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(71) Applicant: LUPAK METAL S.R.L. [IT/IT]; Via Proventa, 230, 48018 Faenza (Ravenna) (IT).

(72) Inventors: AMADORI, Daniela; Via Manzoni, 9, 25126 Brescia (IT). MOR, Carlo; Via Manzoni, 9, 25126 Brescia (IT). BETTOLI, Luca; C.so Matteotti, 60, 48018 Faenza (Ravenna) (IT).

(74) Agent: CONTI, Marco; c/o BUGNION S.p.A., Via di Corticella, 87, 40128 Bologna (IT).

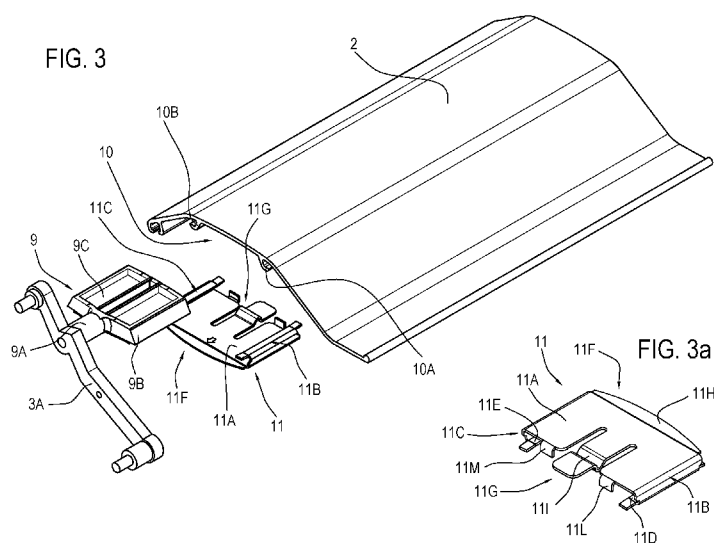
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(54) Title: SUNSHADE APPARATUS AND METHOD OF ASSEMBLING A SUNSHADE SLAT



(57) Abstract: A sunshade apparatus (1) comprises at least one slat (2) having a guide (10) integral therewith and extending along a longitudinal direction of the slat (2); at least one movement element (9) configured to be coupled to one end of the slat (2); a locking element (11) slidably coupled to the guide (10) of the slat, to be movable along the longitudinal direction between a deactivated position, where it does not interfere with the movement element (9), and an active position, where it is at least partly superposed on the movement element (9) to lock it relative to the slat (2); an elastic structure for applying a force perpendicular to a contact surface between the slat (2) and the movement element (9) when the locking element (11) is at the active position.

DESCRIPTION
SUNSHADE APPARATUS AND METHOD OF ASSEMBLING A
SUNSHADE SLAT

Technical field

This invention relates to a sunshade apparatus and to a method of assembling a sunshade slat.

The term “sunshade apparatus” may identify a venetian blind, that is to say, an apparatus provided with horizontal slats which can be oriented horizontally. Venetian blinds can be retracted by lifting and stacking the slats.

Background art

Sunshade apparatuses are known which are provided with a plurality of sunshade slats which, in use, are designed to screen a room from sunlight so as to allow controlling the amount of light entering the room where the sunshade apparatus is installed.

For that purpose, the sunshade slats are movable simultaneously by means of a slat connecting mechanism forming part of the sunshade apparatus.

The connecting mechanism comprises a plurality of slat movement elements each of which is, in use, integrally coupled to one end of a slat.

These sunshade apparatuses are also provided with a pair of opposite lateral guides which house and guide the movement elements: more specifically, these apparatuses comprise a first lateral guide, with which first movement elements are associated, and a second lateral guide, opposite to the first, with which second movement elements are associated.

It should be noted that in these sunshade apparatuses, each slat is thus fixed, at a first end of it, to a first movement element which is slidably

associated with the first guide and, at a second end of it, to a second movement element which is slidably associated with the second guide.

In other words, each slat is bilaterally coupled to the connecting mechanism so that it can be moved and oriented.

5 A need which is particularly strongly felt in the sector concerned is that of having a sunshade slat which can be fixed very quickly and easily to the elements of the connecting mechanism and which, at the same time, allows the connecting mechanism to guarantee a particularly high degree of robustness for the apparatus.

10 An example of the above is described in patent document ITBO20120588, in the name of the same Applicant as this application and where a sunshade slat comprises a guide which is integral with the slat and which extends in the longitudinal direction thereof. The system by which the slat is connected to the connecting mechanism comprises a first locking
15 element by which the slat is locked to the first movement element and a second locking element by which the slat is locked to the second movement element. The first locking element and the second locking element are slidably coupled to the guide so as to be movable along the longitudinal direction between a position of non-interference with the
20 respective movement element and a coupling position where it is locked to the respective movement element.

This connecting system, although it allows connecting the slats quickly by means of a relatively simple solution, is not flexible. In effect, the locking elements of this solution cannot be coupled or adapted to be coupled to
25 different types of movement elements and are not therefore applicable to sunshade apparatuses of all kinds (that is, to sunshade apparatuses having movement elements of a different kind).

Moreover, this fixing method does not guarantee a very good degree of robustness, in use, thus limiting the reliability of the system. For example,
30 the slat is subject to vibrations which make the sunshade apparatus noisy,

for example in the case of wind or during opening and closing of the sunshade.

Other examples of sunshade apparatuses and related systems for locking the slats to the slat movement elements are provided in the following patent documents: US4444242A, WO2011/099078A1, US8201609B1 and WO2010/010542A2.

These sunshade apparatuses, however, involve time-consuming and awkward procedures both for assembly and, when necessary, removal of the slats. Moreover, these sunshade apparatuses, too, are subject to unwanted vibrations of the slats relative to the slat mounting structure.

Disclosure of the invention

The aim of this invention is to overcome the above mentioned disadvantages of the prior art by providing a system for connecting a slat to a connecting mechanism of a sunshade apparatus and a method for its use.

More specifically, this invention has for an aim to provide a system for connecting a slat to a connecting mechanism of a sunshade apparatus and a method for its use which are particularly simple and flexible.

A further aim of the invention is to provide a system for connecting a slat to a connecting mechanism of a sunshade apparatus and a method for its use which are particularly robust and reliable.

These aims are fully achieved by the sunshade apparatus of this invention as characterized in the appended claims.

The sunshade apparatus according to the invention comprises at least one slat having a guide integral therewith and extending along a longitudinal direction of the slat. The sunshade apparatus comprises at least one movement element configured to be coupled to one end of the slat and one locking element slidably coupled to the guide of the slat, to be movable along the longitudinal direction between a deactivated

position, where it does not interfere with the movement element, and an active position, where it is at least partly superposed on the movement element to lock it relative to the slat.

The guide is elongated along the longitudinal direction.

5 The locking element is operatively connected to the guide of the slat, to hang on the slat and to slide freely along the guide along the longitudinal direction.

The guide of the slat comprises at least one track oriented along the longitudinal direction. In one example, the slat comprises a first track and
10 a second track. In one example, said at least one track has L-shaped profile.

Preferably, the locking element has a profile which is shaped to match the profile of the movement element.

In one example, the locking element has one or more engagement
15 portions for connecting to said at least one track of the guide of the slat.

Preferably, the locking element has a profile which is shaped to be coupled to the guide (in particular to said at least one track), preferably through the engagement portions.

The sunshade apparatus according to the present description comprises
20 an elastic structure, having a first configuration of non-interference with the movement element and a second configuration where it operates on the movement element to apply a force perpendicular to a contact surface between the slat and the movement element. The elastic structure is configured to move to the second configuration when the locking element
25 is in the active position.

The elastic structure allows coupling the movement element securely to the slat, preventing the movement element from moving relative to the slat in a direction perpendicular to a contact surface between the slat and the movement element. It should be noted that this solution allows reducing
30 vibrations.

In an example embodiment, the locking element is provided with at least one guide engagement portion configured to be coupled to the guide in such a way that the locking element can slide along the guide in the longitudinal direction.

5 Preferably, the locking element comprises a base and a pair of side walls (that is, a first side wall and a second side wall). In an example embodiment, the locking element comprises a first and a second side wall provided with portions for engaging the slat guide.

10 Preferably, the locking element is elastically deformable between a first configuration and a second configuration, to form the elastic structure. Still more preferably, the locking element is made of a resilient material and is configured to bend about the longitudinal direction.

15 In an example embodiment, the first and second side walls of the locking element are elastically deformable to allow the base of the slat to be positioned in a first position, when the locking element is in the deactivated position, and a second position, when the locking element is in the active position, where the base at the second position is at a greater distance from the slat than it is at the first position. It should be noted that this solution allows creating an interference fit which generates the force in a direction perpendicular to a contact surface between the slat and the movement element.

20 In an example embodiment, the slat comprises a first track and a second track, integral with the slat and having L-shaped profiles (or hook-shaped profiles). The first and second tracks define the guide. Preferably, each of the first and second tracks comprises an L-shaped profile (or hook-shaped profile) extending from a rear face of the slat.

25 In an example embodiment, the hook-shaped profiles of the first and second tracks are opposite and outward-facing. In a further example embodiment, the hook-shaped profiles of the first and second tracks are opposite and inward-facing.

30

Preferably, the first side wall of the locking element comprises a first ledge and the second side wall comprises a second ledge. It should be noted that each ledge defines, with the respective side wall, a profile having the shape of an upturned L. These upturned L-shaped profiles are thus configured for coupling to the L-shaped profiles of the first and second tracks.

More specifically, in the example embodiment where the L-shaped profiles of the first and second tracks are opposite and outward-facing, the locking element is C-shaped for coupling to the guide. In the example embodiment where the L-shaped profiles of the first and second tracks are opposite and inward-facing, the locking element is omega-shaped for coupling to the guide.

In an example embodiment, the movement element comprises a connecting pin and a head configured to be coupled to the slat. Preferably, the head of the movement element has a trapezoidal cross section. In the coupling between the slat and the movement element, a first contact surface of the movement element delimited by a minor base of the trapezoidal cross section is in contact with the rear face of the slat.

The locking element comprises a front part and a rear part. The front part faces towards an end of the slat where the locking element couples the slat to a movement element. Preferably, the front part has a flared portion defining a guide for facilitating insertion of the movement element into the locking element. Preferably, the locking element can be coupled to the movement element by interference. When the locking element is at the active position, the flared portion is in contact with the movement element.

More specifically, if the movement element has a trapezoidal cross section, the locking element at the active position touches a second surface of the movement element, delimited by a major base of the trapezoidal cross section so as to press the movement element against the rear face of the slat and to cancel out vibrations by preventing the rear

face from moving in the perpendicular direction.

The locking element is configured to house the movement element securely between its side walls and base (substantially without slack). In other words, the locking element has a profile which is shaped to match the profile of the movement element and to be coupled to the guide by means of the engagement portions. The base thus defines an abutment wall for the movement element.

In an example embodiment, the elastic structure comprises a wedge-shaped elastic element, operatively interposed between the movement element and the locking element positioned at the active position, for generating the force in a direction perpendicular to a contact surface between the slat and the movement element. Preferably the wedge is in the shape of a U and has at least a first bent end which constitutes an abutment by which the elastic element is stopped on the movement element so that when the wedge is inserted, the wedge is prevented from moving lengthways further towards the end of the slat.

According to a further aspect of this description, also defined is a method for assembling a sunshade slat in a sunshade apparatus having at least one movement element and one locking element to removably connect the slat to the movement element. The method comprises the following steps:

- positioning the slat so it rests on the at least one movement element;
- moving the locking element, slidably coupled to a longitudinal guide which is integral with the slat, between a deactivated position, where it does not interfere with the movement element, and an active position, where it is at least partly superposed on the movement element to lock it relative to the slat.

Preferably, the movement of the locking element into the active position generates an elastic force perpendicular to a contact surface between the slat and the movement element.

In an example embodiment, where the locking element is elastically deformable, the movement of the locking element into the active position comprises inserting the movement element into the locking element by interference and elastically deforming the locking element.

5 If the elastic structure comprises a wedge-shaped elastic element, the method comprises a further step of interposing a wedge-shaped elastic element between the movement element and the locking element to generate the elastic force perpendicular to a contact surface between the slat and the movement element.

Brief description of the drawings

The technical features of the invention according to the above mentioned aims are clearly described in the claims below and its advantages are more apparent from the detailed description which follows, with reference
15 to the accompanying drawings which illustrate a non-limiting example embodiment of the invention and in which:

- Figure 1 is a perspective view, with some parts cut away in order to better illustrate others, showing a sunshade apparatus according to an example embodiment of the invention;

20 - Figure 2 shows a side view of the sunshade apparatus of Figure 1, with some parts cut away in order to better illustrate others;

- Figure 3 shows a perspective view of a detail of an embodiment of the sunshade apparatus of this description, with some parts cut away in order to better illustrate others;

25 - Figure 3a is a perspective view showing an embodiment of a locking element according to this description;

- Figure 4 shows the detail of Figure 3 in a bottom view;

- Figure 5 shows the detail of Figure 3 in a front view;

- Figure 6 shows the detail of Figure 3 through the section labelled VI-VI in
30 Figure 5;

- Figure 7 shows a perspective view of a detail of an embodiment of the sunshade apparatus of this description, with some parts cut away in order to better illustrate others;
- Figure 8 shows the detail of Figure 7 in a bottom view;
- 5 - Figure 9 shows the detail of Figure 7 in a front view;
- Figure 10 shows the detail of Figure 7 through the section labelled X-X in Figure 9;
- Figure 11 shows a perspective view of a detail of an embodiment of the sunshade apparatus of this description, with some parts cut away in order to better illustrate others;
- 10 - Figure 11a is a perspective view showing an embodiment of a locking element according to this description;
- Figure 12 shows the detail of Figure 11 in a bottom view;
- Figure 13 shows the detail of Figure 11 in a front view;
- 15 - Figure 14 shows the detail of Figure 11 through the section labelled XIV-XIV in Figure 13.

Detailed description of preferred embodiments of the invention

With reference to the accompanying drawings, the numeral 1 denotes a sunshade apparatus according to this description.

More specifically, the sunshade apparatus 1 according to the invention comprises a plurality of sunshade slats 2 (or slats 2), which make up a slatted blind. Preferably, the slats 2 are elongate in a longitudinal direction.

25 The sunshade apparatus 1 is configured to space the sunshade slats 2 from each other and to vary their tilt. Preferably, the tilt of the slats 2 is varied by rotating the slats 2 about their longitudinal axes. Still more preferably, the longitudinal axes of the slats 2 making up the slatted blind are parallel to each other. It should be noted that, in this description, the spacing between the sunshade slats 2 is the spacing between the axes of

rotation of the slats 2 themselves.

The sunshade apparatus 1 is configured to adopt intermediate configurations between a gathered configuration (where the spacing of the slats 2 is at its minimum, the slats 2 are retracted and their overall dimensions are minimized) and an extended configuration (where the spacing of the slats 2 is at its maximum).

Each slat 2 has a first and a second end which are operatively coupled to a first and a second lateral guide, respectively. The first and second lateral guides are configured to guide the slats 2 along a direction of movement.

It should be noted that the sunshade apparatus 1 is made up of two mirror-symmetrical parts: the first part is connected to the first end of the slats 2 and the second part is connected to the second end of the slats 2. For brevity, this description applies to the first part, it being understood that the second part is constructionally similar (mirror-symmetrical), unless otherwise specified.

The sunshade apparatus 1 comprises a connecting mechanism 3 (or pantograph 3) configured to connect together the slats 2 and rotate them about their longitudinal axes. Preferably, the pantograph 3 is a ladder-like load-bearing structure.

The pantograph 3 comprises a plurality of levers 3A which are coupled to each other to rotate relative to each other. The pantograph 3 is configured to connect the slats 2 to each other and to define their spacing. The pantograph 3 is also configured to allow adjusting the tilt of the slats 2 simultaneously.

The sunshade apparatus 1 comprises a lifting shaft 4 coupled to a motor 13. Preferably, the first and second parts making up the sunshade apparatus 1 are driven by the same lifting shaft 4. Preferably, the axis of rotation of the lifting shaft 4 is perpendicular to the direction of movement and parallel to the longitudinal axes of the slats 2.

The sunshade apparatus 1 comprises a lifting element 5 – for example, a

cable, a belt or, preferably, a lift chain. Preferably, the lifting element 5 is coupled to the lifting shaft 4 by means of a lift pulley. The lifting element 5 is connected to at least one slat 2. Preferably, the lifting element 5 is connected to the slat which is distal from the lifting shaft 4 (that is, the last or lowermost slat 2A), to move the slats 2 in the direction of movement when the lifting shaft 4 is rotated. Preferably, the lifting element 5 is also connected to a second lift pulley 7 in a closed-loop configuration. Preferably, the second lift pulley 7 is idle and connected to a frame of the sunshade apparatus 1.

The sunshade apparatus 1 comprises a tilt element 8 (for example, a cable, a belt or, preferably, a tilt chain) to connect the pantograph 3 to the lifting shaft 4, preferably by means of a tilt pulley 11. Preferably, the tilt element 8 is fixed to the pantograph 3 at points proximal to the lifting shaft 4.

In use, the sunshade slats 2 of the sunshade apparatus 1 are adapted to be fixed to the pantograph 3. The pantograph 3 comprises a plurality of movement elements 9 by which the slats 2 are moved and, in use, each of the elements 9 is integrally coupled to one end of a slat 2.

Preferably, the movement element 9 comprises a connecting pin 9A for connection to a lever 3A of the pantograph 3 and a head 9B configured to be coupled to the slat 2. Preferably, the head 9B of the movement element 9 has a trapezoidal cross section.

Each slat 2 comprises a guide 10 integral with the slat 2 and configured to be coupled to the movement element 9. The guide 10 extends along the longitudinal direction of the slat 2. Preferably, the guide 10 is integral with the slat 2, that is to say, it is made as a single piece therewith. Still more preferably, the slat 2 (including the guide 10) is made by extrusion.

Preferably, the guide 10 comprises a first track 10A and a second track 10B, both integral with the slat 2. The first and second tracks 10A, 10B extend in the longitudinal direction.

The first and second tracks 10A,10B, in combination, define the guide 10 which is integral with the slat 2. Preferably, each of the first and second tracks 10A,10B comprises an L-shaped profile (or hook-shaped profile) extending from a rear face of the slat 2. It should be noted therefore that
5 each track 10A,10B is preferably defined by a portion which protrudes from the rear face of the slat 2. Preferably, in the coupling between the slat 2 and the movement element 9, where the movement element 9 has a trapezoidal cross section, a first contact surface of the movement element 9 delimited by a minor base of the trapezoidal cross section is in contact
10 with the rear face of the slat 2.

It should be noted that the L-shaped profiles of the first and second tracks 10A,10B face opposite ways along a direction transverse to the slat 2, perpendicular to the longitudinal direction. In other words, in an example embodiment, the hook-shaped profiles of the first and second tracks
15 10A,10B are opposite and outward-facing. In a further example embodiment, the hook-shaped profiles of the first and second tracks 10A,10B are opposite and inward-facing.

The sunshade apparatus 1 comprises locking elements 11 for locking the slat 2. Each locking element 11 is configured to connect one end of the
20 slat 2 to the respective movement element 9.

The locking element 11 is configured to be coupled to the guide 10. Preferably, the locking element 11 is removably coupled to the guide 10. Still more preferably, each locking element 11 is slidably coupled to the
25 guide 10 so as to be movable along the guide 10 between a deactivated position, where it does not interfere with the movement element 9, and an active position, where it is at least partly superposed on the movement element 9 to lock it relative to the slat 2.

The sunshade apparatus 1 comprises an elastic structure, having a first configuration of non-interference with the movement element 9 and a
30 second configuration where it operates on the movement element 9 to

apply a force perpendicular to a contact surface between the slat 2 and the movement element 9. The elastic structure is configured to move to the second configuration when the locking element 11 is in the active position. Preferably, the locking element 11 is elastically deformable
5 between a first configuration and a second configuration, to form the elastic structure. Still more preferably, the locking element 11 is made of a resilient material and is configured to bend about the longitudinal direction. The locking element 11 comprises a base 11A and a pair of side walls (that is, a first side wall 11B and a second side wall 11C).

10 The locking element 11 of the slat 2 is provided with at least one portion for engaging the guide 10 and configured to be coupled to the guide 10 in such a way that the locking element 11 can slide along the guide 10 in the longitudinal direction.

The engagement portion has at least one ledge configured to be coupled
15 to the at least one guide 10. More specifically, the first side wall 11B comprises a first ledge 11D and the second side wall 11C comprises a second ledge 11E. It should be noted that each ledge 11D, 11E defines, with the respective side wall 11B, 11C, a profile having the shape of an upturned L. These upturned L-shaped profiles are thus configured for
20 coupling to the L-shaped profiles of the first and second tracks 10A and 10B.

More specifically, in an embodiment where the L-shaped profiles of the first and second tracks 10A, 10B are opposite and outward-facing, the locking element 11 is C-shaped for coupling to the guide 10. In other
25 words, the ledges 11D, 11E of the first and second side walls 11B, 11C are directed towards the inside of the locking element 11. In an embodiment where the L-shaped profiles of the first and second tracks 10A, 10B are opposite and inward-facing, the locking element 11 is omega-shaped for coupling to the guide 10. In other words, the ledges 11D, 11E of the first
30 and second side walls 11B, 11C are directed towards the outside of the

locking element 11.

The locking element 11 comprises a front part 11F and a rear part 11G. The front part 11F faces towards an end of the slat 2 where the locking element 11 couples the slat 2 to a movement element 9. Preferably, the front part 11F has a flared portion 11H defining a guide for facilitating insertion of the movement element 9 into the locking element 11.

In an example embodiment, the locking element 11 can be coupled to the movement element 9 by interference. When the locking element 11 is in the active position, at least one portion of the locking element 11 itself is in contact with the movement element 9 to apply a force perpendicular to a contact surface between the slat 2 and the movement element 9 so as to press the movement element against the rear face of the slat 2, thus preventing the rear face from moving in the perpendicular direction.

Preferably, the locking element 11 is configured to be coupled to the movement element 9, allowing the slat 2 to be securely locked to the movement element 9 when the locking element 11 is in the active position.

To form the elastic structure, the locking element 11 preferably comprises at least one portion configured to be elastically deformed during coupling to the movement element 9. In an example embodiment, the first and second side walls 11B, 11C of the locking element 11, and/or the respective ledges 11D, 11E, are elastically deformable to allow the base 11A of the slat to be positioned at a first position, when the locking element 11 is at the deactivated position, and at a second position, when the locking element is at the active position, where the base 11A at the second position is at a greater distance from the slat 2 than it is at the first position.

Preferably, the locking element 11 comprises an elastic snap element 11I configured to be elastically deformed and to be coupled to the movement element 9 so that, at the active position, the locking element 11 is prevented from moving along the guide 10 in the longitudinal direction

away from the end of the corresponding slat (that is, away from the movement element 9).

Preferably, the locking element 11 comprises an abutment element configured to abut and stop against the movement element 9 at the active position, so that the locking element 11 is prevented from moving in the longitudinal direction towards the end of the corresponding slat. Still more preferably, the locking element 11 comprises a first abutment element 11L and a second abutment element 11M.

It should be noted that when the locking element 11 is at the active position, the abutment elements 11L, 11M are in contact with the movement element 9, thus preventing the locking element 11 from moving along the longitudinal direction towards the end of the slat 2 (that is, towards the movement element 9).

Preferably, the abutment element and the elastic snap element 11I are included in the rear part 11G of the locking element 11.

In an example embodiment, the head 9B comprises a seat 9C. Preferably, the elastic snap element 11I is inserted into the seat 9C, acting in combination with the abutment element to prevent any further movement of the locking element 11 relative to the movement element 9 along the longitudinal direction.

It should also be noted that the locking element 11 is configured to house the movement element 9 securely between its side walls 11B, 11C and base 11A (substantially without slack). The base 11A thus defines an abutment wall for the movement element 9. It should be noted that the movement element 9 is locked between the rear face of the slat 2 and the locking element 11.

In an example embodiment, the elastic structure comprises a wedge-shaped elastic element 12, operatively interposed between the movement element 9 and the locking element 11 positioned at the active position, for generating said force. In the specific embodiment illustrated, the wedge is

in the shape of a U and has at least a first bent end 12A which constitutes an abutment by which the elastic element 12 is stopped on the movement element 9 so that when the wedge is inserted, the wedge is prevented from moving lengthways further towards the end of the slat (that is, further
5 towards the movement element 9).

According to a further aspect of this description, also defined is a method for assembling a sunshade slat 2 in a sunshade apparatus 1 having at least one movement element 9 and one locking element 11 to removably connect the slat 2 to the movement element 9. The method comprises the
10 following steps:

- positioning the slat 2 so it rests on the at least one movement element 9;
- moving the locking element 11, slidably coupled to a longitudinal guide 10 which is integral with the slat 2, between a deactivated position, where it does not interfere with the movement element 9, and an active position,
15 where it is at least partly superposed on the movement element 9 to lock it relative to the slat 2.

Preferably, the movement of the locking element 11 into the active position generates an elastic force perpendicular to a contact surface between the slat 2 and the movement element 9.

20 In an example embodiment, where the locking element 11 is elastically deformable, the movement of the locking element 11 into the active position comprises inserting the movement element 9 into the locking element 11 by interference and elastically deforming the locking element 11.

25 If the elastic structure comprises a wedge-shaped elastic element 12, the method comprises a further step of interposing a wedge-shaped elastic element 12 between the movement element 9 and the locking element 11 to generate the elastic force perpendicular to a contact surface between the slat 2 and the movement element 9.

CLAIMS

1. A sunshade apparatus (1), comprising:
 - at least one slat (2) having a guide (10) integral therewith and extending along a longitudinal direction of the slat (2);
 - at least one movement element (9) configured to be coupled to one end
5 of the slat (2);
 - a locking element (11) slidably coupled to the guide (10) of the slat, to be movable along the longitudinal direction between a deactivated position, where it does not interfere with the movement element (9), and an active position, where it is at least partly superposed on the movement element
10 (9) to lock it relative to the slat (2),characterized in that it comprises an elastic structure, having a first configuration of non-interference with the movement element (9) and a second configuration, where it operates on the movement element (9) to apply a force perpendicular to a contact surface between the slat (2) and
15 the movement element (9), where the elastic structure is configured to move to the second configuration when the locking element (11) is at the active position.
2. The apparatus (1) according to claim 1, wherein the locking element (11) comprises a first and a second side wall (11B,11C) equipped with
20 portions for engaging the guide (10) of the slat (2), and a base (11A), and wherein the locking element (11) is elastically deformable between a first configuration and a second configuration, to form the elastic structure.
3. The apparatus (1) according to claim 2, wherein the locking element (11) is made of a resilient material and is configured to bend about the
25 longitudinal direction.
4. The apparatus (1) according to claim 2 or 3, wherein the locking element (11) can be coupled by interference to the movement element (9) and has at least one flared portion (11H) defining a guide, for facilitating insertion of the movement element (9) into the locking element (11).

5. The apparatus (1) according to any one of claims 2 to 4, wherein the first and second side walls (11B,11C) of the locking element (11) are elastically deformable to allow the base (11A) of the slat to be positioned at a first position, when the locking element (11) is at the deactivated position, and at a second position, when the locking element (11) is at the active position, wherein the base (11A) at the second position is at a greater distance from the slat (2) than it is at the first position.

6. The apparatus (1) according to any one of the preceding claims, wherein the movement element (9) has a pin (9A) and a head (9B) connected to the pin (9A), and wherein the locking element (11) is configured to be at least partly superposed and pressed on the pin (9A) and/or on a portion of the head (9B) adjacent to the pin, when it is at the active position.

7. The apparatus (1) according to claim 6, wherein the movement element (9) has a pin (9A) and a head (9B) connected to the pin (9A), wherein the locking element (11) is configured to be at least partly superposed and pressed on a portion of the head (9B) adjacent to the pin, when it is at the active position.

8. The apparatus (1) according to any one of the preceding claims, wherein the guide (10) of the slat comprises a first track (10A) and a second track (10B) integral with the slat (2), having L-shaped profiles, and wherein the locking element (11) has a profile which is shaped to match the profile of the movement element (9) and to be coupled to the guide (10) through engagement portions.

9. The apparatus (1) according to claim 8, wherein the L-shaped profiles of the first and second tracks (10A,10B) are opposite and outward-facing and wherein the locking element (11) has the shape of a C for coupling to the guide (10).

10. The apparatus (1) according to claim 8, wherein the L-shaped profiles of the first and second tracks (10A,10B) are opposite and inward-

facing and wherein the locking element (11) is omega-shaped for coupling to the guide (10).

11. The apparatus (1) according to any one of the preceding claims, wherein the movement element (9), alternatively:

- 5 i) has a substantially flat face opposite the slat (2);
- ii) comprises a seat (9C) made in that face.

12. The apparatus (1) according to any one of the preceding claims, wherein the elastic structure comprises a wedge-shaped elastic element (12) operatively interposed between the movement element (9) and the
10 locking element (11) positioned at the active position, for generating said force.

13. A method for assembling a sunshade slat (2) in a sunshade apparatus (1) having at least one movement element (9) and one locking element (11) to removably connect the slat (2) to the movement element
15 (9), comprising the following steps:

- positioning the slat (2) so it rests on the at least one movement element (9);
- moving the locking element (11), slidably coupled to a longitudinal guide (10) which is integral with the slat (2), between a deactivated position,
20 where it does not interfere with the movement element (9), and an active position, where it is at least partly superposed on the movement element (9) to lock it relative to the slat (2);

characterized in that the movement of the locking element (11) into the active position generates an elastic force perpendicular to a contact
25 surface between the slat (2) and the movement element (9).

14. The method according to claim 13, wherein the movement of the locking element (11) into the active position comprises inserting the movement element (9) into the locking element (11) by interference and elastically deforming the locking element (11).

15. The method according to claim 13 or 14, comprising a step of interposing a wedge-shaped elastic element (12) between the movement element (9) and the locking element (11) to generate said elastic force.

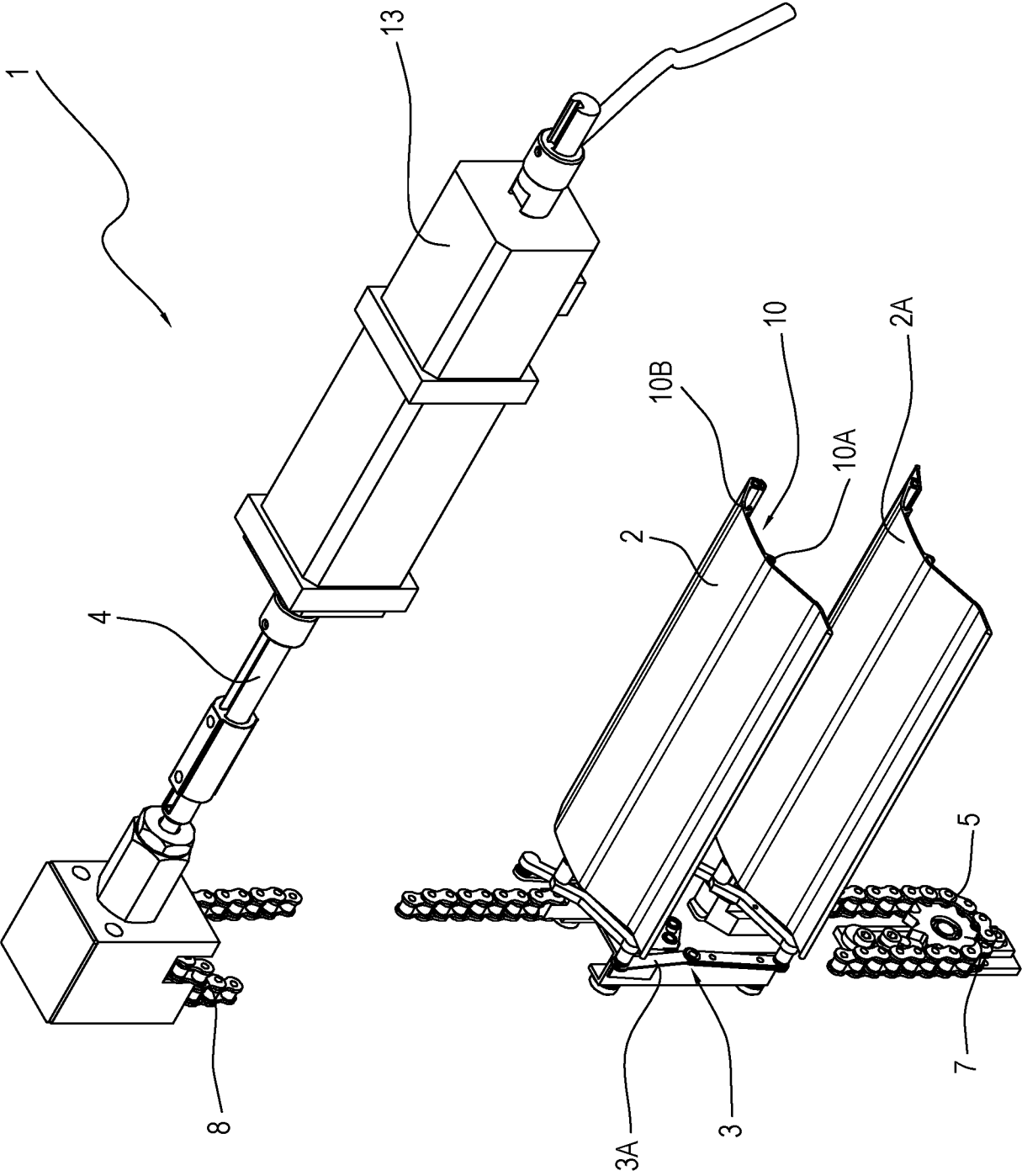
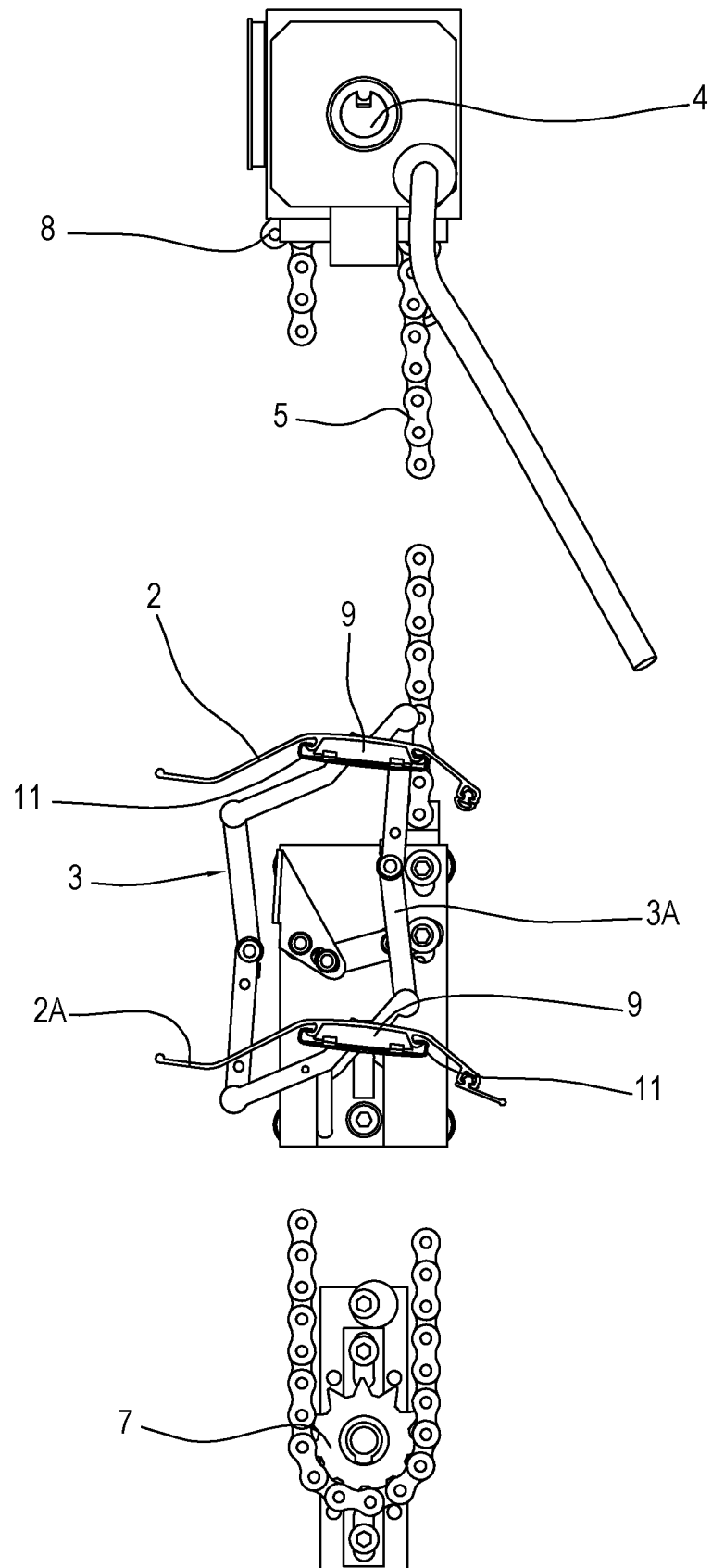


FIG. 1

FIG. 2



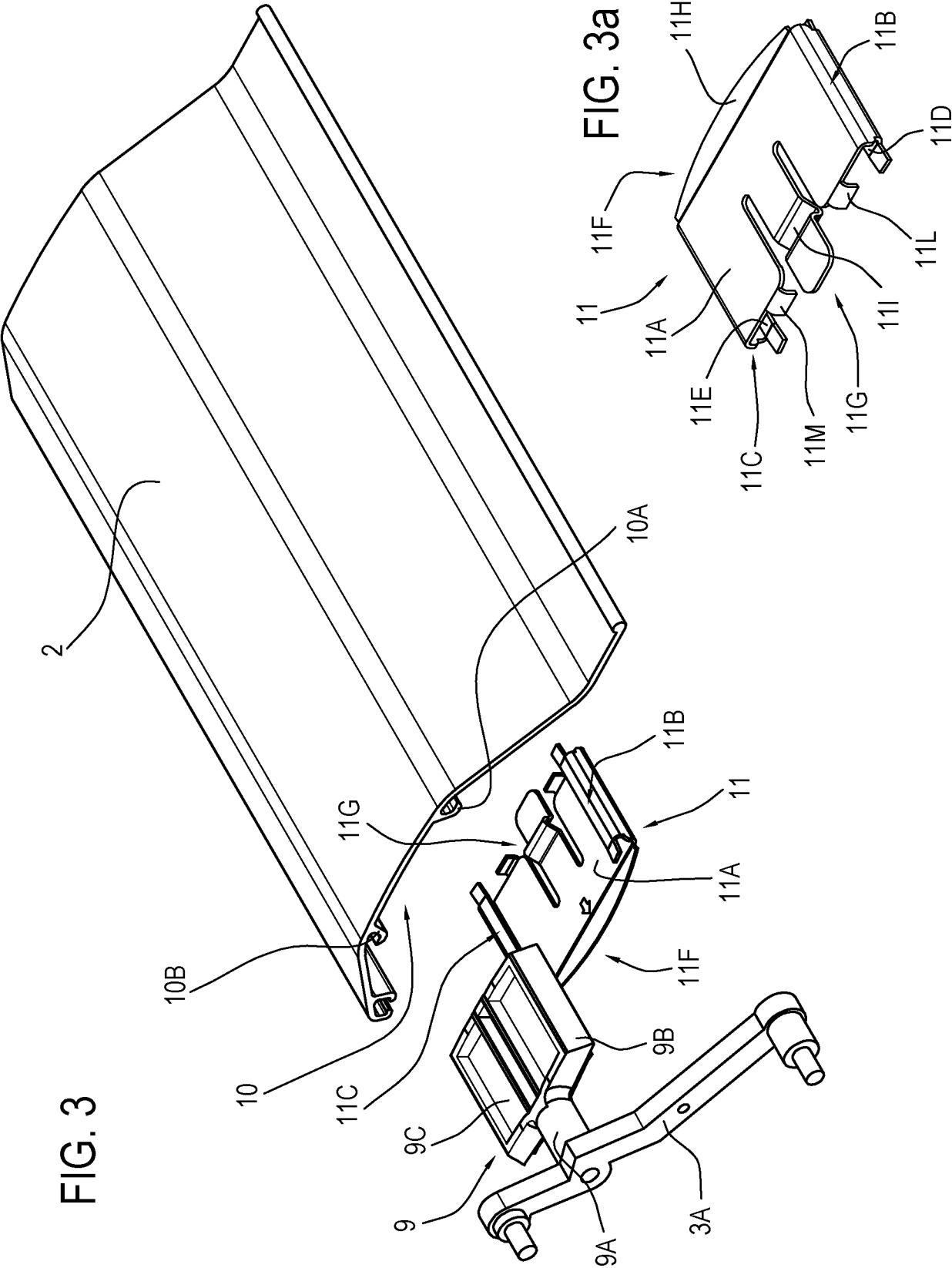


FIG. 4

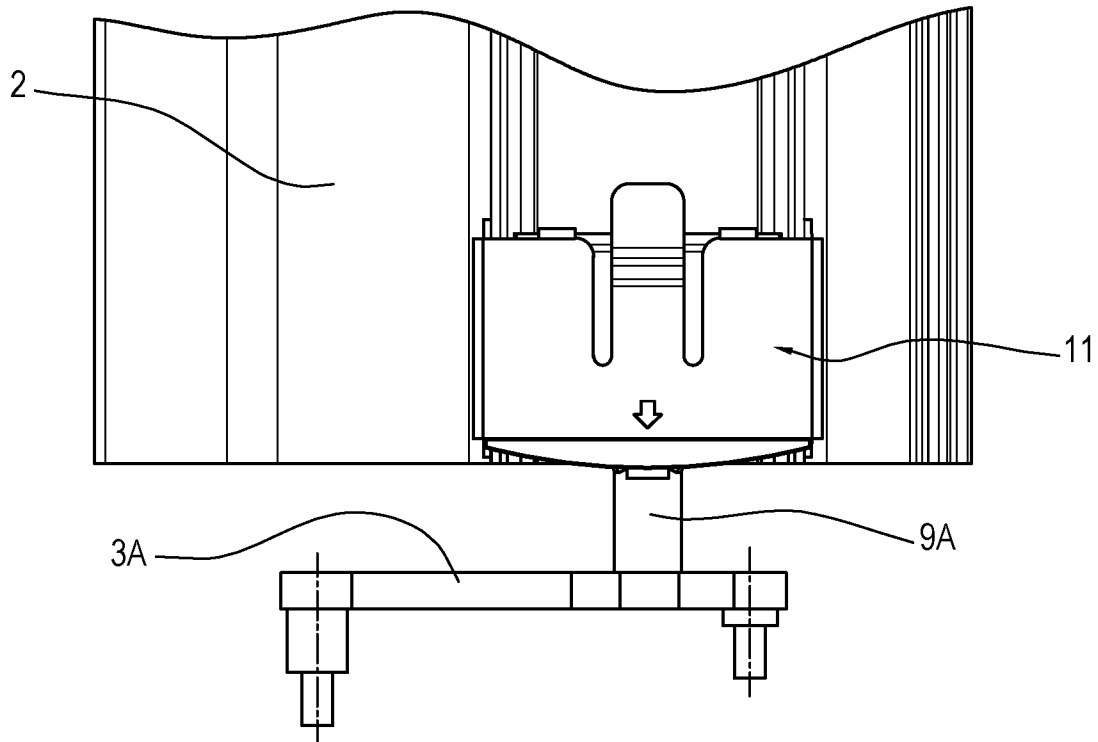


FIG. 5

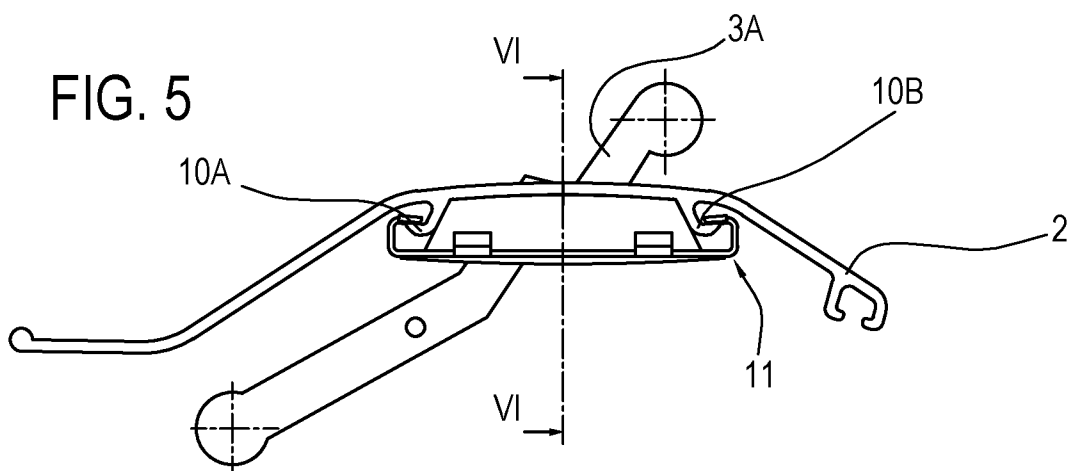
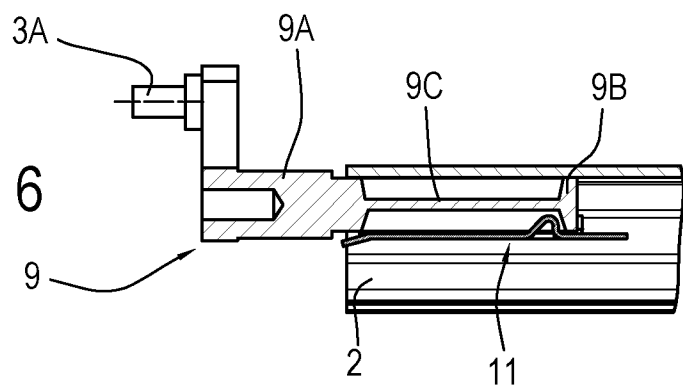


FIG. 6



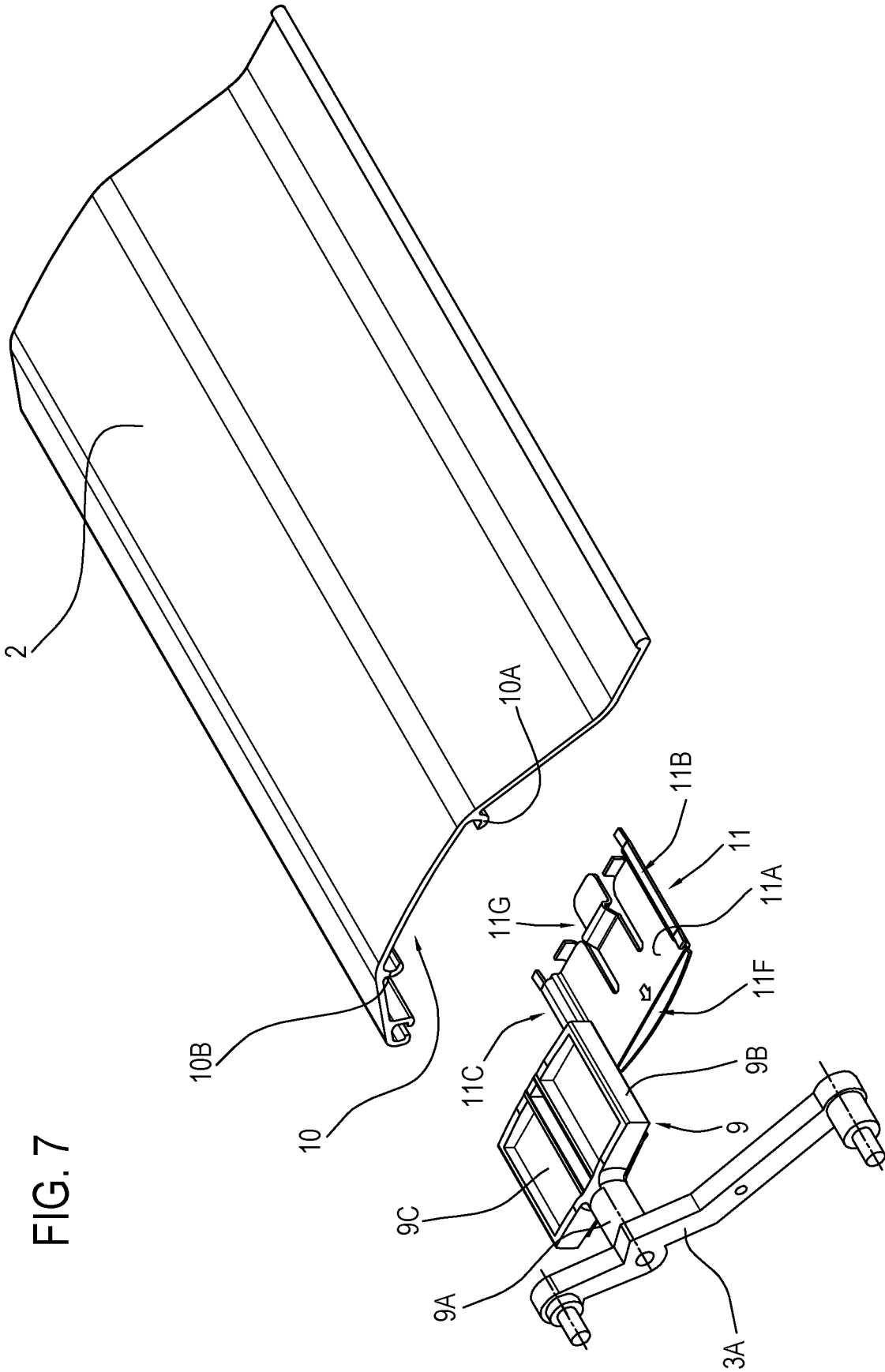


FIG. 8

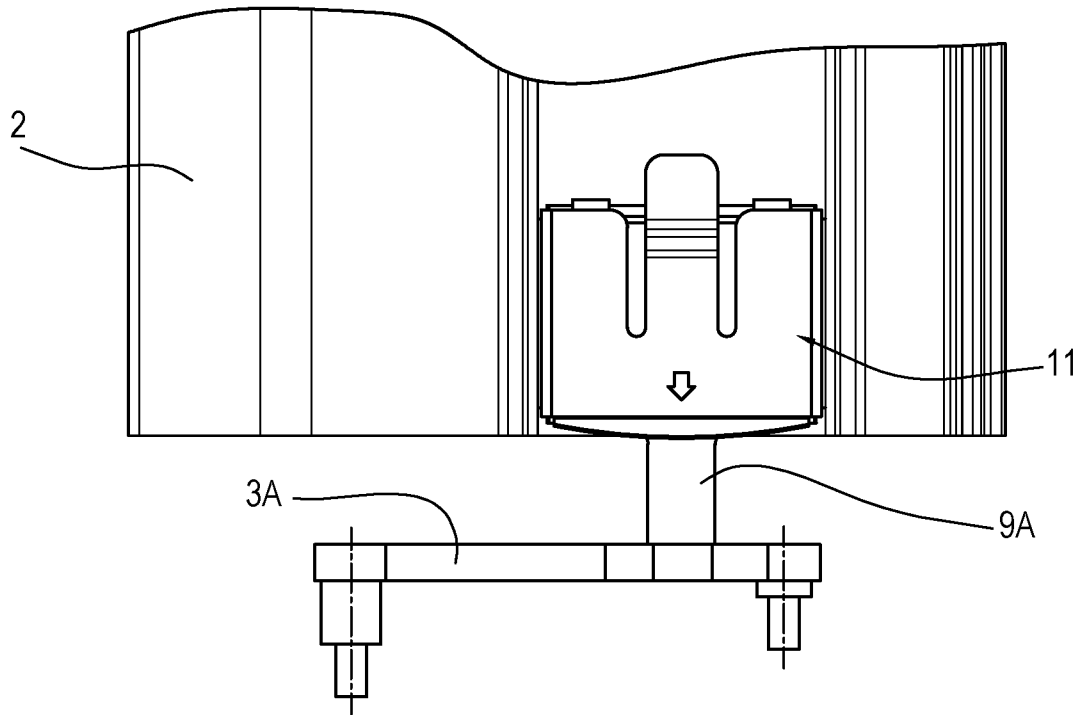


FIG. 9

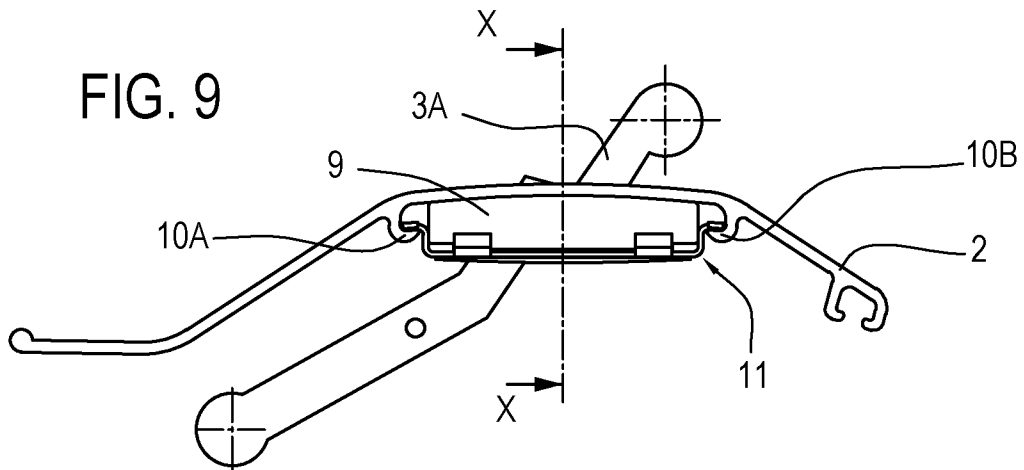
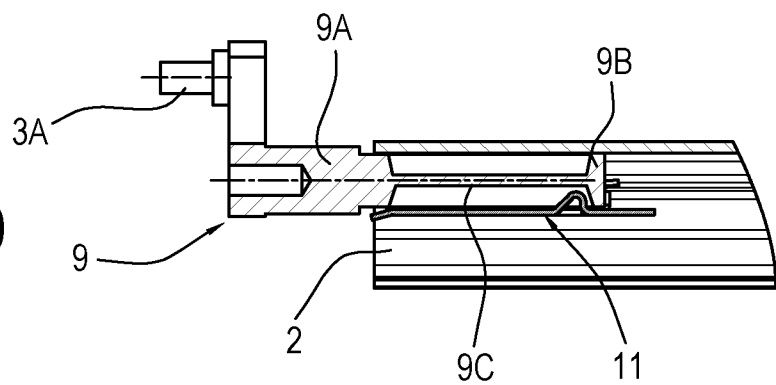
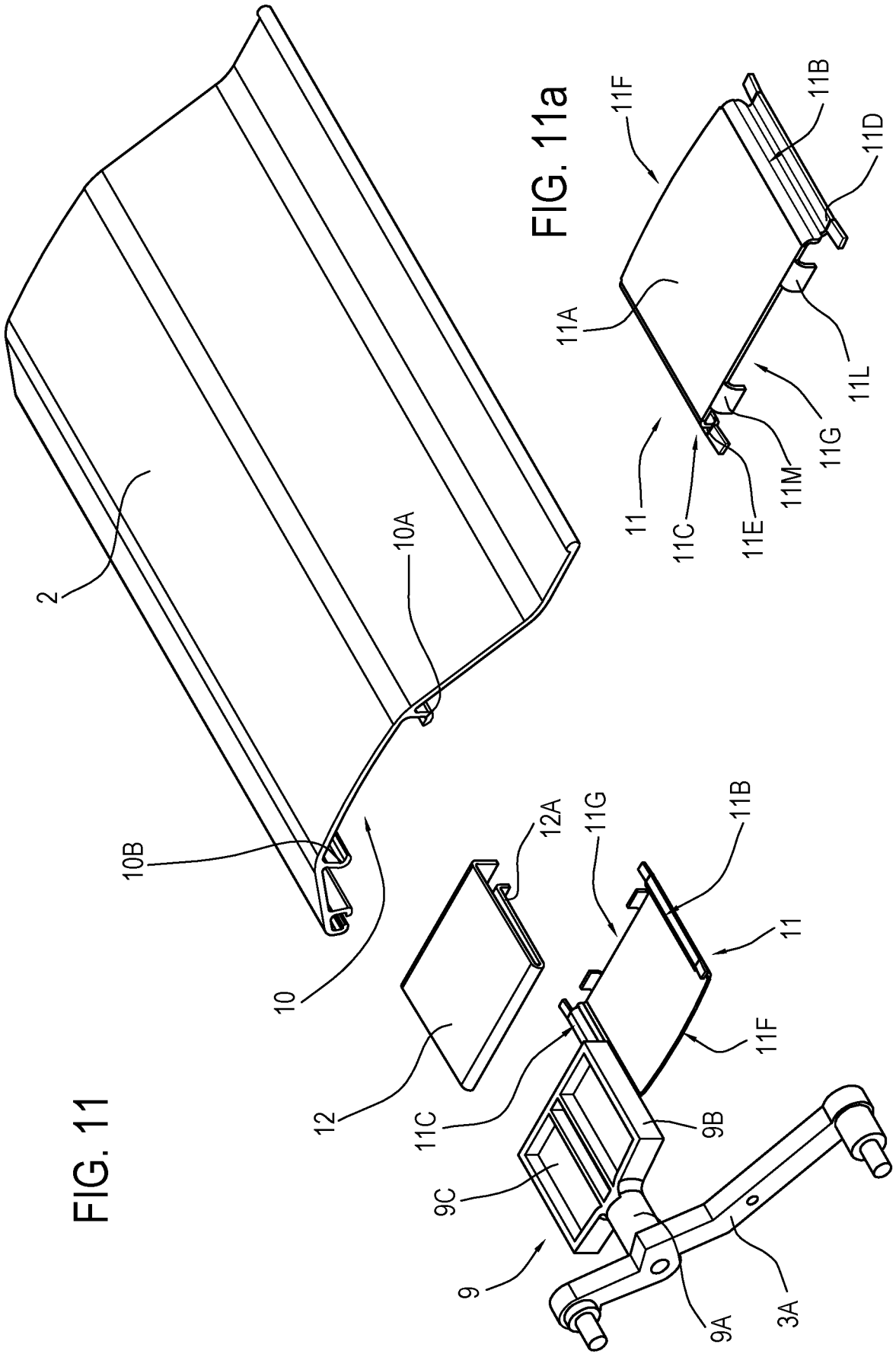
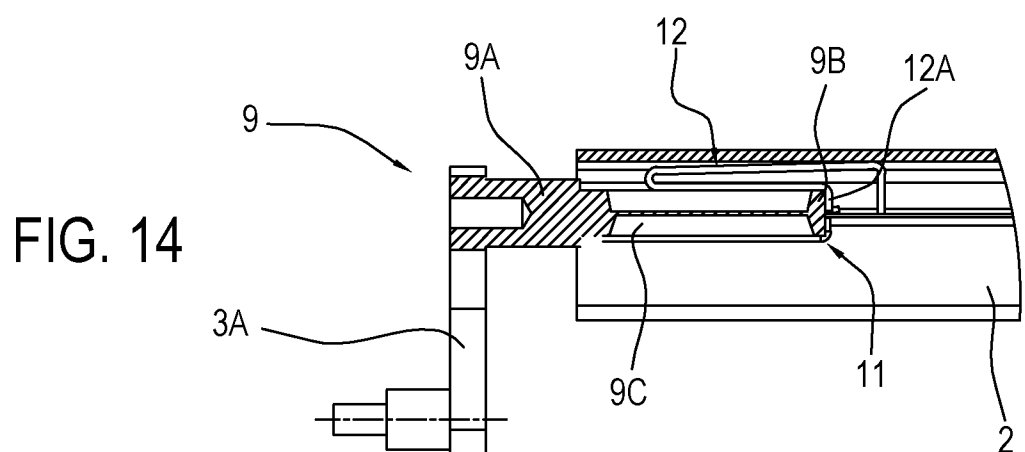
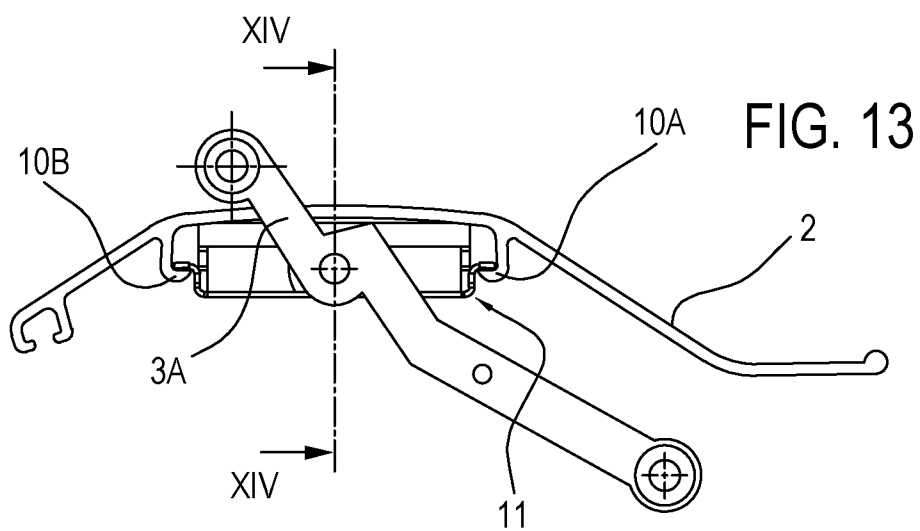
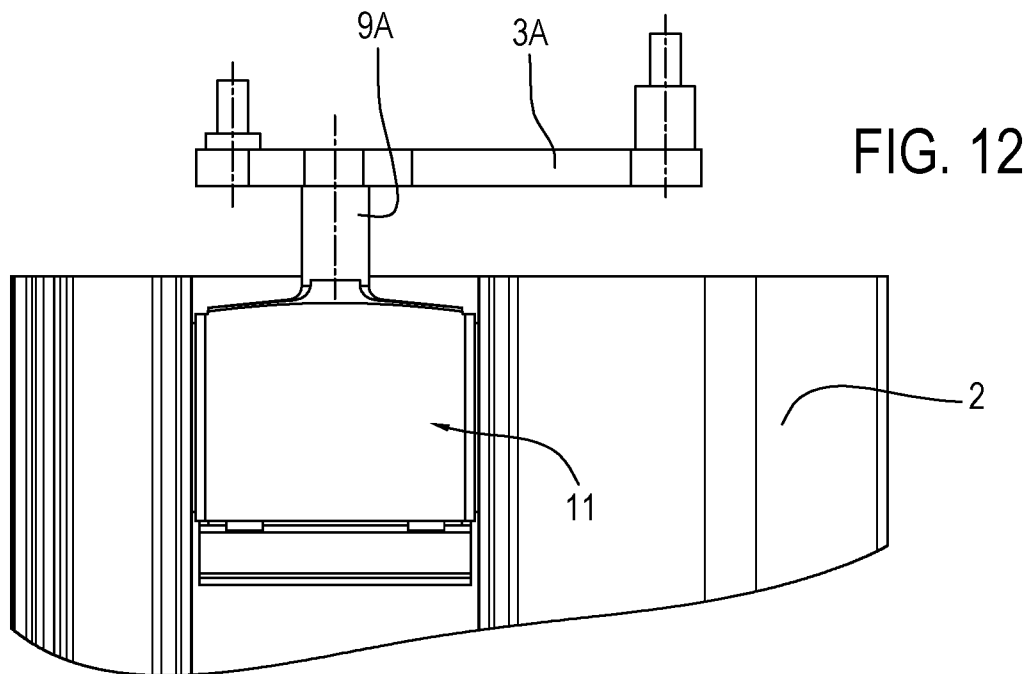


FIG. 10







INTERNATIONAL SEARCH REPORT

International application No
PCT/IB2015/059713

A. CLASSIFICATION OF SUBJECT MATTER

INV. E06B9/06 E06B9/302 E06B9/386 E06B9/327
ADD.

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)
E06B

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)

EP0-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	US 4 444 242 A (AMSLER BRUNO [CH] ET AL) 24 April 1984 (1984-04-24)	1-4,6,7, 11,13,14
A	abstract; figures 1-3 column 8, line 16 - line 41 -----	5,8-10, 12,15
A	CN 202 627 916 U (WUHONG CO LTD) 26 December 2012 (2012-12-26) figures 1,5 -----	1-15
A	EP 1 418 306 A2 (OILES INDUSTRY CO LTD [JP]) 12 May 2004 (2004-05-12) the whole document -----	1-15



Further documents are listed in the continuation of Box C.



See patent family annex.

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Date of the actual completion of the international search

31 March 2016

Date of mailing of the international search report

11/04/2016

Name and mailing address of the ISA/

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+31-70) 340-2040,
Fax: (+31-70) 340-3016

Authorized officer

Cornu, Olivier

INTERNATIONAL SEARCH REPORT

Information on patent family members

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