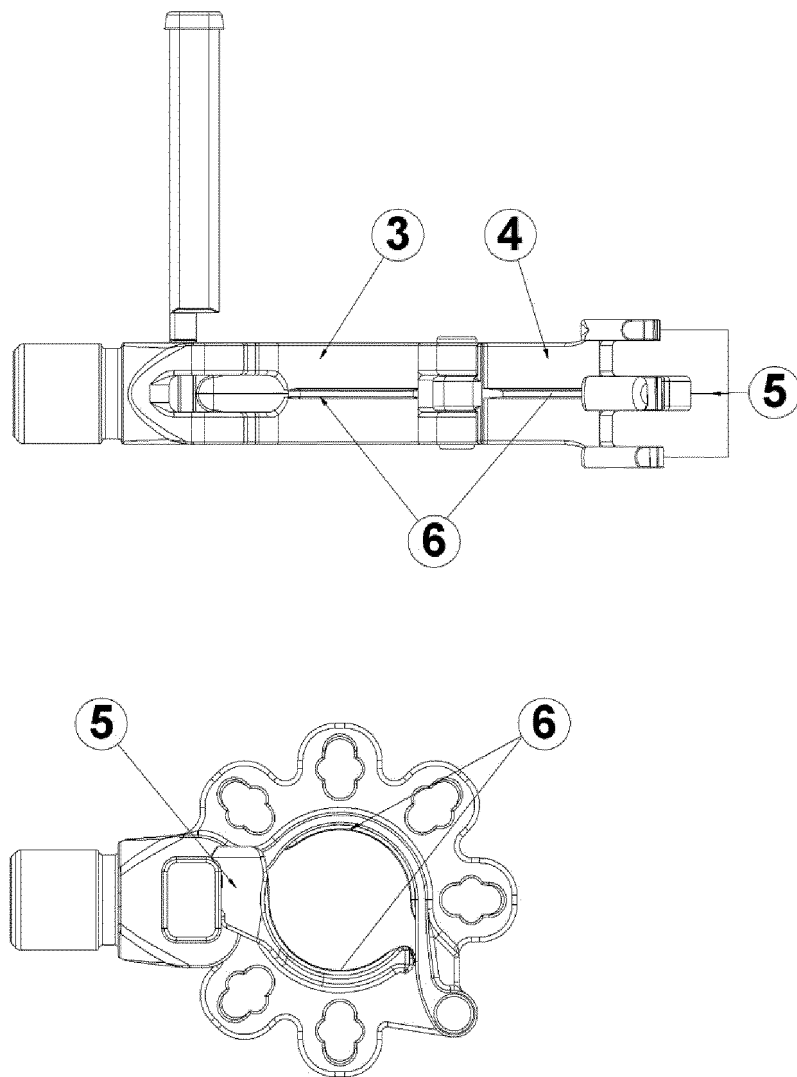


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2019/052689

A. CLASSIFICATION OF SUBJECT MATTER

INV. E04G7/26 E04G7/22 E04G25/02 E04G25/06 E04G5/16
ADD. E04G25/00

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)
E04G

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)

EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 258 549 A2 (ABDELLATIF ALA [FR]) 18 August 1975 (1975-08-18) figures 3, 4	1-4
X	US 2015/117936 A1 (HART ANDREW JOHN [CA] ET AL) 30 April 2015 (2015-04-30) figures 1a, 5a, 5b	1-4
A	US 4 412 370 A (SPEIRS GRAEME K [GB]) 1 November 1983 (1983-11-01) figures 1, 2	1-4
A	WO 2014/051391 A2 (HA EUN JUNG [KR]) 3 April 2014 (2014-04-03) figures 1, 2	1-4

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

☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No

PCT/IB2019/052689

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR 2258549 A2	18-08-1975	NONE	
US 2015117936 A1	30-04-2015	US 2015117936 A1	30-04-2015
		US 2017175396 A1	22-06-2017
US 4412370 A	01-11-1983	NONE	
WO 2014051391 A2	03-04-2014	CN 104822586 A	05-08-2015
		KR 101306468 B1	17-09-2013
		WO 2014051391 A2	03-04-2014

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- JP 2010019055 A [0009]
- CN 204552060 U [0009]