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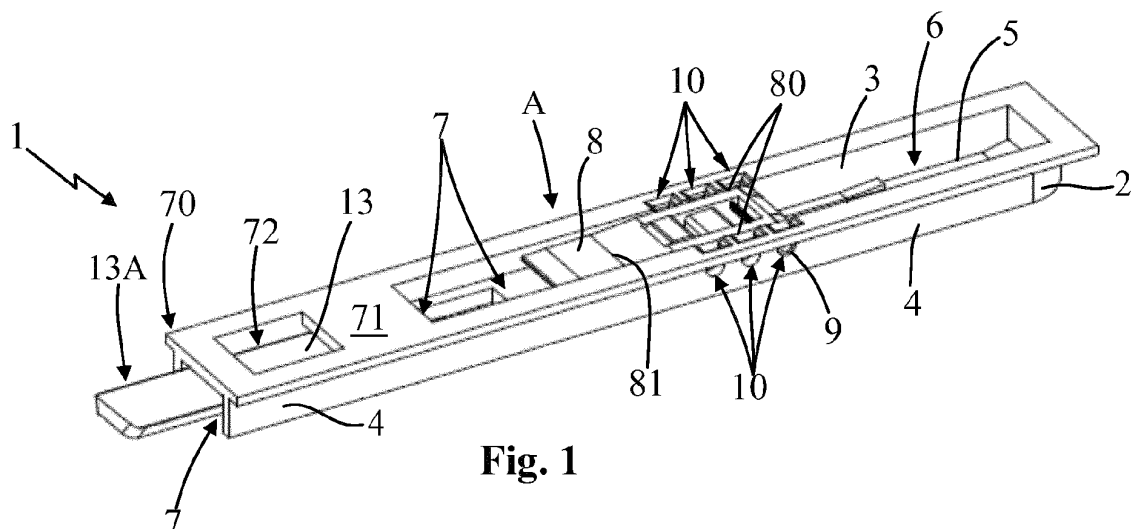
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(54) **LEVER LATCH**

(57) Lever latch for locking a leaf, which comprises a support body (2) susceptible of being embedded in a shaped cavity of a leaf, and provided with a guide (7) having at one end an outlet opening (70). The latch (1) also comprises an actuation lever (8), hinged to the support body (2) by means of a first pin (9) engaged at its ends in opposite seats (10), made on the lateral walls (3,4) of the support body (2). Then, an elongated plate-like spring (11) is provided which is engaged at a first end (11A) with a second pin (12) mechanically associated with the aforesaid actuation lever (8), and a locking rod (13) is also provided, slidably engaged in the guide (7) of the support body (2), and provided with a first free termination (13A) susceptible of being engaged in a hole of a fixed frame or of a floor and with a second

termination (13B) fixed to the second end (11B) of the elongated plate-like spring (11). The actuation lever (8) is then manually actuatable to rotate around the first pin (9) between a first angular end stop position (A), in which the locking rod (13) projects from the outlet opening (70) of the guide (7), and a second angular end stop position (B), in which the locking rod (13) is more retracted in the guide (7). The lateral walls (3, 4) of the support body (2) are provided with a plurality of opposite seats (10) that are aligned along the longitudinal direction (Y) of the same support body (2), and are susceptible of selectively receiving the ends of the first pin (9) in order to vary the position of the actuation lever (8) and of the locking rod (13) along the longitudinal direction (Y) of the support body (2).



**Fig. 1**

## Description

### Field of application

**[0001]** The present invention regards a lever latch, in particular for hinged leaves, according to the preamble of the relative independent claim.

**[0002]** The present latch is advantageously employable for fixing - to a fixed frame, to the floor or to the ceiling - hinged leaves for example of doors, front/security doors, French windows or the like.

**[0003]** The present latch is advantageously intended to be used with double-leaf windows/shutters/doors, e. g. of semi-fixed type and flanking a door, of which one leaf is movable and one fixable by means of such latch in a closed position in which it is susceptible of receiving the movable leaf in abutment.

**[0004]** The latch, subject of the present invention, is therefore inserted in the field of production of accessories for windows/shutters/doors.

### State of the art

**[0005]** In the field of windows/shutters/doors, pairs of lever latches mounted on the section of a first leaf are widely known and diffused, generally in order to lock the leaf to the floor and to the ceiling - and against such section, a second movable leaf is susceptible of abutting when it reaches the closed position.

**[0006]** Several embodiments of lever latches are for example described in the patents IT 1258498, IT 1392432, GB 748188 and EP 537122.

**[0007]** In particular, lever latches are known of the type comprising a support body, which is mounted embedded in a counter-shaped longitudinal seat made in the section of the first leaf at its thickness, and an actuation lever in turn housed in a seat of the support body and pivoted thereto around a transverse axis.

**[0008]** The latch then comprises a spring, which at one end is pivoted to the actuation lever in a position distal from the rotation pin of the actuation lever, and at the other end is fixed to a locking rod (bolt) provided at its opposite end with a push rod intended to be inserted in a hole obtained in the fixed frame of the window/shutter/door or directly in the ground floor.

**[0009]** In operation, by rotating the actuation lever on the support body around the rotation pin, usually between two positions placed at 180 degrees from each other, the spring is driven forward and backward along the extension of the support body, consequently driving the push rod of the latch between a position projecting from the support body, in which the push rod is inserted in the hole of the fixed frame or of the floor in order to retain the leaf rigidly immobilized, and a retracted position, in which the push rod exits from the hole and therefore consequently frees the movement of the leaf.

**[0010]** The lever latches of the type briefly described above have in practice shown that they do not lack draw-

backs.

**[0011]** A first drawback lies in the fact that there is the particular need in the field of reference to adjust the length of that portion of locking rod that exits from the support body in order to allow engaging doors with the floor or with the frame, having made the milling on the thickness of the door in different positions, or having left slits of different height below the door or also having made holes of different depth in the frame or in the floor.

**[0012]** A second drawback lies in the fact that the locking rod is generally made of circular section and this involves a rather high bulk of the support body that houses the rod, which in turn requires carrying out a deep milling on the thickness of the leaf so as to completely embed it; such milling on small thicknesses of the leaf becomes problematic since it risks causing cracks in the wood.

**[0013]** A further third drawback lies in the fact that the latches of known type rotatably have limited push rod travel between the two projecting and retracted positions, which do not allow retaining and freeing the leaf in a fully suitably manner.

**[0014]** In order to at least partly overcome these drawbacks, lever latches are known which connect the spring to the locking rod in an adjustable manner, since a nose projecting from the rod is provided that is susceptible of being selectively engaged in different aligned holes made on the spring. Such latch has the drawback of requiring an adjustment operation that is rather difficult to execute and only possible with latch disassembled from the door.

**[0015]** In general, the latches known up to now are composed of a high number of components and are complicated and costly to make.

### Presentation of the invention

**[0016]** In this situation, the main object of the present invention is therefore that of overcoming the drawbacks manifested by the abovementioned solutions of known type, by providing a lever latch which allows easily adjusting the length of the projecting portion of the locking rod which is extended outside the support body thereof.

**[0017]** A further object of the present invention is to provide a lever latch that allows achieving the aforesaid adjustment of the projecting portion with latch fully mounted on the door.

**[0018]** A further object of the present invention is to provide a lever latch which can be embedded within the thickness of the section of a leaf without compromising the mechanical strength of the same leaf.

**[0019]** A further object of the present invention is to provide a lever latch of limited size, in particular such to make it compatible with all windows/shutters/doors.

**[0020]** A further object of the present invention is to provide a lever latch whose locking rod is capable of achieving a travel of improved length between its projecting and retracted positions.

**[0021]** A further object of the present invention is to provide a lever latch that is structurally robust and durable

over time.

**[0022]** A further object of the present invention is to provide a lever latch that is structurally simple and inexpensive to make.

**[0023]** A further object of the present invention is to provide a lever latch that is simple to install and to adjust.

#### Brief description of the figures

**[0024]** The technical characteristics of the invention, according to the aforesaid objects, can be clearly seen in the contents of the below-reported claims and the advantages thereof will be more evident from the following detailed description, made with reference to the enclosed drawings, which represent a merely exemplifying and non-limiting embodiment of the invention in which:

- figure 1 shows a perspective view of the lever latch, subject of the present invention, with its locking rod in a position projecting from its support body;
- figure 2 shows a plan view of the lever latch illustrated in figure 1;
- figure 3 shows a sectional view of the lever latch illustrated in figure 2 according to the trace III - III of the same figure 2;
- figure 4 shows a perspective view of the lever latch, subject of the present invention, with its locking rod in a position partially retracted from its support body;
- figure 5 shows a plan view of the lever latch illustrated in figure 4;
- figure 6 shows a sectional view of the lever latch illustrated in figure 4 according to the trace VI - VI of the same figure 5;
- figure 7 shows a perspective view of the lever latch, subject of the present invention, with its locking rod in retracted position and completely housed in the support body;
- figure 8 shows a plan view of the lever latch illustrated in figure 7;
- figure 9 shows a sectional view of the lever latch illustrated in figure 7 according to the trace IX - IX of the same figure 8;
- figure 10 shows a perspective view of the lever latch, subject of the present invention, with the actuation lever of the locking rod being adjusted having its first pin disengaged from the opposite seats made on lateral walls of the support body 2;
- figure 11 shows a sectional view of the lever latch illustrated in figure 10, carried out along the middle longitudinal plane, i.e. along the same plane of figures 3, 6 and 9;
- figure 12 shows a perspective and exploded view of the lever latch, subject of the present invention;
- figure 13 shows a perspective view of the lever latch, subject of the present invention, mounted on a leaf and with its locking rod in a position projecting from its support body.

#### Detailed description

**[0025]** In accordance with the enclosed figures, reference number 1 overall indicates the lever latch, subject of the present invention.

**[0026]** The lever latch 1 is intended to be preferably employed for locking a "semi-fixed" leaf of a door, of a front/security door, of a French window or of another similar window/shutter/door, provided with another movable leaf intended to abut against said semi-fixed leaf.

**[0027]** Of course, without departing from the protective scope of the present patent, the lever latch 1, subject of the present invention, can be analogously employed on any one window/shutter/door, in particular constituted by a hinged leaf, in order to retain it with respect to a fixed frame or with respect to the floor.

**[0028]** More in detail the lever latch 1 comprises, in a per se known manner, a support body 2, preferably made of metal material, which is susceptible of being embedded in a shaped cavity of a leaf (indicated with 100 in figure 12), e.g. with external slot form.

**[0029]** Such support body 2 appears as a box-like body provided with an elongated main extension in a longitudinal direction Y between a first and a second termination, respectively indicated with 2A and 2B, and comprises two lateral walls 3 and 4, parallel to and opposite each other, which delimit, preferably together with a bottom 5, preferably starting from the first termination 2A, a containment chamber 6, which is open at the top in opposite direction with respect to the bottom 5.

**[0030]** Along its longitudinal extension Y, for at least one section starting from its second termination 2B, the support body 2 defines a guide 7, which is in communication at a first end with the containment chamber 6 and at the other second end is provided with an outlet opening 70.

**[0031]** The lever latch 1 also comprises an actuation lever 8, which is hinged to the support body 2 within the containment chamber 6 by means of a first pin 9 arranged along a first transverse axis X and engaged at its ends in opposite seats 10 made on the lateral walls 3, 4 of the support body 2.

**[0032]** Then, an elongated plate-like spring 11 is provided that is engaged at a first end 11A with a second pin 12 associated with the actuation lever 8 according to a second transverse axis X' parallel to the first transverse axis X of the first pin 9 and arranged in distal position with respect to such first transverse axis X towards the free end of the actuation lever 8.

**[0033]** The lever latch 1 also consists of a locking rod 13, which is slidably engaged in the guide 7 of the support body 2.

**[0034]** More in detail, such locking rod 13 is provided with a first free termination 13A (push rod), possibly tapered, susceptible of being engaged in a hole of a fixed frame or of a floor, and with a second termination 13B fixed to the second end 11B of the elongated plate-like spring 11.

**[0035]** In operation, the actuation lever 8 is manually actuable to rotate around the first pin 9 between a first angular end stop position A, in which the free end 13A of the locking rod 13 projects from the outlet opening 70 of the guide 7, and a second angular end stop position B, in which the locking rod 13 is more retracted in the guide 7, for example having the free end 13A contained in the guide 7 or even only in proximity to the outlet opening 70 of the guide 7.

**[0036]** The two angular end stop positions A and B are substantially opposite, i.e. they are obtained by rotating the actuation lever 8 by 180 degrees in one sense and in the opposite sense.

**[0037]** In such angular end stop positions A and B, the actuation lever 8 is contained within the containment chamber 6 on opposite sides with respect to the first pin 9.

**[0038]** According to the idea underlying the present invention, the lateral walls 3, 4 of the support body 2 are provided with a plurality of opposite seats 10 that are aligned along the longitudinal direction Y of the support body 2, and are susceptible of selectively receiving the ends of the first pin 9 in order to vary the position of said actuation lever 8 and of the locking rod 13 along the longitudinal extension direction Y of the support body 2.

**[0039]** Advantageously, simply by moving the hinging position of the first pin 9 between the different pairs of opposite seats 10 that are transversely aligned on the walls 3 and 4 of the support body, it is easily possible to adjust the length with which the locking rod projects from the outlet opening 70 of the guide 7, when the actuation lever 8 is placed in the first angular end stop position A and correspondingly the free termination 13A of the locking rod is in projecting position.

**[0040]** By moving the position of the first pin 9 of the actuation lever 8, also the position of the locking rod 13 connected to the actuation lever 8 is moved by means of the elongated plate-like spring 11.

**[0041]** Preferably, or in accordance with the preferred embodiment of the present invention, the opposite seats 10 are open at the top, i.e. towards the upper opening of the containment chamber 6 of the support body 2.

**[0042]** In this manner, advantageously, the ends of the first pin 9 can be easily inserted in the pairs of opposite seats 10 starting from the top, i.e. from the exterior of the containment chamber 6 towards its interior, i.e. towards its bottom 5 (if present).

**[0043]** In figures 10 and 11, it is possible to easily appreciate the ease of moving the first pin 9 between the different pairs of opposite seats 10, simply by overcoming the force of the plate-like spring 11 for the time necessary for moving the same pin 9. Once moved into the desired seat 10, the pin 9 will be maintained herein by the compression force towards the seat 10 exerted by the same plate-like spring 11.

**[0044]** Preferably, the elongated plate-like spring 11 is shaped for acting on the first pin 9 so as to elastically force it towards the interior of the seats 10.

**[0045]** In this mode, advantageously, the first pin 9 re-

mains engaged in the respective opposite seats 10 without being able to exit therefrom, if not by following a manual action that overcomes the elastic resistance action of the spring in order to move the first pin 9 into another pair of opposite seats 10.

**[0046]** Otherwise or jointly, in accordance with an embodiment not illustrated in the enclosed figures, the inlet mouth of the opposite seats 10 can be slightly reduced in order to allow the entrance of the ends of the first pin 9 only with an effort aimed to make them go beyond the aforesaid inlet mouth of the pair of opposite seats 10 via elastic deformation. In this manner, the first pin will be stably fixed in its selected position.

**[0047]** The guide 7 for the locking rod is advantageously in the form of a through channel, which is defined between the lateral walls 3, 4 that are parallel to each other, by the bottom 5 and by an upper wall 71. Both the upper wall 71 and the bottom wall 5 can have one or more windows, respectively indicated with 72 and 52 for an easy molding of the support body 2.

**[0048]** The guide in through channel form is therefore, for example, open at the top or bottom at such windows 72 and 52 provided at contiguous portions of the support body 2.

**[0049]** The elongated plate-like spring 11 unloads, on the upper wall of the through channel 71 of the guide 7 and through the locking rod 13, the elastic force adapted to determine the moment that it exerts on the actuation lever 8 for pushing it towards the interior of the containment chamber 6.

**[0050]** Advantageously, in accordance with the embodiment illustrated in the enclosed figures, the elongated plate-like spring 11 is shaped with an annular portion 110 placed at its first end 11A, which is wound around the second pin 12. Advantageously, such annular portion is not circumferentially closed, having a lower opening in order to allow the forced insertion of the second pin 12 at its interior.

**[0051]** The elongated plate-like spring 11 also comprises, in an intermediate position thereof, a first concave portion 111 directed towards the interior of the containment chamber 6 and susceptible of receiving the first pin 9 of the actuation lever 8 when the latter is in the second angular end stop position B.

**[0052]** Advantageously, the elongated plate-like spring 11 finally comprises a flattened terminal portion 112 at its second end 11B, which is surmounted on the second termination 13B, also flattened, of the locking rod 13.

**[0053]** In this manner, the elongated plate-like spring 11 and the locking rod 13 are superimposed with their two flattened portions limiting the bulk and thus in the end the thickness of the lever latch 1.

**[0054]** Advantageously, the flattened terminal portion 112 of the elongated plate-like spring 11 and the flattened second termination 13B of the locking rod 13 are fixed to each other by fixing means 50, e.g. screw fixing means, or they are provided with aligned holes engaged for ex-

ample by a rivet.

[0055] The locking rod 13 can advantageously comprise a window 14, which allows the passage of a fixing screw (not illustrated) for fixing the latch in the seat made in the leaf 100, regarding which in the figures the seat 101 is indicated for the screw on the bottom 5. Such window 14 can also allow forcibly acting with a tool in order to move the locking rod 13 slidably in the guide 7 if the same locking rod 13 is jammed or the actuation lever 8 is unusable.

[0056] Advantageously, moreover, the actuation lever 8 comprises two longitudinal shoulders 80 connected to each other by the first and second pins 9, 12, which are longitudinally extended along the extension of the support body 2, parallel to each other.

[0057] Preferably, the two longitudinal shoulders 80 are also joined by an upper wall 81 opposite the containment chamber 6 and advantageously provided only at the free end of the actuation lever 8 so as to define an opening at the base of the actuation lever 8 at the first pin adapted to allow an improved penetration of the elongated plate-like spring 11 in the actuation lever 8, as better specified hereinbelow.

[0058] The actuation lever 8 is susceptible of receiving, between its two shoulders 80, the terminal section of the elongated plate-like spring 11 towards its first end 11A when it is in the first angular end stop position A. In this manner, the lever latch 1 can maintain the bulk of its thickness extremely limited, allowing limiting the milling operations for the window/shutter/door for making the cavity necessary for housing the support body 2 of the latch 1.

[0059] In addition, the elongated plate-like spring 11 comprises, between the annular portion 110 and the first concave portion 111, also a second concave portion 113, in this case with concavity directed towards the exterior of the containment chamber 6.

[0060] In this manner, when the actuation lever 8 is in the first angular end stop position A, it is susceptible of receiving between its two shoulders 80 both the annular portion 110 and the first concave portion 111 of the elongated plate-like spring 11, with the second pin 12 that is simultaneously housed in the second concave portion 113 of the elongated plate-like spring 11.

## Claims

### 1. Lever latch for locking a leaf, which comprises:

- a support body (2), which is susceptible of being embedded in a shaped cavity of a leaf, and is provided with:

- an elongated main extension in a longitudinal direction (Y),
- at least two opposite lateral walls (3, 4) delimiting a containment chamber (6) open

at the top;

- a guide (7) in communication at a first end with said containment chamber (6) and provided at the other second end with an outlet opening (70);

- an actuation lever (8), which is hinged to said support body (2) within said containment chamber (6) by means of a first pin (9) arranged along a first transverse axis (X) and engaged at its ends in opposite seats (10), made on the lateral walls (3,4) of said support body (2);

- an elongated plate-like spring (11) engaged at a first end (11A) with a second pin (12) mechanically associated with said actuation lever (8) having a second transverse axis (X') and arranged at a distal position with respect to said first transverse axis (X);

- a locking rod (13), slidably engaged in the guide (7) of said support body (2), and provided:

- with a first free termination (13A) susceptible of being engaged in a hole of a fixed frame or of a floor and

- with a second termination (13B) fixed to the second end (11B) of said elongated plate-like spring (11);

said actuation lever (8) being actuatable to rotate around said first pin (9) between a first angular end stop position (A), in which the first free termination (13A) of said locking rod (13) projects from the outlet opening (70) of said guide (7), and a second angular end stop position (B), in which said locking rod (13) is more retracted in said guide (7),

### characterized in that:

the lateral walls (3, 4) of said support body (2) are provided with a plurality of opposite seats (10) aligned along the longitudinal direction (Y) of said support body (2), and susceptible of selectively receiving the ends of said first pin (9) in order to vary the position of said actuation lever (8) and of said locking rod (13) along the longitudinal direction (Y) of said support body (2).

2. Lever latch according to claim 1, **characterized in that** said opposite seats (10) are open towards the upper opening of the containment chamber (6) of said support body (2).

3. Lever latch according to claim 1 or 2, **characterized in that** said elongated plate-like spring (11) acts on said first pin (9), elastically forcing it towards the interior of said opposite seats (10).

4. Lever latch according to any one of the preceding claims, **characterized in that** said guide (7) comprises a through channel (71) provided with an inlet

section (71A) and with an outlet section (71B) traversed to size by said locking rod (8).

5. Lever latch according to claims 3 and 4, **characterized in that** said elongated plate-like spring (11) unloads, on said through channel (71) through said locking rod (13), the elastic force of the moment exerted on said actuation lever (8) towards the interior of said containment chamber (6).
 

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6. Lever latch according to any one of the preceding claims, **characterized in that** said elongated plate-like spring (11) comprises, at its first end (11A), an annular portion (110) wound around said second pin (12).
 

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7. Lever latch according to any one of the preceding claims, **characterized in that** said elongated plate-like spring (11) comprises in an intermediate position thereof a first concave portion (111) directed towards the interior of said containment chamber (6) and susceptible of receiving the first pin (9) of said actuation lever (8) when the latter is in said second angular end stop position (B).
 

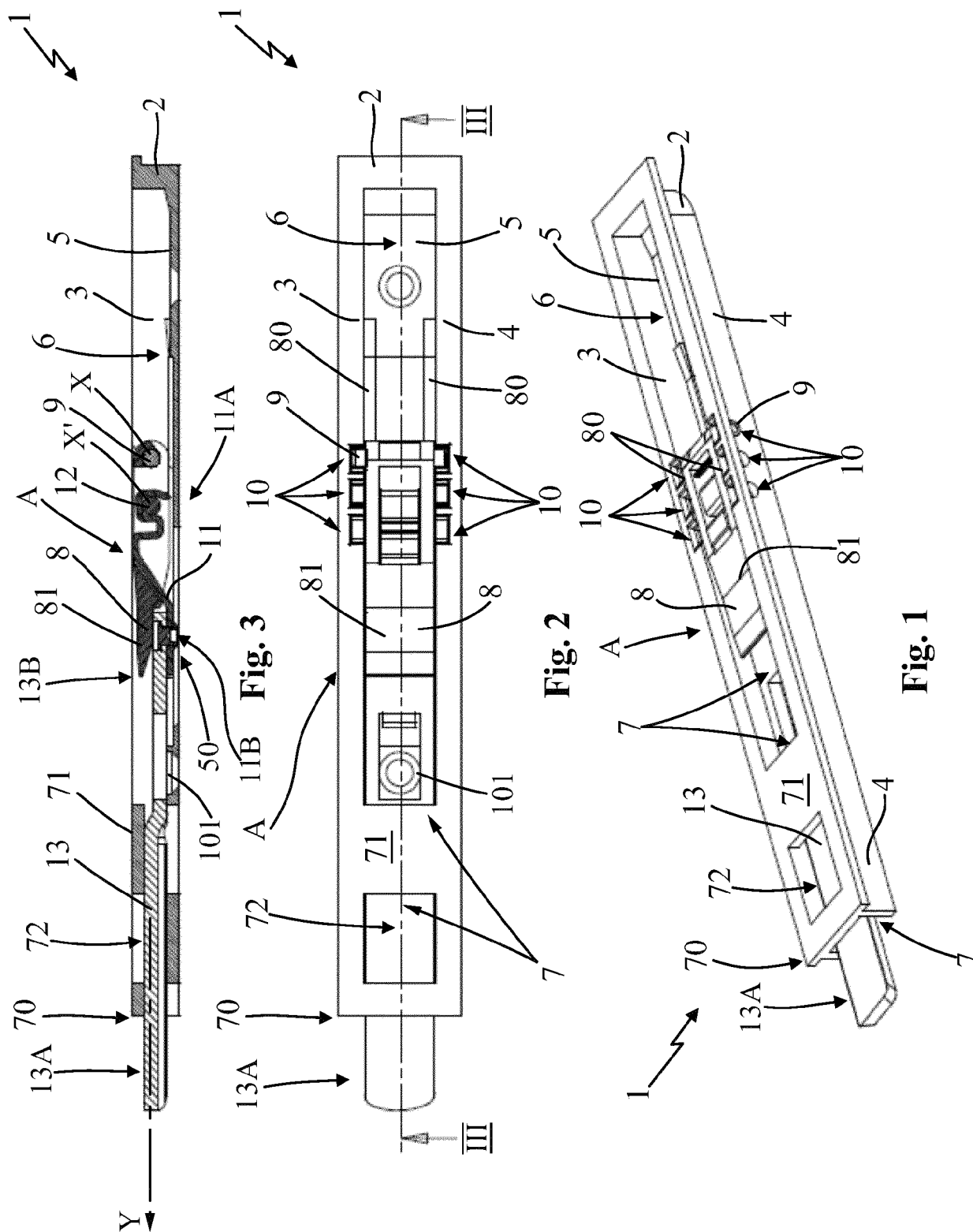
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8. Lever latch according to any one of the preceding claims, **characterized in that** said actuation lever (8) comprises two longitudinal shoulders (80) joined together by said first and second pin (9, 12) which are parallel to each other and transverse to the extension direction of said support body (2).
 

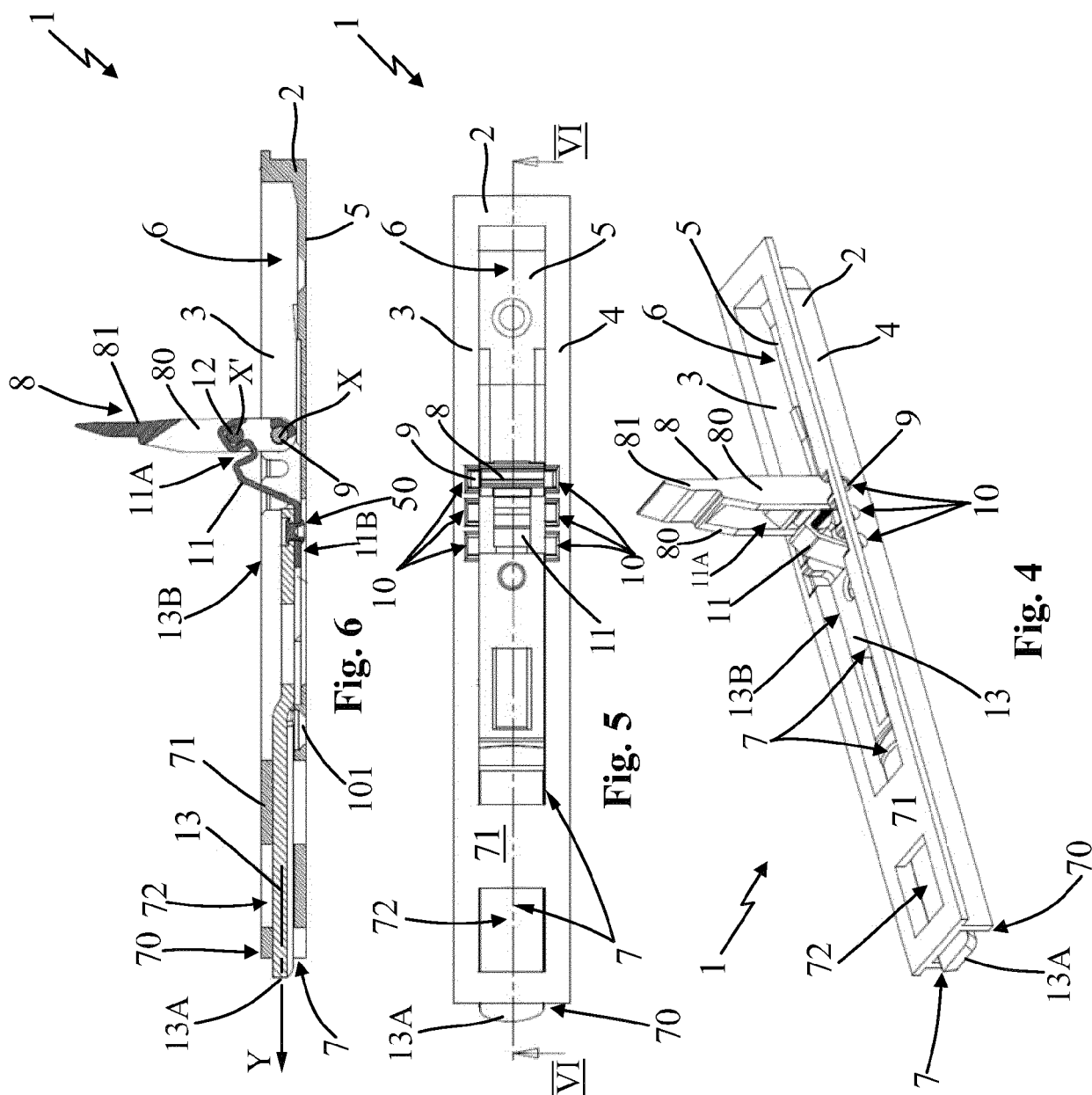
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9. Lever latch according to claims 6, 7 and 8, **characterized in that** said elongated plate-like spring (11) comprises, between said annular portion (110) and said first concave portion (111), a second concave portion (113) directed towards the exterior of said containment chamber (6); said actuation lever (8) being susceptible of receiving the annular portion (110) and the first concave portion (111) of said elongated plate-like spring (11) when the latter is in said first angular end stop position (A), with said second pin (12) housed in said second concave portion (113).
 

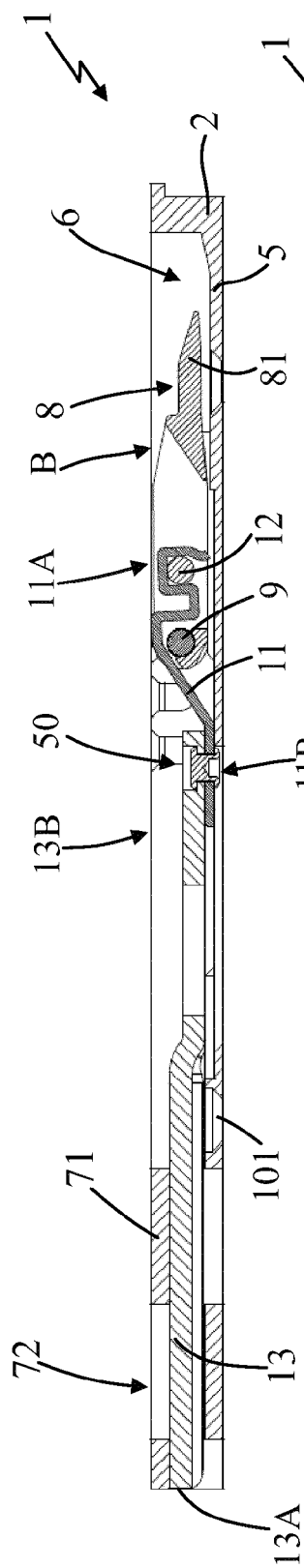
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10. Lever latch according to claim 1, **characterized in that** said actuation lever (8) is contained within said containment chamber (6) on opposite sides with respect to said first pin (9) in said two opposite angular end stop positions (A, B).
 

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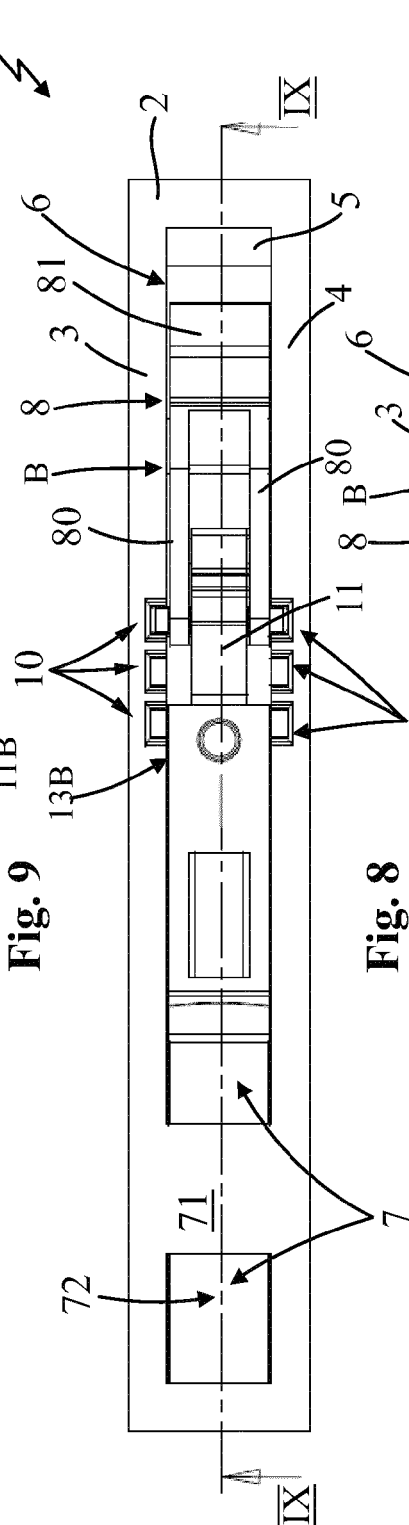
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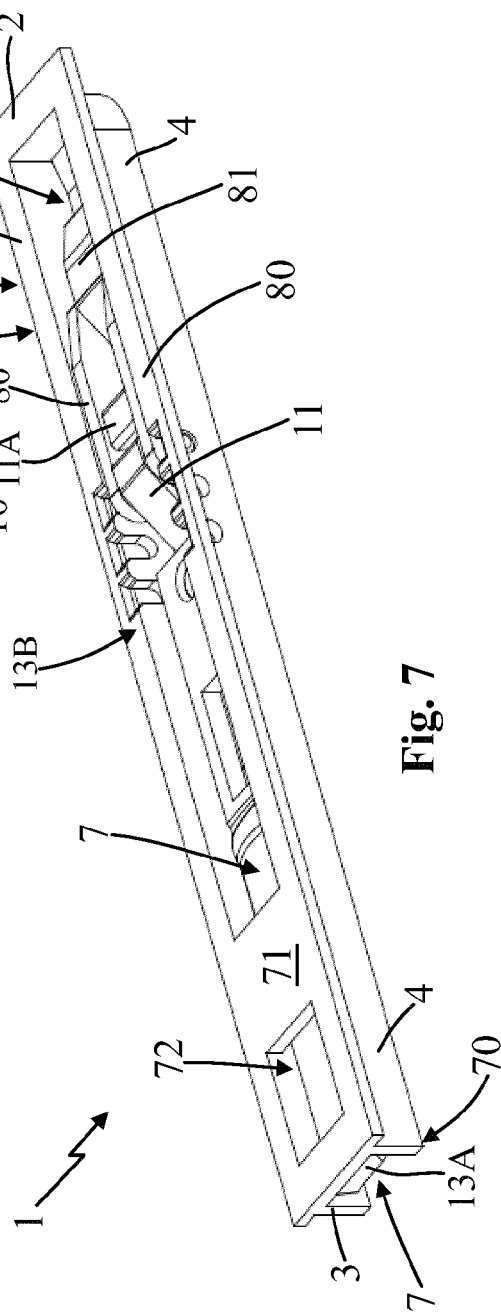




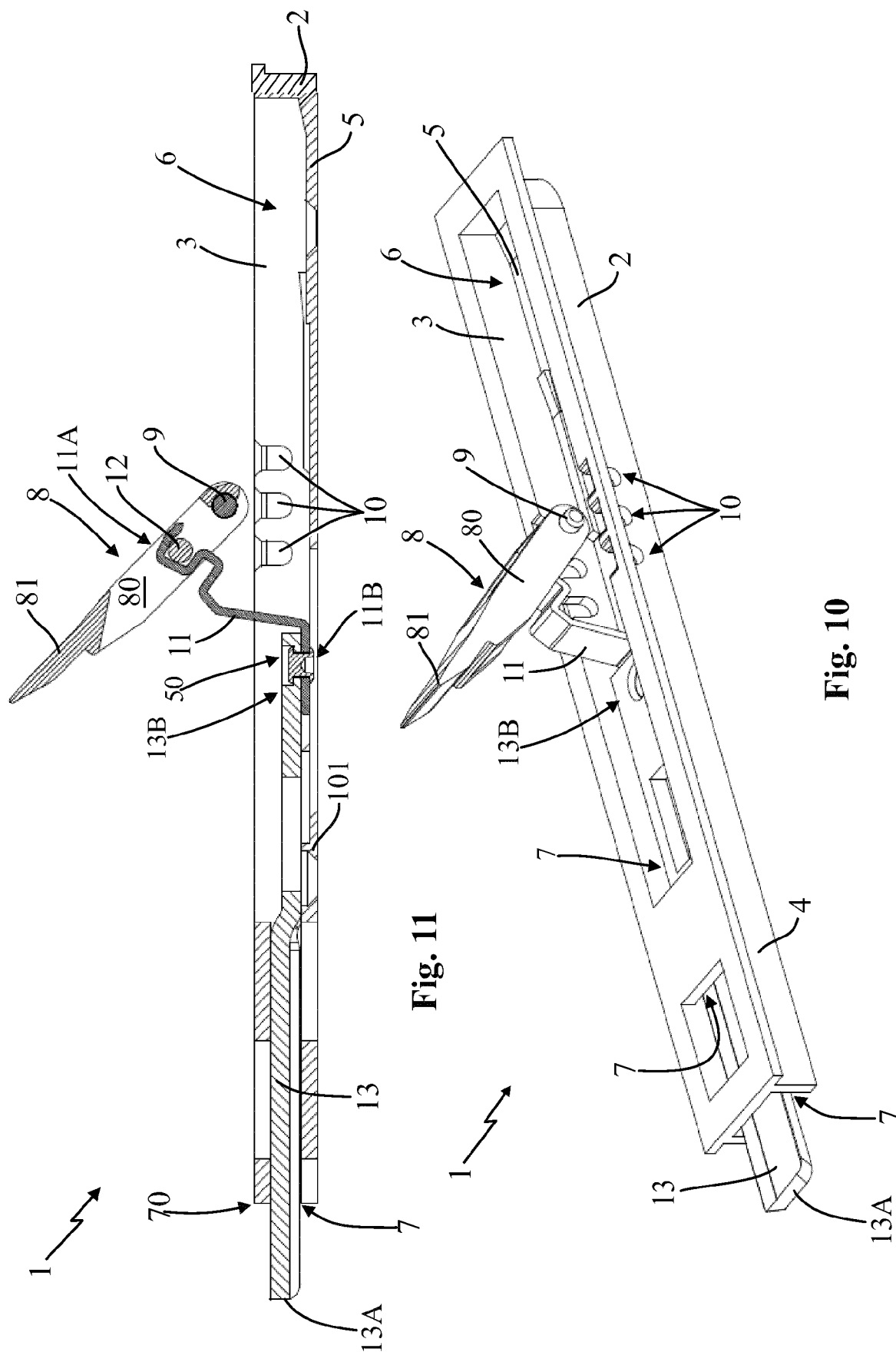
**Fig. 9**

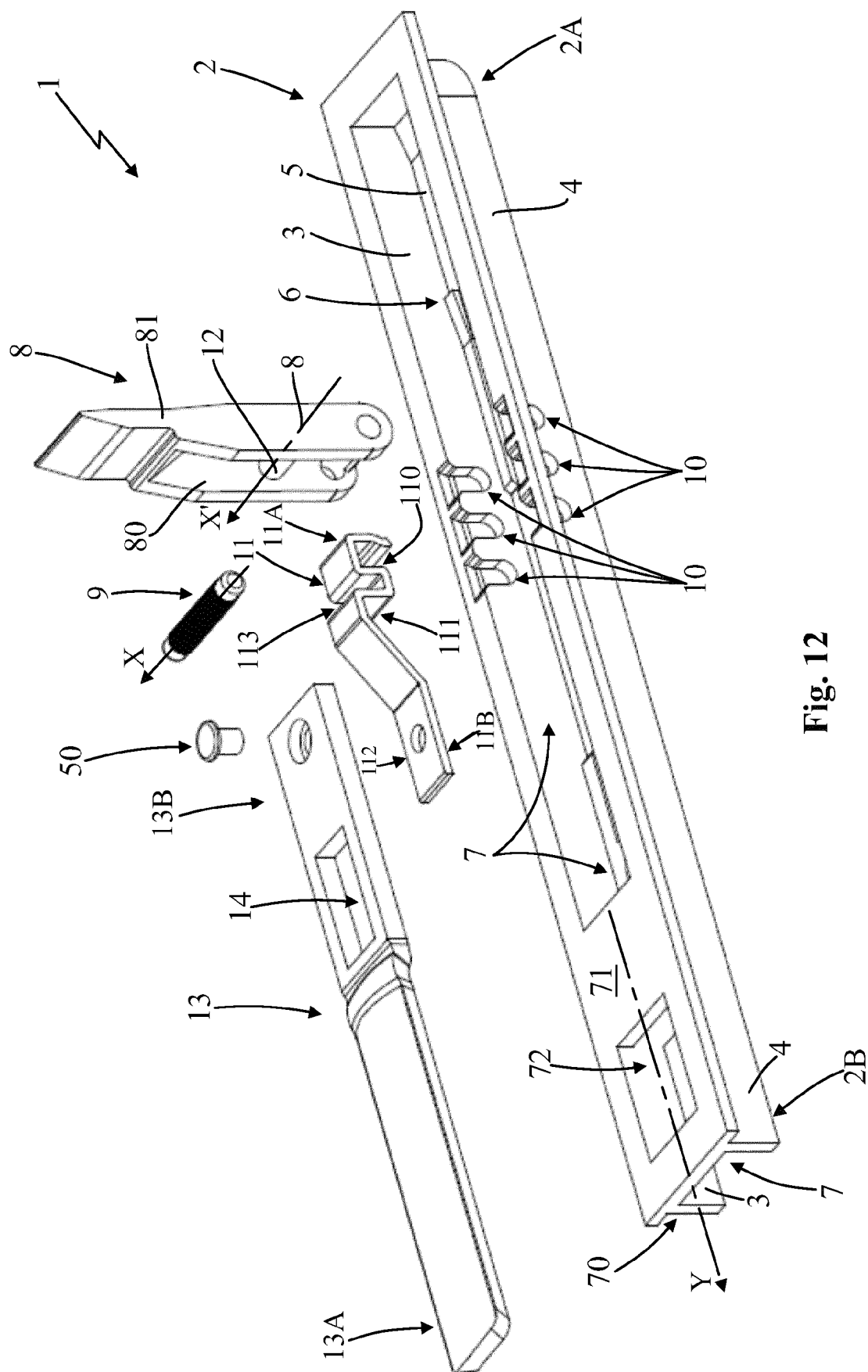


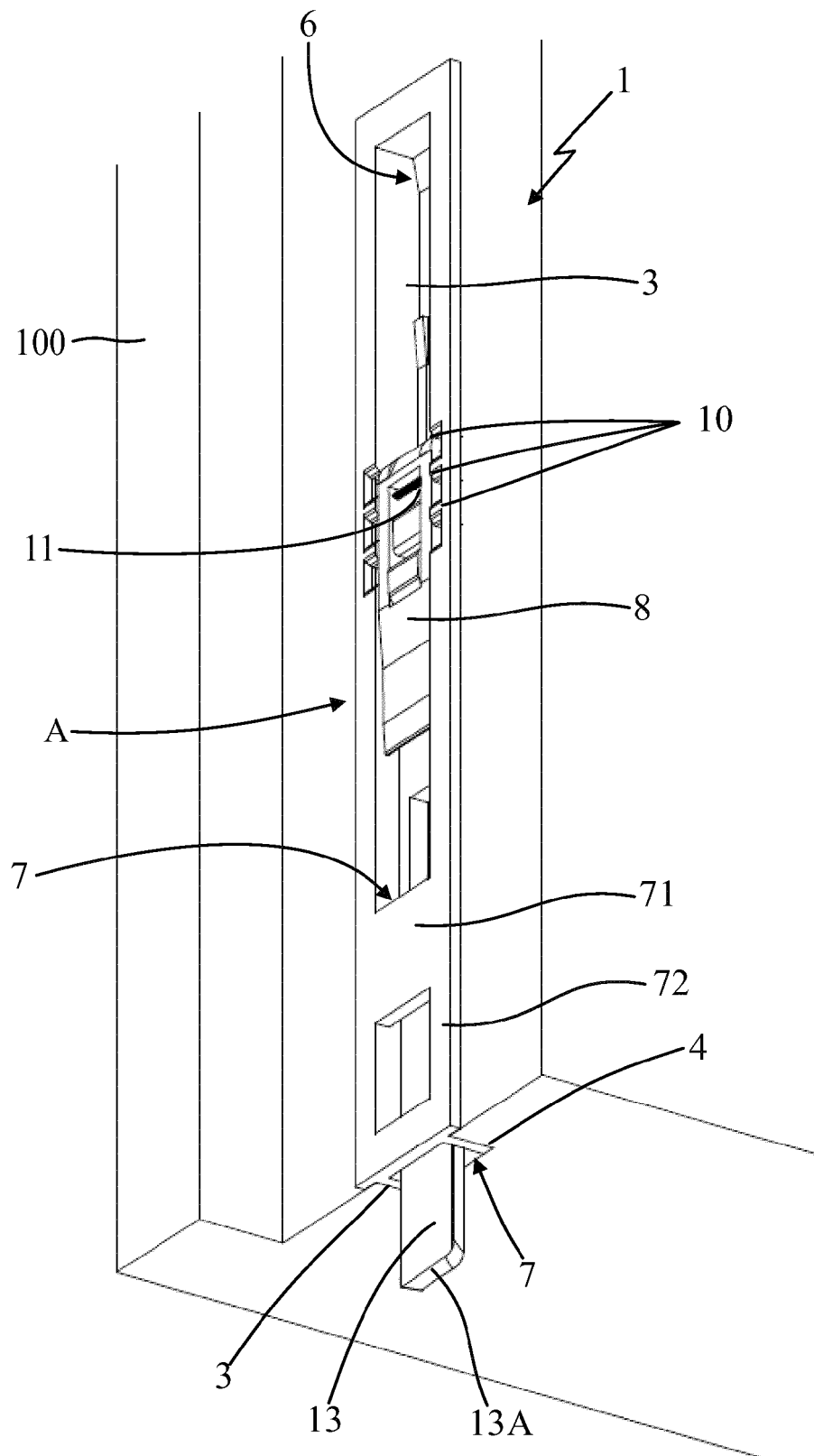
**Fig. 8**



**Fig. 7**







**Fig. 13**



## EUROPEAN SEARCH REPORT

Application Number  
EP 19 15 6165

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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                    |                                                                                                                                |                                                                                                                                                                                                                                                                              |                                         |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
| Category                                                                                                                                                                                                                                               | Citation of document with indication, where appropriate, of relevant passages                                                  | Relevant to claim                                                                                                                                                                                                                                                            | CLASSIFICATION OF THE APPLICATION (IPC) |
| A                                                                                                                                                                                                                                                      | WO 01/65039 A1 (MASTER SRL [IT]; LOPERFIDO MICHELE [IT])<br>7 September 2001 (2001-09-07)<br>* pages 1-7; figures 1-6 *        | 1-10                                                                                                                                                                                                                                                                         | INV.<br>E05C1/06<br>E05B63/06           |
| A                                                                                                                                                                                                                                                      | US 9 145 718 B1 (LIN HSI-TING [TW])<br>29 September 2015 (2015-09-29)<br>* column 3, line 30 - column 7, line 2; figures 1-5 * | 1-10                                                                                                                                                                                                                                                                         | ADD.<br>E05B15/04                       |
| A                                                                                                                                                                                                                                                      | US 3 680 901 A (BIEBUYCK LAWRENCE F)<br>1 August 1972 (1972-08-01)<br>* the whole document *                                   | 1-10                                                                                                                                                                                                                                                                         |                                         |
| A                                                                                                                                                                                                                                                      | CN 102 943 802 A (LEYARD CO)<br>27 February 2013 (2013-02-27)<br>* abstract; figures 1-22 *                                    | 1-10                                                                                                                                                                                                                                                                         |                                         |
| A                                                                                                                                                                                                                                                      | GB 748 188 A (HOLDEN & CO B HAM LTD E; ERNEST JOHN HOLDEN)<br>25 April 1956 (1956-04-25)<br>* the whole document *             | 1-10                                                                                                                                                                                                                                                                         |                                         |
|                                                                                                                                                                                                                                                        |                                                                                                                                |                                                                                                                                                                                                                                                                              | TECHNICAL FIELDS SEARCHED (IPC)         |
|                                                                                                                                                                                                                                                        |                                                                                                                                |                                                                                                                                                                                                                                                                              | E05C<br>E05B                            |
| The present search report has been drawn up for all claims                                                                                                                                                                                             |                                                                                                                                |                                                                                                                                                                                                                                                                              |                                         |
| Place of search<br><b>The Hague</b>                                                                                                                                                                                                                    |                                                                                                                                | Date of completion of the search<br><b>27 June 2019</b>                                                                                                                                                                                                                      | Examiner<br><b>Boufidou, Maria</b>      |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document |                                                                                                                                | T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                         |

EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 19 15 6165

5 This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
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