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(54) **Cremone bolt for opening and closing door or window frames**

Treibstange zum Öffnen und Schließen von Türen- oder Fensterrahmen

Boulon en crémona pour l'ouverture et la fermeture de cadres de portes ou fenêtres

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**EP-A1- 1 387 030 DE-U1-202009 007 797**

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## Description

**[0001]** The present invention refers to a cremone bolt for opening and closing door or window frames.

**[0002]** In the field of window and door frames, closing and opening groups of the so called "cremone bolt" type are known, which, in their most basic version, comprise one or two rods that are associated to the mobile frame of a door or window frame in a slidable manner along the two opposite directions of a same straight line and the sliding motion of which is controlled by the rotation of a handle fixed to the same mobile frame of the door or window frame. In the closed configuration, the rod or the rods are inserted with their ends in suitable abutments or female seats obtained in the fixed frame of the door or window frame.

**[0003]** Typically, the rod or the rods are connected to the handle through connection blocks and the ends of the rod/s intended to be inserted in the abutments or in the female seats of the fixed frame in turn consist of terminal elements or end locking bars connected to the rods themselves.

**[0004]** The handle comprises a handgrip pivotally mounted on a support case around an axis which, in its assembled configuration, is orthogonal to the plane of the mobile frame of the door or window frame and the rotation of which, through a pinion and rack driving mechanism, controls the movement, along the two opposite directions of a same straight line, of the rod/s and of all the members engaged with it (connection block and end locking bars or end terminals) .

**[0005]** In greater detail, the pinion and rack driving mechanism comprises a pinion that is integrally constrained to the handgrip of the handle and that meshes one or two racks, each of which is mounted in a slidable manner in the support case of the handle. Each rack has a respective actuating element integral with it, also known in the field as "fin", which is directly or indirectly connected to the connection block of the rod/s themselves.

**[0006]** In known cremone bolts, such as known from e.g. DE 20 2009 007 797 U1, the actuation elements or "fins" are obtained in a single piece with the racks or are fixed to them in a rigid and complete manner without the possibility of any relative movement with respect to one another so as to form a single body.

**[0007]** It should be made clear that the closing and opening groups of the cremone bolt type can control the opening and the closure of the turning or of the tilting and turning type; in both cases, the transmission of the motion from the handle to the actuation elements or "fins" and from these to the kinematism connected to them does not vary.

**[0008]** A cremone bolt in which a separate actuation element is positioned in a seat in the rack is furthermore known from EP 0 446 566 A1.

**[0009]** These cremone bolt closing and opening groups of the known type have some drawbacks, amongst which, in particular, it should be remembered

that the coupling and connection clearances between the various elements that form them add to one another giving way to operation faults in the opening and closing steps of the door or window frames.

**[0010]** Indeed, as indicated above, the kinematism of closing and opening groups consists of various elements - handle, pinion and rack motion transmission means, actuation elements or "fins", connection blocks, rods and terminals or end locking bars - which are coupled and connected to one another, so that the tolerances and the manufacturing and/or assembly faults of each element add to one another giving way to clearances that are overall not negligible, negatively affecting the operation of the closing and opening group itself.

**[0011]** The purpose of the present invention is that of avoiding the drawbacks of the cremone bolt closing and opening groups of the known type as highlighted above.

**[0012]** In the field of such a general purpose, the present invention proposes to provide a cremone bolt for opening and closing door or window frames that allows to recover coupling and connection clearances between the various elements that make up the corresponding kinematism and the operation of which is regular and precise during both opening and closure.

**[0013]** These and other purposes are achieved with a cremone bolt for opening and closing door or window frames, of the type comprising a handle in turn comprising a case intended to be applied on a movable door or window frame and a manoeuvring shaft pivotally mounted on said case around a rotation axis, in which within said case a pinion is pivotally mounted around said rotation axis, said pinion being integrally constrained, at least in rotation, to said manoeuvring shaft and engaging with at least a rack associated to said case in a slidable manner in both directions of a straight line orthogonal to said rotation axis and parallel to at least one manoeuvring rod of the cremone bolt, furthermore comprising at least an actuating element which is connectable to said manoeuvring rod wherein said actuating element is associated to said rack in a slidable manner in both directions of a straight line parallel to said straight line and adjusting and fastening means of the position of said actuating element with respect to said rack.

**[0014]** In one embodiment, the adjusting and fastening means are supported by the rack so as to be integral with it in its sliding movement along said straight line (R) and are accessible from the outside of the handle, so as to be able to carry out the adjustment and the fastening of the position of the actuating element even when the cremone bolt has already been mounted in the configuration of use.

**[0015]** In a preferred embodiment, the adjusting and fastening means are of the kind of a manoeuvring and adjusting screw and comprise a screw extending substantially parallel to the straight line (R), which has its opposite ends pivotally supported by the rack and engages with a corresponding nut screw defined in the actuating element.

**[0016]** The characteristics and the advantages of a cremone bolt for opening and closing door or window frames, according to the present invention shall become clearer from the following description, given as an example and not for limiting purposes, with reference to the attached schematic drawings, in which:

figure 1 is an exploded schematic view of a detail of a possible application of a cremone bolt according to the present invention;  
figure 2 is an axonometric view of the handle of a cremone bolt according to the present invention;  
figure 3 is a schematic exploded view of the handle of figure 2;  
figure 4 is a schematic view of the back of the handle of figure 3 without the closure counter-plate;  
figures 5, 6 and 7 schematically show an axonometric view of the detail of the cremone bolt according to the present invention consisting of the pinion, of the rack, of the actuating element and of the means for adjusting and fastening the position of the actuating element with respect to the rack, seen from the frame side, from the side of the handle and in an exploded view, respectively;  
figure 8 is a schematic section view according to the plane VIII-VIII of figure 5.

**[0017]** With particular reference to the attached figures reference numeral 1 wholly indicates a cremone bolt for opening and closing door or window frames.

**[0018]** The cremone bolt 1 comprises a handle that in turn comprises a case 2 intended to be applied onto a movable door or window frame, in particular on the upright of a wing of a door or window frame, and a manoeuvring handgrip 3 that is pivotally mounted on the case 2 around a rotation axis A.

**[0019]** Inside the case 2 a pinion 4 is pivotally mounted around the same rotation axis A, integrally constrained, at least in rotation, to the handgrip 3.

**[0020]** The pinion 4 engages with at least one rack 5, which is associated to the case 2 in a slidable manner in both directions of a straight line R orthogonal to the rotation axis A and parallel to the rod/s 6 for manoeuvring the cremone bolt, of which one is schematised in figure 1.

**[0021]** The rack 5 is associated to an actuating element 7, also known in the field as "fin", intended to be directly or indirectly connected to the manoeuvring rod 6.

**[0022]** According to the special characteristic of the present invention, the actuating element 7 is associated to the rack 5 in a slidable manner in both directions of a straight line parallel to the straight line R and there are adjusting and fastening means of the position of the actuating element 7 with respect to the rack 5.

**[0023]** The adjusting and fastening means make it possible to manoeuvre the actuating element 7 to slide along the rack 5 so as to be able to modify the relative position of the former with respect to the latter and to fix the actuating element 7 with respect to the rack 5 in the desired

position, so that the actuating element 7 integrally moves with the rack 5 when, by action of the pinion 4, it is made to slide in one or in the other of the two sliding directions respectively for the closure and the opening of the door or window frame.

**[0024]** The adjusting and fastening means are supported by the rack 5 so as to be integral with it in its sliding movement along said straight line (R).

**[0025]** Advantageously, moreover, such adjusting and fastening means are accessible from outside of the case 2, so as to be able to carry out adjustment operations even when the cremone bolt 1 is already mounted in its configuration of use.

**[0026]** As shall become clearer from the following description, the possibility of relative sliding of the actuating element 7, or fin, with respect to the rack 5 and the possibility of adjusting the position of the actuating element 7 with respect to the rack 5 by acting upon the adjusting and fastening means, make it possible to recover the clearances of coupling between the various elements that form the kinematism of the cremone bolt (connection block, rods and terminals or end locking bars), said kinematism depending upon the actuating element 7 itself.

**[0027]** As schematically represented in figure 1, indeed, each actuating element 7 is intended to be directly or indirectly connected to a connection block 8 which slides in a channel of a suitable guide 9 intended to be fixed on the side of an upright of a wing. The connection block 8 in turn couples with the end of a manoeuvring rod 6, the opposite end of which is connected to a closure terminal or end locking bar 10. The free end of the end locking bar 10 is intended to be engaged in a corresponding abutment or female seat 11 that is fixed to the fixed frame of the door or window frame.

**[0028]** It should be made clear that in figure 1 a possible embodiment of the cremone bolt object of the present invention is represented, purely as an example and not for limiting purposes, without excluding different embodiments, referring for example: to the number, to the form and to the connection of the various elements that make up the manoeuvring kinematism (connection block, manoeuvring rods and terminal or end locking bar), to the number of actuation elements or fins, of which there can also be two, each associated with a respective rack and to respective adjusting and fastening means, or to the type of closure and opening of the door or window frame, which can simply turn or turn and tilt.

**[0029]** Figures 3-8 show in greater detail the cremone bolt 1 object of the present invention.

**[0030]** The case 2 has a circular seat 12 within which the cylindrical portion of the stem 13 which projects behind the pinion 4 is supported in rotation. The end of the stem 13 opposite to the pinion 4 has a prismatic configuration intended to be coupled with a corresponding seat formed in the handgrip 3 and that is not visible in the attached figures. Between the stem 13 and the handgrip 3 there is thus a prismatic coupling that constrains the stem 13 at least against rotation with respect to the hand-

grip 3.

**[0031]** Between the case 2, the handgrip 3 and the stem 13 there are springs 14 and 15 respectively of the snap-in type and of the anti-friction type.

**[0032]** Inside the case 2 there is a plate 16 for guiding the rack 5.

**[0033]** The rack 5 has a toothing 17 that engages with the toothing 18 of the pinion 4.

**[0034]** The actuating element 7 is associated to the rack 5 with a coupling of a male and female kind suitable for allowing the relative sliding of the former with respect to the latter and *vice versa*.

**[0035]** In the embodiment represented in the attached figures, the rack 5 has, on the side facing the actuating element 7, a male element consisting of a projecting ribbing 19 which is inserted in a corresponding female seat consisting of a groove 20 formed on the corresponding side of the base 70 of the actuating element 7, with, of course, the reverse coupling also being possible.

**[0036]** Alternative embodiments of the male-female coupling between the actuating element 7 and the rack 5 are not excluded, said coupling, purely as an example, could be of the prismatic type, of the dove tail type or of any other type as long as it is such as to allow the relative sliding of the actuating element 7 with respect to the rack 5.

**[0037]** The adjusting and fastening means are of the kind of a manoeuvring and adjusting screw and comprise a screw 21 arranged substantially parallel to the straight line R and the opposite ends of which are pivotally supported by two ears 50 that project from the opposing ends of the rack 5.

**[0038]** The screw 21 engages with a corresponding nut screw 22 provided in the base 70 of the actuating element 7.

**[0039]** Therefore, by acting upon the screw 21 it is possible to adjust the position of the actuating element 7 with respect to the rack 5. The actuating element 7 is in any case integral with the rack 5 when it slides by effect of the pinion 4 manoeuvred by the handgrip 3 to open or close the door or window frame.

**[0040]** At least one of the two opposed ends of the screw 21, in particular its outermost end 21a facing towards the end of the case 2, has a coupling seat 23 for a manoeuvring tool, with it being possible for both the opposing ends of the screw 21 to be equipped with a corresponding coupling seat 23.

**[0041]** At the end of the case 2 facing towards the end 21a of the screw 21 there is provided an opening 24 for the access of the manoeuvring tool inside the coupling seat 23.

**[0042]** From the base 70 of the actuating element 7 a small plate 71 projects to directly or indirectly coupling with the manoeuvring rod 6 of the kinematism of the cremone bolt 1 itself.

**[0043]** There is also a counter-plate 25 for closing the case 2.

**[0044]** A man skilled in the art can easily understand

that, although in figures 2-8 a cremone bolt 1 is represented with a single actuating element 7, according to the present invention there can be two actuation elements 7, as represented in figure 1, each of which is associated to a respective rack 5 and to respective adjusting and fastening means that can be accessed by the opposing ends of the case 2.

**[0045]** From the description above and from the attached drawings, the man skilled in the art can easily understand the assembly, the operation and the advantages of the cremone bolt according to the present invention.

**[0046]** In assembly configuration of the cremone bolt 1, the handgrip 3 controls the rotation around the rotation axis A of the pinion 4 which actuates the rack 5 when sliding, in one or the other of the two directions of the straight line R.

**[0047]** Said rack slides with respect to the case 2 dragging the actuating element 7 with it thus actuating the kinematism connected to it and consisting for example of the connection block 8, of the manoeuvring rod 6 and of the end locking bar 10 for opening or closing the door or window frame.

**[0048]** As indicated above, the actuating element 7 or the actuation elements 7 and 7' are intended to be directly or indirectly connected to the manoeuvring rods 6, which, in turn, are connected to terminals or end locking bars 10 which engage with the abutments or with the female seats 11 constrained to the fixed frame of the door or window frame.

**[0049]** According to the present invention, the coupling clearances, which are inevitably generated in the connection between the various components of the kinematism controlled by the actuating element 7 due to the tolerances and to the manufacturing and coupling faults of such same components, can be recovered and eliminated by adjusting the position of the actuating element 7 with respect to the rack 5.

**[0050]** Such an adjustment can be made even when the cremone bolt 1 is mounted in its configuration of use; it is indeed sufficient, to insert, through the suitable opening 24 of the case 2, a manoeuvring tool suitable for engaging with the corresponding coupling seat 23 formed at one or at both ends 21a of the screw 21. By imposing a certain rotation angle on the screw 21 it is possible to make the actuating element 7 slide with respect to the rack 5 so as to recover the coupling clearances between the various components of the kinematism controlled by it.

**[0051]** The cremone bolt thus conceived can undergo numerous modifications and variants, all covered by the invention; moreover, all the details can be replaced by technically equivalent elements. In practice the sizes and the materials used can be any according to the technical requirements.

## Claims

1. A cremone bolt (1) for opening and closing door or window frames, of the type comprising a handle in turn comprising a case (2) intended to be applied on a moveable frame and a manoeuvring shaft (3) mounted pivotally on said case (2) around a rotation axis (A), in which within said case (2) a pinion (4) is provided, which is pivotally mounted around said rotation axis (A) is integrally constrained, at least in rotation, to said manoeuvring shaft (3) and engages with at least a rack (5) that is slidably associated to said case (2) in both directions of a straight line (R) orthogonal to said rotation axis (A) and parallel to at least a manoeuvring rod (6) of the cremone bolt, furthermore comprising at least an actuating element (7) which is connectable to said manoeuvring rod (6), **characterised in that** said actuating element is slidably associated to said rack (5) in both directions of a straight line parallel to said straight line (R), and adjusting and fastening means of the position of said actuating element (7) with respect to said rack (5).
2. The cremone bolt (1) according to claim 1, **characterized in that**, said adjusting and fastening means are supported by said rack (5) so as to be integral with said rack in its sliding movement along said straight line (R).
3. The cremone bolt (1) according to claim 1 or 2, **characterized in that** said adjusting and fastening means are accessible from the outside of said handle.
4. The cremone bolt (1) according to one or more preceding claims, **characterized in that** said actuating element (7) is associated to said rack (5) with a coupling of a male and female kind.
5. The cremone bolt (1) according to claim 4, **characterized in that** said coupling comprises a male element (19) protruding from a side of said rack (5) or from the base (70) of said actuating means (7) and slideably housed in a corresponding female seat (20) provided in the base (70) of said actuating means (7) or alongside said rack (5).
6. The cremone bolt (1) according to one or more preceding claims, **characterized in that** said adjusting and fastening means are of the kind of a manoeuvring and adjusting screw.
7. The cremone bolt (1) according to claim 6, **characterized in that** said adjusting and fastening means comprise a screw (21) extending substantially parallel to said straight line (R), which has opposed ends pivotally supported by said rack (5) and which en-

gages with a corresponding nut screw (22) provided in said actuating element (7).

8. The cremone bolt (1) according to claim 7, **characterized in that** at least one of the two opposed ends (21a) of said screw (21) comprises a coupling seat (23) for a manoeuvring tool.
9. The cremone bolt (1) according to claim 8, **characterized in that** said case (2) comprises at least an access opening (24) to said coupling seat (23) from the outside.
10. The cremone bolt (1) according to one or more preceding claims, **characterized in that** it comprises a pair of said racks (5), each of them being associated to respective said actuating element (7, 7') having respective said adjusting and fastening means.

## Patentansprüche

1. Treibstange (1) zum Öffnen und Schließen von Tür- oder Fensterrahmen des Typs, der einen Griff umfasst, der seinerseits ein Gehäuse (2), das dazu vorgesehen ist, an einem beweglichen Rahmen angebracht zu sein, und einen Betätigungsstiel (3) umfasst, der um eine Drehachse (A) drehbar auf das Gehäuse (2) montiert ist, wobei in dem Gehäuse (2) ein Ritzel (4) vorgesehen ist, das um die Drehachse (A) drehbar montiert und zumindest bei der Drehung fest an dem Betätigungsstiel (3) verankert ist und in mindestens eine Zahnstange (5) eingreift, die in beiden Richtungen einer geraden Linie (R), die orthogonal zur Drehachse (A) und parallel zu mindestens einer Betätigungsstange (6) der Treibstange ist, verschiebbar mit dem Gehäuse (2) verbunden ist, ferner umfassend mindestens ein Treibelement (7), das mit dem Betätigungsstab (6) verbunden werden kann, **dadurch gekennzeichnet, dass** dieses Treibelement in beiden Richtungen einer zur geraden Linie (R) parallelen Linie verschiebbar mit der Zahnstange (5) verbunden ist, und ein Einstell- und Befestigungsmittel für die Position des Treibelements (7) in Bezug auf die Zahnstange (5).
2. Treibstange (1) nach Anspruch 1, **dadurch gekennzeichnet, dass** das Einstell- und Befestigungsmittel von der Zahnstange (5) derart getragen wird, dass es mit der Zahnstange bei ihrer Gleitbewegung längs der geraden Linie (R) fest verbunden ist.
3. Treibstange (1) nach Anspruch 1 oder 2, **dadurch gekennzeichnet, dass** das Einstell- und Befestigungsmittel von der Außenseite des Griffs her zugänglich ist.
4. Treibstange (1) nach einem oder mehreren der vor-

hergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Treibelement (7) mit der Zahnstange (5) durch eine Männlich-Weiblich-Verbindung verbunden ist.

5. Treibstange (1) nach Anspruch 4, **dadurch gekennzeichnet, dass** die Verbindung ein männliches Element (19) umfasst, das von einer Seite der Zahnstange (5) oder von der Basis (70) des Treibmittels (7) vorsteht und verschiebbar in einem entsprechenden weiblichen Sitz (20) untergebracht ist, der in der Basis (70) des Treibmittels (7) oder längs der Zahnstange (5) vorgesehen ist.
6. Treibstange (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** das Einstell- und Befestigungsmittel von der Art einer Betätigungs- und Stellschraube ist.
7. Treibstange (1) nach Anspruch 6, **dadurch gekennzeichnet, dass** das Einstell- und Befestigungsmittel eine sich im Wesentlichen parallel zu der geraden Linie (R) erstreckende Schraube (21) umfasst, die entgegengesetzte Enden aufweist, die drehbar von der Zahnstange (5) getragen werden, und die mit einer entsprechenden Mutterschraube (22) in Eingriff ist, die in dem Treibelement (7) vorgesehen ist.
8. Treibstange (1) nach Anspruch 7, **dadurch gekennzeichnet, dass** mindestens eines der zwei entgegengesetzten Enden (21a) der Schraube (21) einen Verbindungssitz (23) für ein Betätigungswerkzeug umfasst.
9. Treibstange (1) nach Anspruch 8, **dadurch gekennzeichnet, dass** das Gehäuse (2) mindestens eine Zugangsöffnung (24) zu dem Verbindungssitz (23) von außen umfasst.
10. Treibstange (1) nach einem oder mehreren der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** sie ein Paar von Zahnstangen (5) umfasst, von denen jede mit dem entsprechenden Treibelement (7, 7') mit dem entsprechenden Einstell- und Befestigungsmittel verbunden ist.

## Revendications

1. Crémone (1) pour l'ouverture et la fermeture de cadres de portes ou de fenêtres, du type comprenant une poignée comprenant à son tour un boîtier (2) destiné à être appliqué sur un cadre mobile et un arbre de manoeuvre (3) monté de manière pivotante sur ledit boîtier (2) autour d'un axe de rotation (A), dans laquelle un pignon (4) est disposé à l'intérieur dudit boîtier (2), lequel est monté de manière pivotante autour dudit axe de rotation (A), est solidaire

de manière intégrale, au moins en rotation, dudit arbre de manoeuvre (3) et s'engage avec au moins une crémaillère (5) qui est associée de manière coulissante audit boîtier (2) dans les deux directions d'une ligne droite (R) orthogonale audit axe de rotation (A) et parallèle à au moins une tige de manoeuvre (6) de la crémone, comprenant en outre au moins un élément d'actionnement (7) qui peut être connecté à ladite tige de manoeuvre (6), **caractérisée en ce que** ledit élément d'actionnement est associé de manière coulissante à ladite crémaillère (5) dans les deux directions d'une ligne droite parallèle à ladite ligne droite (R), et des moyens de réglage et de fixation de la position dudit élément d'actionnement (7) par rapport à ladite crémaillère (5).

2. Crémone (1) selon la revendication 1, **caractérisée en ce que** lesdits moyens de réglage et de fixation sont supportés par ladite crémaillère (5) de manière à être solidaire avec ladite crémaillère dans son mouvement de coulissement le long de ladite ligne droite (R).
3. Crémone (1) selon la revendication 1 ou 2, **caractérisée en ce que** lesdits moyens de réglage et de fixation sont accessibles de l'extérieur de ladite poignée.
4. Crémone (1) selon une ou plusieurs revendications précédentes, **caractérisée en ce que** ledit élément d'actionnement (7) est associé à ladite crémaillère (5) avec un accouplement d'un type mâle et femelle.
5. Crémone (1) selon la revendication 4, **caractérisée en ce que** ledit accouplement comprend un élément mâle (19) faisant saillie à partir d'un côté de ladite crémaillère (5) ou à partir de la base (70) dudit moyen d'actionnement (7) et logé de manière coulissante dans un siège femelle correspondant (20) situé dans la base (70) dudit moyen d'actionnement (7) ou le long de ladite crémaillère (5).
6. Crémone (1) selon une ou plusieurs revendications précédentes, **caractérisée en ce que** lesdits moyens de réglage et de fixation sont du type d'une vis de manoeuvre et de réglage.
7. Crémone (1) selon la revendication 6, **caractérisée en ce que** lesdits moyens de réglage et de fixation comprennent une vis (21) s'étendant sensiblement parallèle à ladite ligne droite (R), qui a des extrémités opposées supportées de manière pivotante par ladite crémaillère (5) et qui s'engage avec un écrouvis correspondant (22) disposé dans ledit élément d'actionnement (7).
8. Crémone (1) selon la revendication 7, **caractérisée en ce qu'**au moins une des deux extrémités oppo-

sées (21a) de ladite vis (21) comprend un siège d'accouplement (23) pour un outil de manoeuvre.

9. Crémone (1) selon la revendication 8, **caractérisée en ce que** ledit boîtier (2) comprend au moins une ouverture d'accès (24) audit siège d'accouplement (23) de l'extérieur. 5

10. Crémone (1) selon une ou plusieurs revendications précédentes, **caractérisée en ce qu'elle** comprend une paire desdites crémaillères (5), chacune d'elles étant associée audit élément d'actionnement respectif (7, 7') ayant respectivement lesdits moyens de réglage et de fixation. 10

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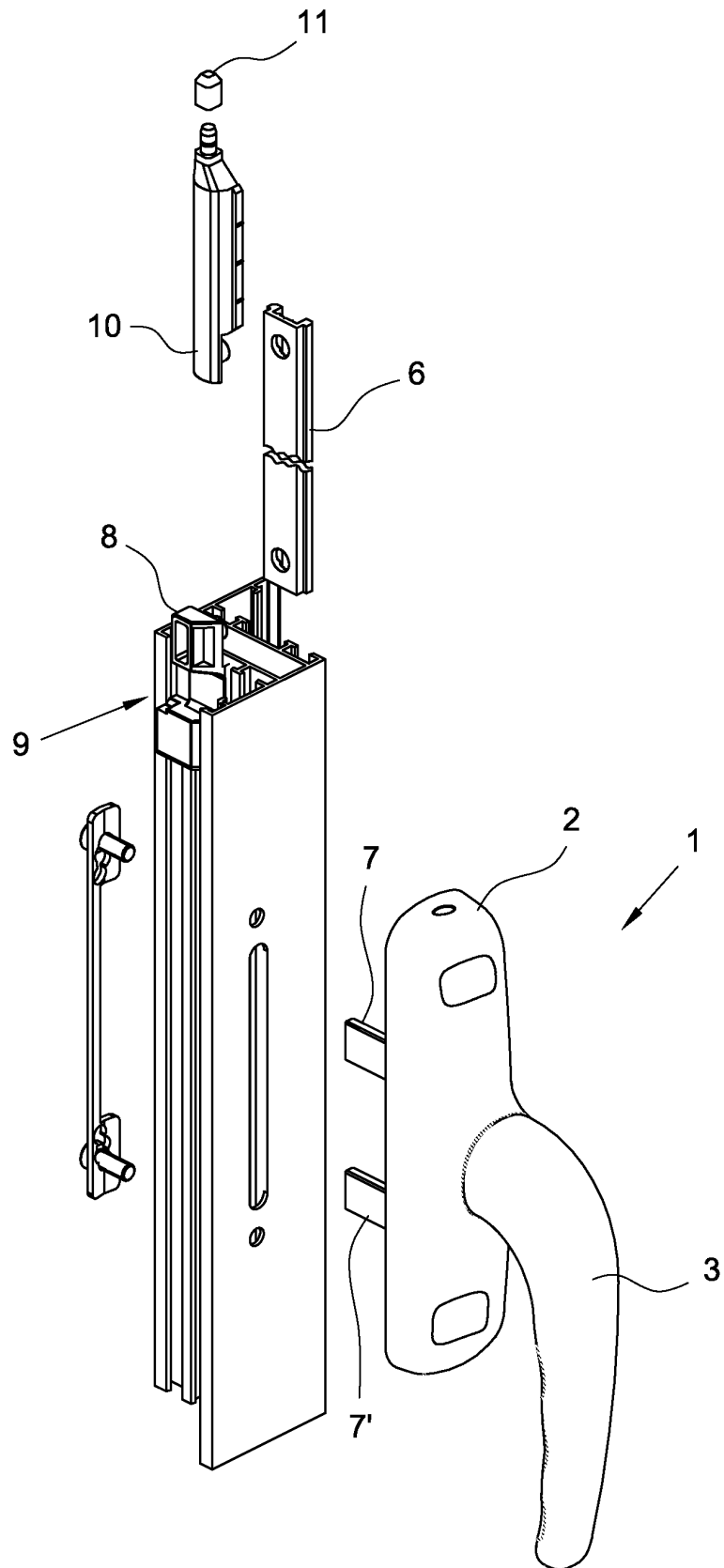


Fig. 1



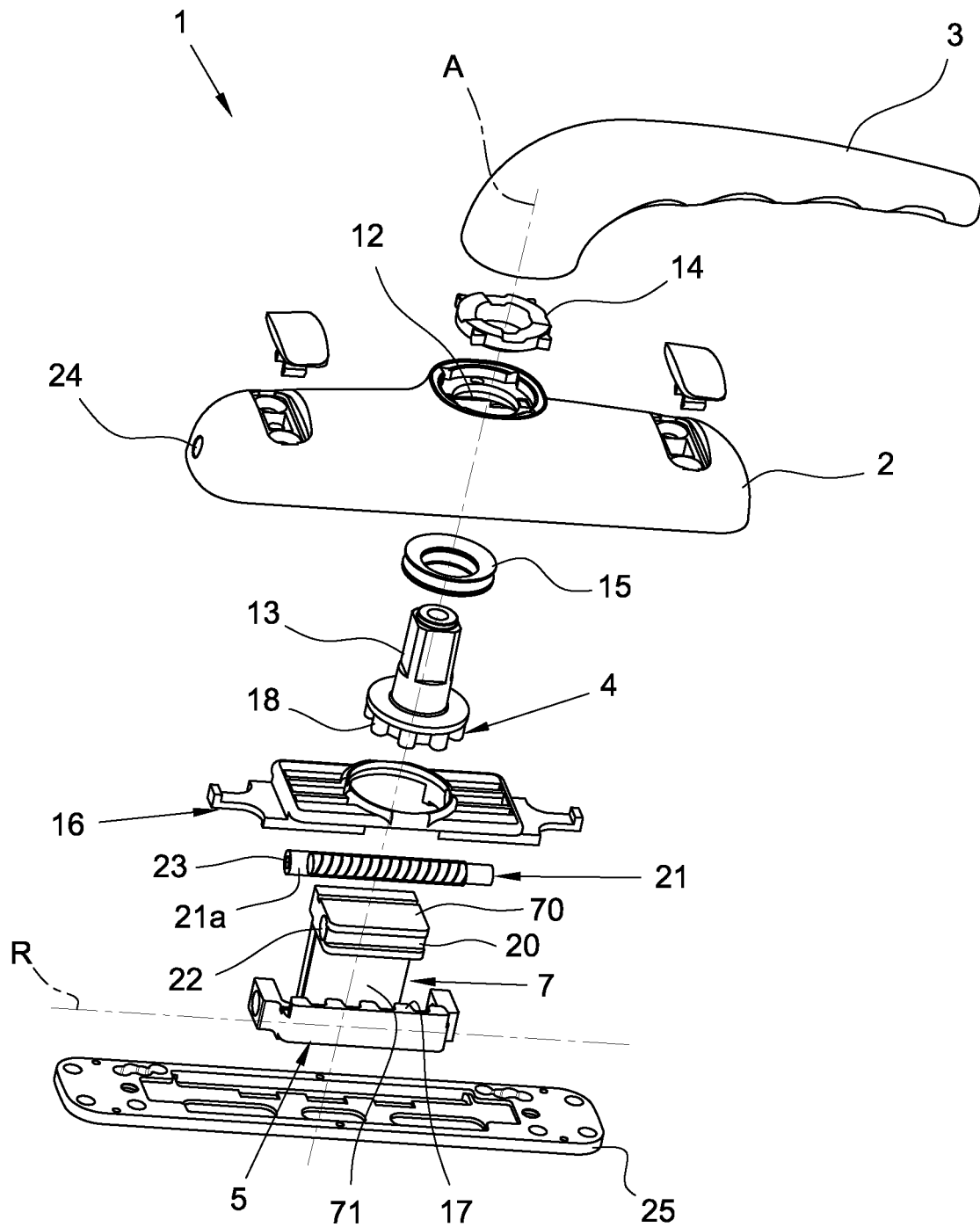
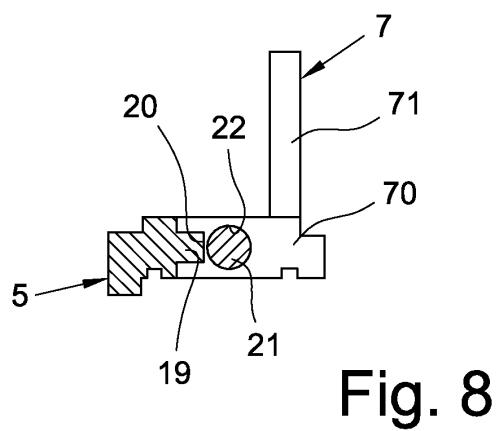
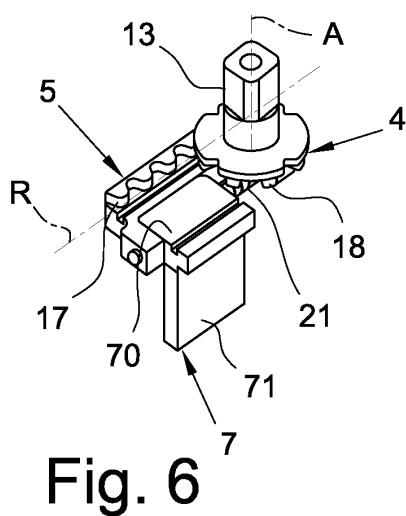
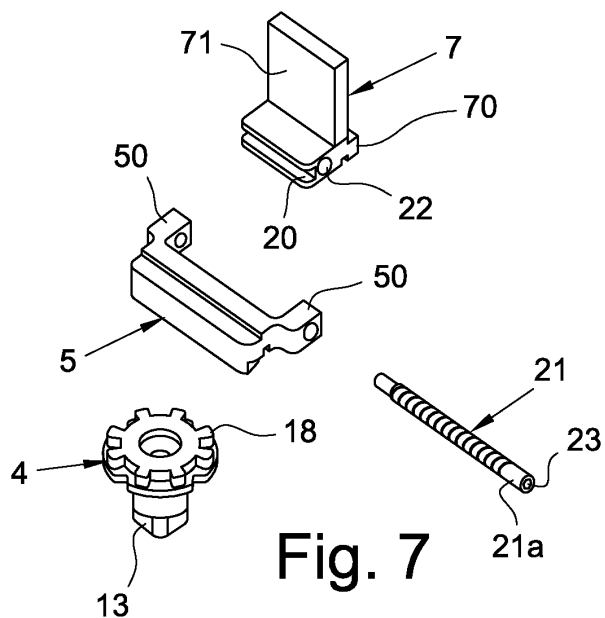
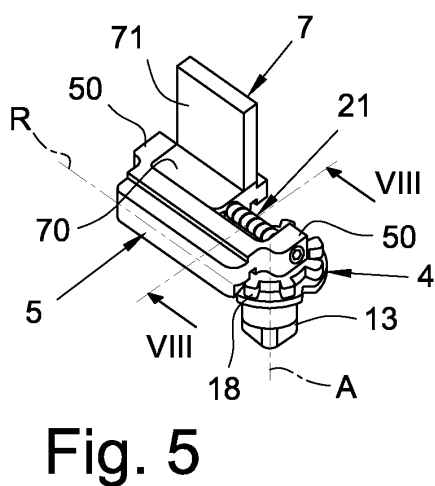
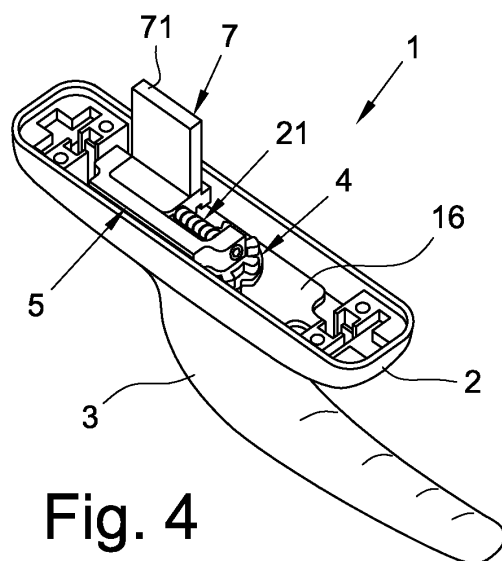
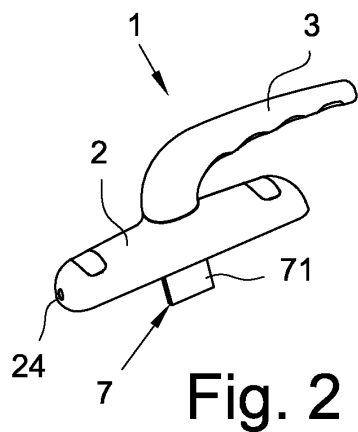


Fig. 3



**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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