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## (54) Moving mechanism, particularly for applications with window handles

(57) A moving mechanism (1) is disclosed for applications with window handles (10). The mechanism is configured in order to increase the distance (A) from a position of a squared seat (G) of the handle (10) to an abutment on an handle (10) bearing section. This is achieved by providing at least one driving wheel (7) and at least one driven wheel (3), wherein both wheels (3,7) are equipped with at least two rows of teeth with different modulus. The wheels (3,7) are connected through a Z-shaped rack (1A). The mechanism further comprises at least one spring (6) placed at the ends of the mechanism and housed in suitable seats (6A).

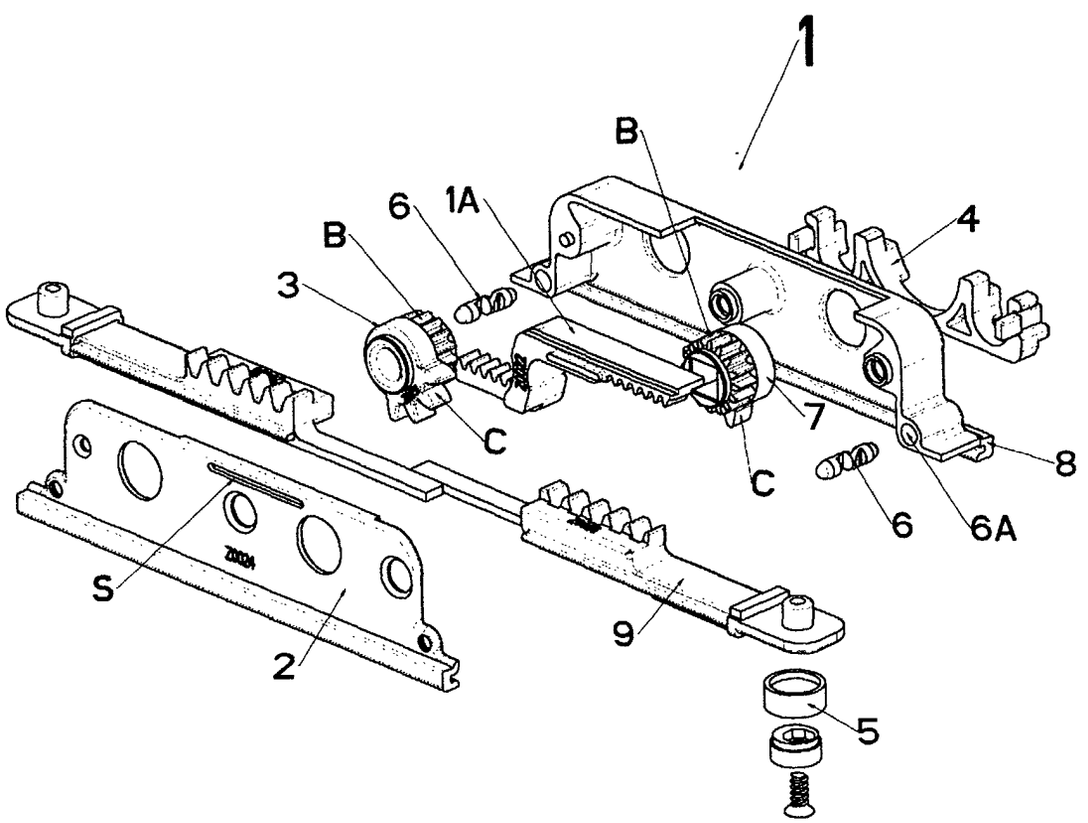


FIG. 2

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## Description

**[0001]** The present invention refers to an improved moving mechanism, that is usually applied to windows with swinging wings assembled with window handles, thereby allowing to open and close the window frame.

**[0002]** Nowadays, among the section systems for realising window frames, the most used one is of the wood-aluminium type: this because the wood that is on the internal part of the environment is better suited to architectural and aesthetic needs, while the aluminium on the external part guarantees the frame endurance in time, because it better resists (with respect to wood) to the atmospheric agents attack. Moreover, currently such wood-aluminium section systems hve been developed both as regards their sectional dimension, and as regards the aesthetic appearance with the presence of greater and more pronounced roundings on the wood side (improved conditions with respect to the previous systems). What has been stated above is obviously not the only application of the mechanism of the invention, but rather a non-limiting example of one of its embodiments, since the inventive mechanism can be extended to any type of frames realised with any type of material (for example, aluminium, steel, PVC, etc.), and moreover to windows with internal or external opening and of any shape and finish.

**[0003]** Object of the present invention, with respect to the currently commercially available products, is satisfying these new need of use, improving some aspects of the functional and application type. In fact, the mechanism of the present invention reaches the above objects by optimising the adopted transmission system. Moreover, this system is efficient and at the same time practical, because, in order to install it, the operator must do nothing more than slightly pressing the mechanism, without the burden of further workings, and without the help of further tools.

**[0004]** The above and other objects and advantages of the invention, as will appear from the following description, are obtained by an improved mechanism as claimed in Claim 1. Preferred embodiments and non-trivial variations of the present invention are claimed in the dependent Claims.

**[0005]** The present invention will be better described by some preferred embodiments thereof, given as a non-limiting example, with reference to the enclosed drawings, in which:

- Figure 1 is a a perspective view of an embodiment of a mechanism according to the present invention;
- Figure 2 is an exploded perspective view of the mechanism of Fig. 1;
- Figure 3 is a perspective view of the mechanism of Fig 1 open on one side in order to show the operating couplings of its components;
- Figure 3A is a detailed view of part of Fig. 3;
- Figure 4 is a side view of the mechanism of Fig. 3 in an open state;
- Figure 5 is a view similar to Fig. 1 but with the overturned mechanism;
- Figure 5A is a detailed view of Fig. 5;
- Figure 5B is a side view of the mechanism of the invention inserted in an operating position;
- Figure 6 is a view similar to Fig. 5 referred to currently-known systems;
- Fig. 6A is a view similar to Fig. 5; and
- Figures 7 and 8 show operating movement positions of the mechanism of the invention.

**[0006]** With reference to the Figures, a preferred embodiment of the improved mechanism of the present invention will be shown and described. It will be immediately obvious that numerous variations and modifications (for example related to shape, sizes, various colours and parts with equivalent functionalities) could be made to the described mechanism without departing from the scope of the invention as appears in the enclosed Claims.

**[0007]** As shown, the functionality of the movements of the mechanism 1 of the invention occurs by using window handles 10 that have no internal mechanisms, but have a squared axis (generally with 7 x 7 mm sizes), that is fitted into the seat G of the moving mechanism 1 (Fig. 3A). Then, through a rotation (preferably of an angle that is equal to 90°) given to the handle, the motion is transferred along the axis X, such motion within the movements, by means of suitable transmission means, being transformed into a linear translation movement Y (Fig. 7 and 8) (of a prefixed stroke), allowing to open and close the swinging window wing.

**[0008]** The distance A (Fig. 7), that establishes the position of the squared seat of the handle with respect to the section abutment, must be as long as possible, at the same time keeping the encumbrance in height H within certain limits, in order not to interfere with the glass base.

**[0009]** The currently-marketed moving mechanisms have a shorter size A, and this, once having applied them onto the current sections, makes the handle 10 position placed next to to the (very pronounced) side roundings of the bearing plane thereof; an effect resulting from this is a non-aesthetic detachment of the handle 10 from the side in which the section rouding is nearest to it (Fig. 6).

**[0010]** From the application point of view, current moving mechanisms use a securing system onto the section, composed of an hole obtained into the rack rod, that, being taken to a pre-established position, has another hole obtained on the box: by means of a tapping or self-locking screw, the section movement is thereby blocked. Such system is very functional but scarcely practical because it requires many operating passages before ending the work. Necessities and needs that require pre-assembling the moving mechanism onto the window frame are of two types: first of all it is necessary

to arrange onto the window frame all necessary accessories (including moving mechanism assembling) for opening and closing the mechanism itself, excluding the window handle assembly because it is subjected, being projecting with respect to the frame plane, if not adequately protected, to risks of scratches and/or breakages during handling and tightening, in a workshop and in a yard, avoiding possible additional costs for repairing its damages; secondly, being it possible to avoid assembling the handle, spaces are optimised for transport purposes, the packaging time (because the handle must be adequately protected) is reduced and everything results in a reduction of costs and in an improvement of the end product quality.

**[0011]** From the functional point of view, the improvement made by the present invention has been obtained by creating an improved moving mechanism M with a longer distance A with respect to the currently-marketed products (Fig. 6A), anyway keeping the encumbrance H at the maximum value allowed by the sections; with this arrangement the mechanism can anyway be used on all existing sections, both those with a narrow section and those with a wide one.

**[0012]** In order to limit the global size H, two toothed wheels have been realised, namely a driving wheel 7 and a driven wheel 3, with two rows of teeth with different modulus: a) the first row of teeth C being partial, with a modulus that is adapted to make the linear straight-teeth rack 9 perform the final stroke Y that will be used for opening and closing the wing; and b) the second toothing B, that is much smaller that the first one and that is complete, that transfer the motion from the driving wheel 7, by means of a Z-shaped straight-teeth rack 1A, to the second driven wheel 3. Also the second driven wheel 3 has, like the driving wheel 7, a complete toothing B, and another partial toothing C with a greater modulus, that meshes with the second linear straight-teeth rack 9.

**[0013]** With this transmission system, it is possible to have a distance A that is much greater than the one occurring in the currently-marketed products, anyway keeping the total encumbrance H at a minimum value, also due to the lower height of the teeth B being present on the driving 7 and driven 3 pinion wheels.

**[0014]** The mechanism 1 of the invention is further substantially composed of two elements 2 and 8, that together define a sort of box, inside which the real movement system is enclosed, that is composed of the driving 7 and driven 3 pinion wheels mutually connected (for transmitting the motion) by the Z-shaped rack 1A that meshes with the second toothing B being present on the two wheels 3, 7: such Z-shaped rack 1A slides by being guided through two tongues L in suitable seats S obtained in the two box elements 2 and 8. The driving 7 and driven 3 wheels with the second row of partial teeth C mesh with the two symmetrical racks 9 that transmit the motion to the driving elements of the frame system.

**[0015]** Moreover, the improvement given to the mechanism of the present invention, from the application point of view, consists in two springs 6, placed at the moving mechanism ends and housed in suitable seats 6A; such springs 6 are made of plastic material with high elastic and self-lubricating properties: this, with the addition of the ball shape of their ends, allows applying the moving mechanism with a snap (and therefore very easily) and to hook it under the bearing slot of the frame section. The springs 6, when assembling onto the section (Fig. 5B), are hooked behind the housing seat tabs. This system is very valid and at the same time practical because the operator must do no more than slightly pressing the mechanism, without the burden of further workings and without the help of further tools. What has been described above is a typical arrangement that is not limiting, but is meant as extended to any other adopted arrangement that reaches the same objects.

**[0016]** Summarising, in the improved mechanism of the present invention, the distance A is increased with respect to the products being present on the market, anyway keeping the global size H within the sectional encumbrances of the most various aluminium systems for window frames with the below-stated advantages. Starting from the assumption that this mechanism will mostly be applied to window frames of the wood-aluminium type, the increased decentralisation A implies an handle displacement towards the window inside (glass side); by operating in such a way, the handle base completely rests onto the plane part of the wooden section, avoiding the roundings of the section ends (that are always very pronounced in the wood-aluminium sections). This greater decentralisation A (Fig. 6A) (anyway keeping the global size H of the mechanism reduced) is realised by a Z-shaped rack 1 that transmits the motion between driving wheel 7 and driven wheel 3, through a linear translation movement, parallel to direction Y by directly meshing with a second row of smaller teeth, obtained in the bottom diameter of the main teeth C of both wheels; the stroke remains fixed because the demultiplying ratio between wheel, rack and wheel remains unchanged; in addition, part of the second row of teeth C being present on the two driving 7 and drive 3 wheels have also been shaved D of an angle that is greater than 180°, allowing to recover further room to the advantage of the global size H.

## Claims

1. Moving mechanism (1), particularly for applications with window handles (10), **characterised in that** it is configured in such a way as to increase a distance (A) that goes from a position of a squared seat (G) of the handle (10) to an abutment on a section onto whith the handle (10) rests, through at least one driving wheel (7) and at least one driven wheel (3), both said wheels (3, 7) being equipped with at least two rows of teeth with different modulus, in order to transmit a motion between said driving wheel (7)

and said at least one driven wheel (3), said rows of teeth being mutually connected by a Z-shaped rack (1A).

2. Moving mechanism (1) according to Claim 1, **characterised in that**, given at least two rows of teeth with different modulus, with which at least one driving wheel (7) and at least one driven wheel (3) are equipped, said wheels (7, 3) are composed of a first partial row of teeth (C), with a modulus that is adapted to make a linear straight-teeth rack (9), with which said wheels (3, 7) are meshed, perform a final stroke (Y) that will be used for opening and closing a wing, and a second toothing (B), that is much smaller than the first row of teeth and is present on the whole circumference of said wheels (3, 7), said second toothing (B) transferring a motion from the driving wheel (7), by means of a Z-shaped straight-teeth rack (1A), to the second driven wheel (3).

3. Moving mechanism (1) according to Claim 1, **characterised in that** part of the second row of teeth (C) being present on the two driving (7) and driven (3) wheels has been shaved (D) of an angle that is greater than 180°.

4. Moving mechanism (1) according to Claim 1, **characterised in that** it further comprises at least one spring (6) placed at the ends of the moving mechanism and housed in a respective seat (6A).

5. Moving mechanism (1) according to Claim 4, **characterised in that** said at least one spring (6) is made of plastic material, with high elastic and self-lubrifying properties, said spring (6), adding the ball shape of the ends, being adapted to apply the moving mechanism with a snap that is hooked under the tabs of a bearing slot of the section of a window frame.

6. Moving mechanism (1) according to Claim 3, **characterised in that** it is composed of two box-shaped elements (2, 8) within which the moving system is enclosed, such system being composed of said driving and driven wheels (7, 3) mutually connected for transmitting a motion by the Z-shaped rack (1A) that meshes with the second toothing (B) being present on the two wheels (3, 7), said Z-shaped rack (1A) sliding by being guided through two tongues (L) into suitable seats (S) obtained in the two box-shaped elements (2, 8), said two wheels (3, 7) with the second partial row of teeth (C) meshing with the two symmetrical racks (9) that transmit a movement to the driving elements of a frame system.

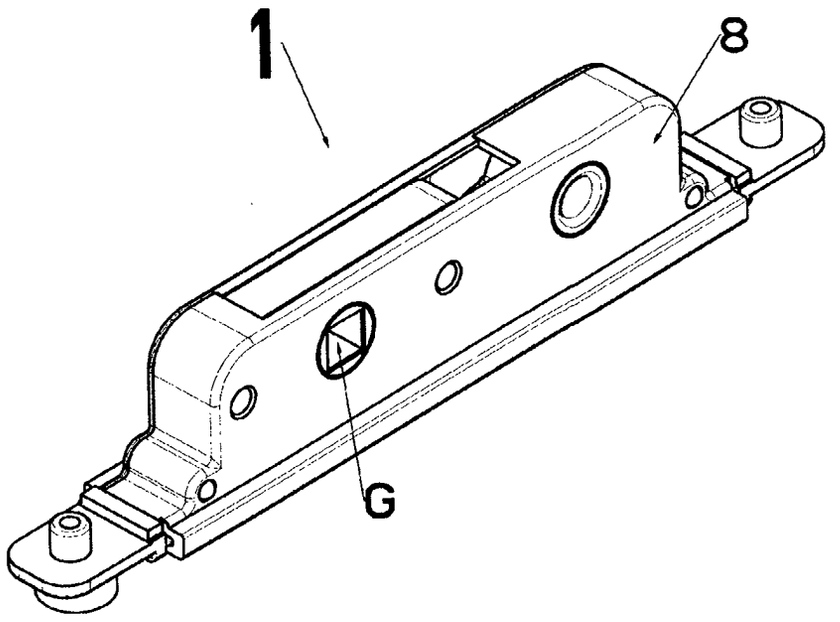


FIG. 1

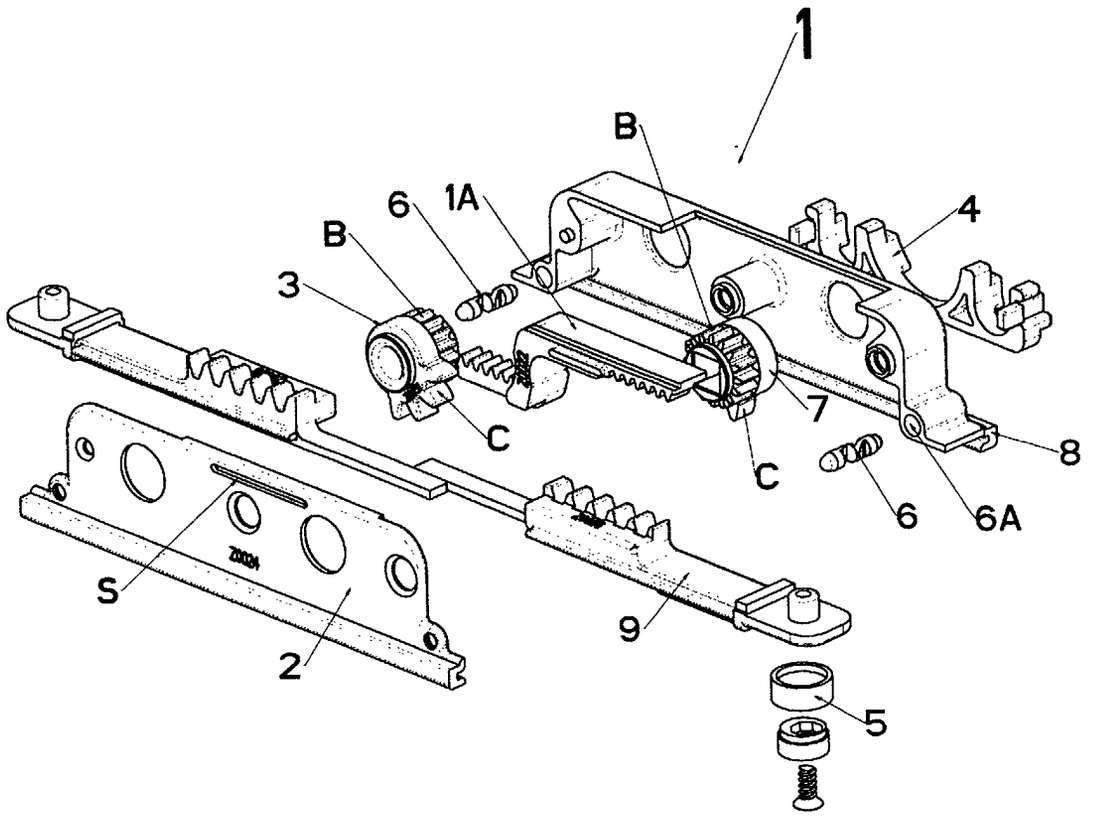


FIG. 2

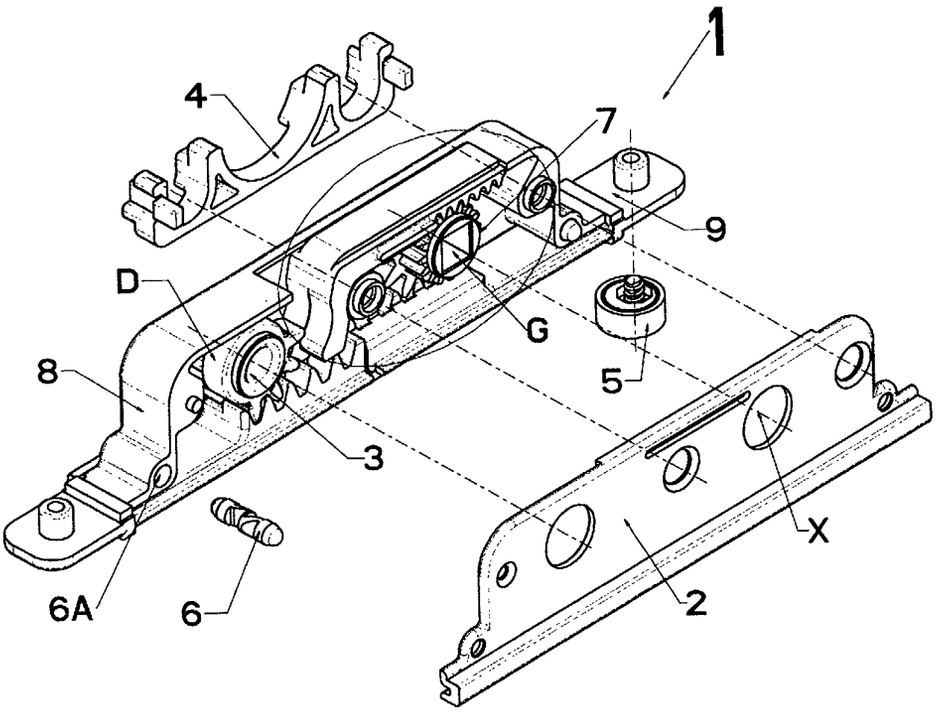


FIG. 3

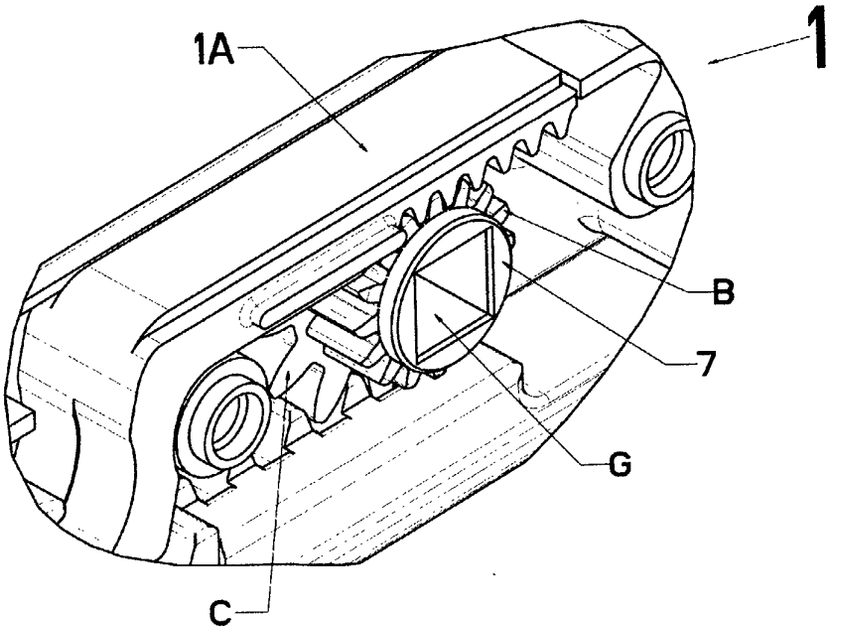


FIG. 3A

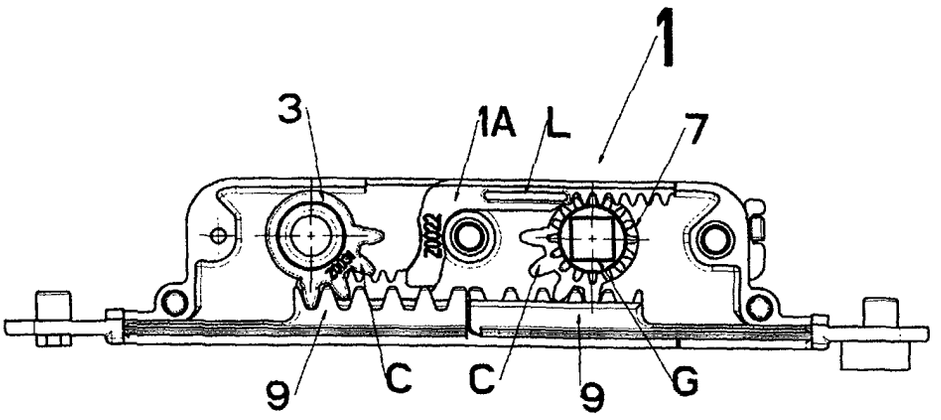


FIG. 4

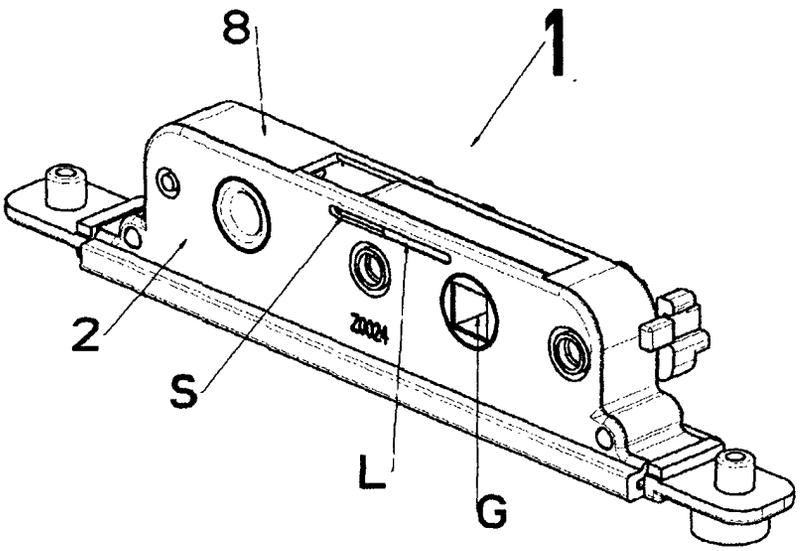


FIG. 5

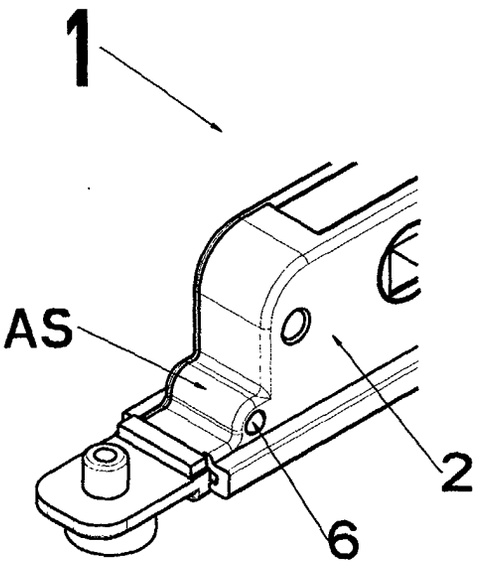


FIG. 5A

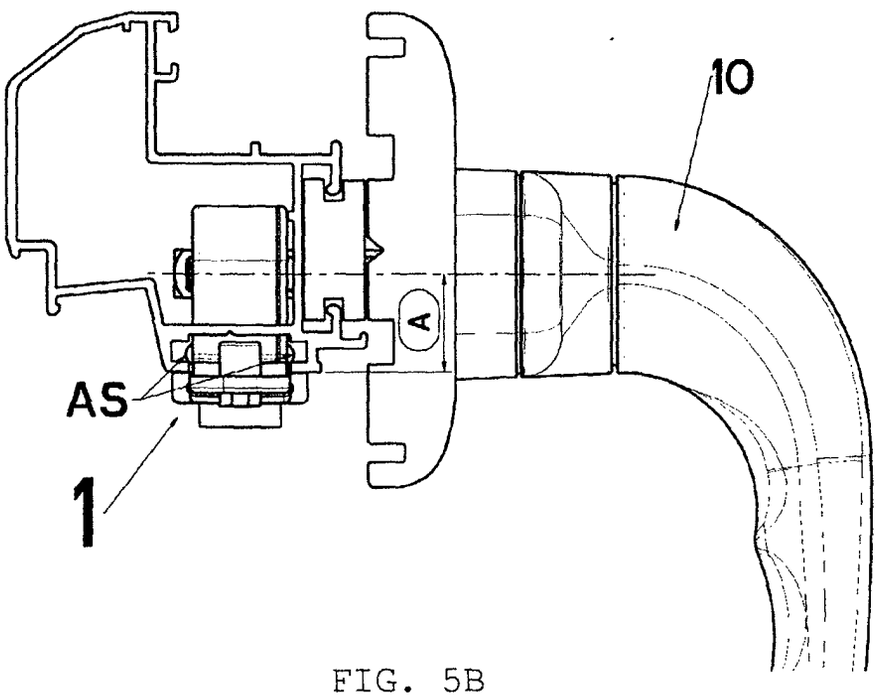


FIG. 5B

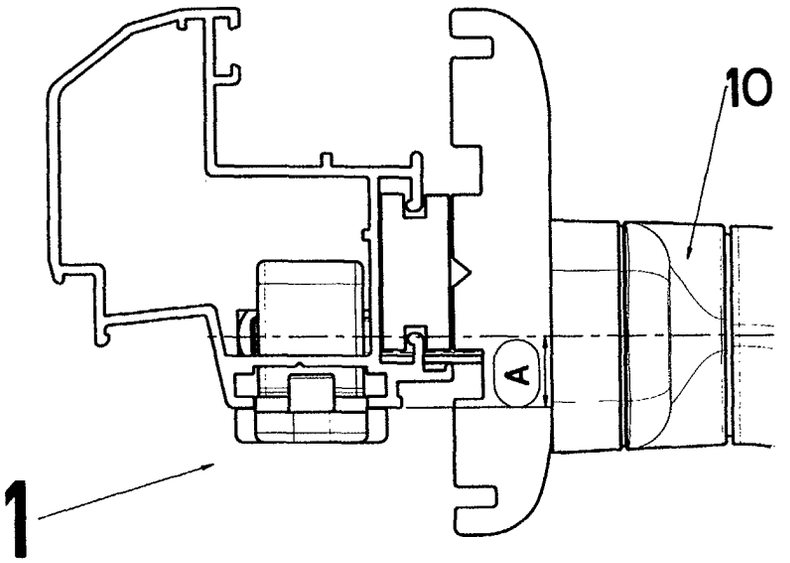


FIG. 6

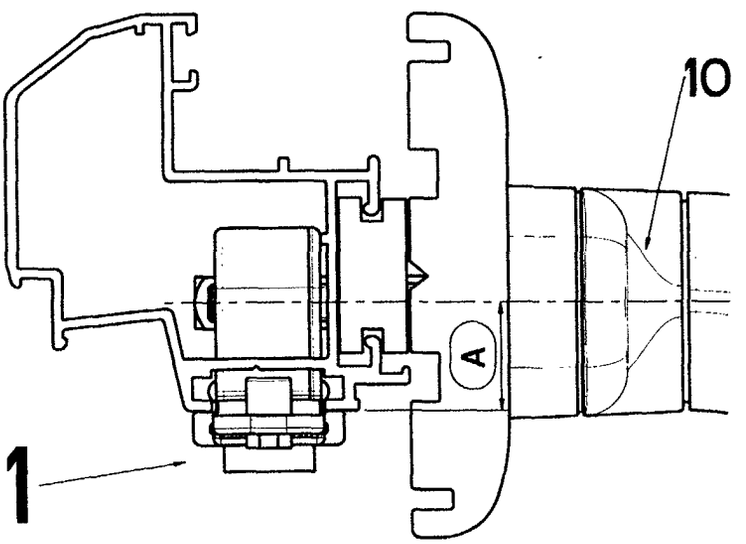


FIG. 6A

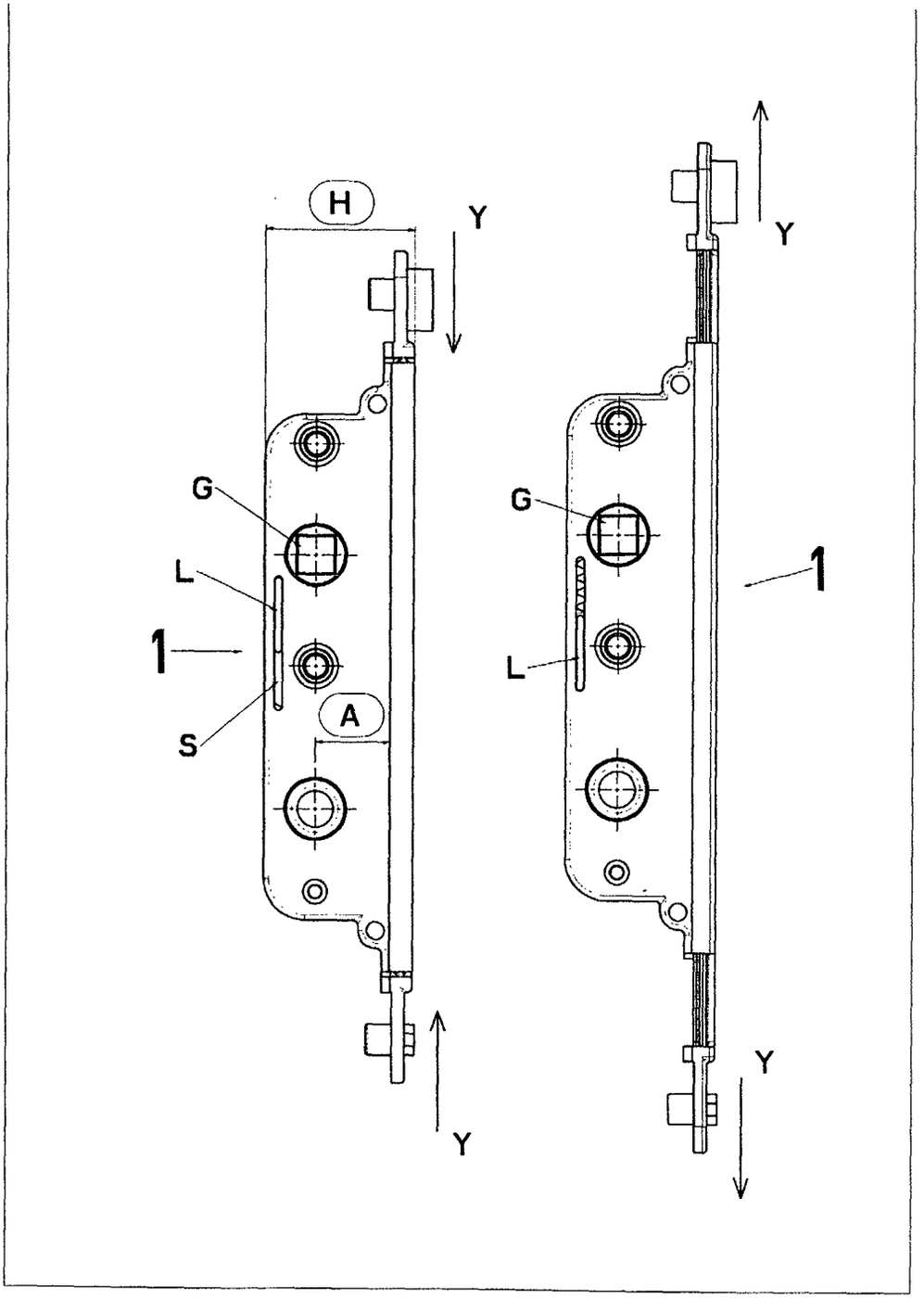


FIG. 7 FIG. 8

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# EUROPEAN SEARCH REPORT

Application Number
EP 02 42 5369

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| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
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TECHNICAL FIELDS SEARCHED (Int.Cl.7)

E05C

The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
|---|---|---|
| THE HAGUE | 26 November 2002 | Westin, K |

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