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## (54) Multipoint latching assembly for sliding doors

(57) A multipoint latching assembly for sliding door or window panels comprising a pair of cooperatively employed longitudinally extending abutting bars (1, 2), with the first bar (1) being fixedly mounted at a plurality of points within the sliding profile member (15) by means of supporting blocks (23) and the other bar (2) being provided with a plurality of latch means (7) and performing a reciprocating movement thereby accordingly setting the multipoint latching assembly at a locked or unlocked condition. The latching assembly comprises means for the automatic retraction and subsequent return of bar (2) so as to avert possible damage of latch means (7) and/or of the receiving members (11) thereof mounted along the frame profile member (16) in case of unsuitable closure operation whilst the latch means are set at a locked condition. The multipoint latching assembly is alternatively connected to an existent or a self operating handle means (4a,4b).

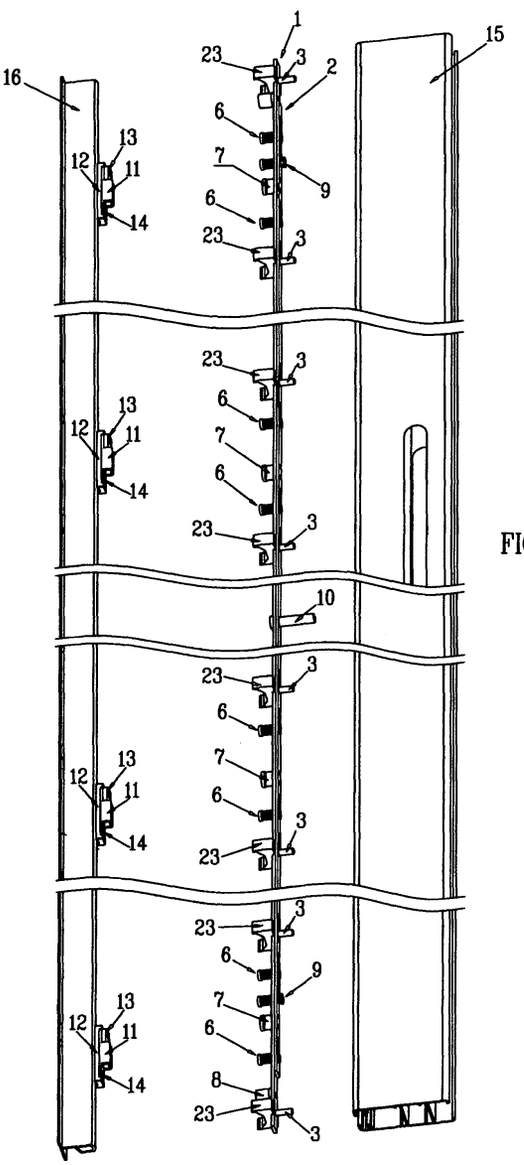


FIG.1

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## Description

THE FIELD OF THE ART

**[0001]** The invention relates to the field of the art of locksmith and in particular refers to locking means of sliding door or window panels and discloses a multipoint latching assembly comprising a pair of cooperatively employed longitudinally extending abutting bars, one of which is fixedly mounted at a plurality of points within the sliding profile member and the other is provided with a plurality of latch means and performs a reciprocating movement thereby accordingly setting the multipoint latching assembly at a locked or unlocked condition.

THE BACKGROUND OF THE INVENTION

**[0002]** Sliding door/window panels of the prior art conventionally employ a single locking point with a locking operation handle means being mounted onto the sliding panel and used in activating a locking means, such as a hook, a pin, etc. that engages into a correspondingly formed receiving member being fixedly mounted onto the vertically extending length of the frame profile member.

**[0003]** Such single locking point might be violated by burglars with a small or greater effort, depending on the specific technology and quality of manufacturing thereof. It is for this reason that pivotally mounted windows have for some time introduced multipoint locking assemblies that may provide an enhanced protection against burglars. Such assemblies comprise sequentially engaged bars with a plurality of locking members attached thereupon, wherein such bars may be set into a synchronized linear movement through the locking operation handle means of the device. However, sliding door / window panels have not so far employed corresponding multipoint locking assemblies and this leads, nowadays with the ever increasing burglar activity, to a decreased demand thereof by the consumers.

**[0004]** It is therefore a main object of the invention to advantageously overcome the abovementioned drawbacks in the prior art sliding door/window panels through the disclosure of a multipoint latching assembly for sliding doors, wherein a single movement of the locking operation handle means results in activation of a plurality of latch means that become engaged within a corresponding number of correspondingly formed receiving members mounted along the vertically extending length of the frame profile member thereby providing a substantially enhanced safety in the locked sliding panel.

**[0005]** Another object of the invention in view of implementation of the above main object thereof is the disclosure of a pair of longitudinally extending bars having a width such as to freely enter through a frontal opening of the sliding profile member, said bars having a length such as to cover a desirable portion or even the entire length of the vertically extending sliding profile member, wherein the first bar is fixedly mounted by means of a plurality of supporting blocks and bolts passing through both bars and the supporting blocks, said bolts being screwed until they abut onto an interior lateral wall of the sliding profile member, whereby a pair of side extensions of each one of the supporting blocks abut onto frontal lateral side walls of the sliding profile member thereby providing a counter support, and wherein the second bar is provided with a plurality of latch means passing through slots of the abovementioned first bar, said second bar performing a reciprocating movement thereby displacing the plurality of latch means along the abovementioned slots of the first bar in order to engage into a corresponding plurality of receiving members being fixedly mounted along the opposing vertically extending length of the frame profile member thereby locking the sliding door along a plurality of points corresponding to the number of latch means and respective receiving members thereof.

**[0006]** Another object of the invention is, in view of averting the possibility of a deformation or fracture of the latch means and/or of the receiving members if the case arises of the sliding panel being led to closure with the latch means set at locked condition and thereby colliding onto the protruding respective receiving members, to disclose an automatic retraction capacity of the second bar being provided with the latch means during such unsuitable closure action with a scope of ensuring protection of the latch means and/or receiving members from undesirable damage.

**[0007]** Another object of the invention, in view of satisfying the above mentioned object of automatic retraction of the second bar being provided with the latch means of the invention thereby averting damage of latch means and/or receiving members thereof, is to disclose an advantageous multipoint connection of the abovementioned first and second bars by means of a plurality of pin-spring assemblies, said pins protruding marginally forward of the latch means so as to be the first to coll ide onto the vertically extending length of the frame profile member in case of an unsuitable closure action, thereby initiating a retraction of the bar bearing the latch means and ensuring protection of latch means and/or receiving members of the latching assembly of the invention.

**[0008]** Another object of the invention is to provide the herein proposed multipoint latching assembly with the alternative options of either installing it on a sliding panel that is equipped with a typical commercially available lock means whereby the first and second bars are provided with suitable openings to allow passage of bolt means to connect with the mechanism of such commercially available lock means or installing the same on a sliding panel without any other lock means whereby an independent handle means passes through an opening of a side wall of the sliding panel and is connected into the interior second bar bearing the latch means of the invention.

## BRIEF DESCRIPTION OF THE DRAWINGS

**[0009]** These and other objects, characteristics and advantages of the present invention will become apparent to those skilled in the art in the detailed description of preferred embodiments by reference to the herein appended drawings in which:

Fig. 1 shows a perspective view, intermediately between a typical profile member of a sliding panel and a corresponding frame profile member, of an illustrative embodiment of the proposed multipoint latching assembly comprising a longitudinally extending bar being fixedly mounted within the sliding profile member and another longitudinally extending bar being provided with a plurality of latch means abutting onto the fixedly mounted bar and reciprocatingly movable thereupon.

Fig. 2 shows a cross section of a typical profile member of a sliding panel comprising the multipoint latching assembly of the invention with the fixedly mounted bar and the reciprocatingly movable bar with the plurality of latch means.

Fig. 3 presents a frontal view of the pair of bars employed in the multipoint latching assembly of the invention.

Fig. 4 shows a perspective view of a portion of the pair of bars employed in the multipoint latching assembly of the invention at the region of connection thereof to an illustrative conventional locking operation handle means.

Fig. 5 shows a perspective view of a portion of the pair of bars employed in the multipoint latching assembly of the invention at the region of connection thereof to a rotatable handle being linked to a mechanism mounted onto the reciprocatingly movable bar being provided with the latch means.

Fig. 6 shows a perspective view of a typical latch means receiving member and accessories thereof employed in the multipoint latching assembly of the invention.

Fig. 7 shows a perspective view of a preferred embodiment of the means of connection of the pair of bars of the multipoint latching assembly of the invention, such connection means providing the advantageous automatic retraction of the bar whereupon are mounted the latch means in case of an undesirable collision thereof onto the opposing frame profile member, thereby averting damage of the latch means and/or of the receiving member.

Fig. 8 shows a perspective view of matching cylinder-pin assembly advantageously adapted to define a limit of the latching assembly and enable precise locating of the latch means receiving members.

Fig. 9 shows a perspective and a cross sectional view of a supporting block being employed in fixedly mounting onto the sliding profile member of the first bar of the multipoint latching assembly of the invention.

Fig. 10 shows a perspective and a cross sectional view of the latch means welded onto the second reciprocatingly moving bar of the multipoint latching assembly of the invention.

Fig. 11 shows the multipoint latching assembly of the invention installed within a sliding profile member with a series of typical latch means shown in a locked condition with the latch means engaged into a corresponding series of latch receiving members mounted onto the opposite vertically extending length of the frame profile member.

Fig. 12 shows the multipoint latching assembly of the invention installed within a sliding profile member with a series of typical latch means shown in an unlocked condition with the latch means released from their corresponding latch receiving members mounted onto the opposite vertically extending length of the frame profile member.

Fig. 13 shows the multipoint latching assembly of the invention installed within a sliding profile member with the latch means shown during an undesirable collision onto the protruding faces of the latch receiving members mounted onto the opposite vertically extending length of the frame profile member, thereby initiating an automatic retraction process of the bar bearing the latch means.

Fig. 14 shows in perspective a detail of a stabilizing pin assembly employed in the multipoint latching assembly of the invention.

Fig. 15 shows a planar and frontal view of the stabilizing pin assembly employed in the multipoint latching assembly of the invention.

## DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

**[0010]** The multipoint latching assembly for sliding doors of the invention comprises a pair of cooperatively employed longitudinally extending bars 1 and 2, which as long as the assembly is in normal operation, - either in a locked condition with the latch means engaged into the receiving members (Fig. 11) or an unlocked condition with the latch means released from the receiving members (Fig. 12), - abut onto one another, however being linked in such a manner that the second bar 2 may automatically retract in relation to the fixedly mounted bar 1 (Fig. 13) in case of an undesired collision of the sliding profile member 15 onto the frame profile member 16 with the latching assembly at a locked condition.

**[0011]** Bars 1, 2 are cut at a desired length that represents a portion that might correspond even to approximately the entire length of the vertically extending extruded sliding profile member 15 within which they will be mounted. As shown in Fig. 3, bars 1, 2 correspondingly include:

- a plurality of points 7b wherein are riveted the latch

means 7 of the multipoint latching assembly of the invention at a desired predetermined spacing along bar 2 and a corresponding plurality of elongated slots 7a along bar 1, such slots 7a being provided directly opposite to points 7b, wherein each of the latch means 7 passes through one of the slots 7a, and wherein slots 7a have a length such as to allow for the sliding stroke of reciprocatingly moving latch means 7 from an unlocked condition to a locked condition and vice versa.

- A plurality of openings 6a along bar 1, preferably a pair of such openings 6a, one on each side of each one of the plurality of elongated slots 7a and a corresponding plurality of elongated slots 6b, directly opposite openings 6a, along bar 2, wherein an internally threaded tubular member 18a passes through each one of the abutting openings 6a of the bar 1 and slots 6b of bar 2 to receive an oppositely passing bolt 18b with a resilient spring 5 in interimposed between each tubular member 18a and bolt 18b, whereupon connection of bars 1, 2 is accomplished with the advantageous capacity of an automatic retraction of latch means 7 in case of undesirable collision thereof onto the receiving members mounted onto the vertical length of the frame profile member.
- A plurality of internally threaded openings 3a along bar 1, preferably a pair of such openings 3a, one on each side of each one of the elongated slots 7a, and a corresponding plurality of elongated slots 3b along bar 2 lying opposite to openings 3a, wherein bolts 3 pass consecutively through a supporting block 23, an internally threaded opening 3a of bar 1 and a slot 3b of bar 2 in order to fixedly mount bar 1 and associated latching assembly onto the sliding profile member.
- An elongated slot 10a along bar 1 and an opening 10b along bar 2 lying opposite to slot 10a of bar 1, a bolt 10 passing consecutively through slot 10a and opening 10b to connect the multipoint latching assembly of the invention comprising cooperatively employed bars 1, 2 to an already used locking operation handle means 4a (Fig. 4). Alternatively in an independently moving embodiment of the multipoint latching assembly of the invention, openings 21a are used to mount thereupon a mechanism 20 adapted to convert the rotational motion of a handle means 4b of the multipoint latching assembly into linear-reciprocating motion of the latch means bearing bar 2.

**[0012]** The hereinabove described multipoint latching assembly of the invention includes a plurality of latch means receiving members 11 fixedly mounted onto the vertically extending length of the frame profile member 16, one receiving member 11 for each one of the latch means 7 welded along bar 2 and protruding through the elongated slots 7a of the fixedly mounted bar 1.

**[0013]** In accordance with an illustrative embodiment of latch means 7 being presented in Fig. 10, latch means 7 comprises a main body 17a with a generally thin rectilinear configuration of dimensions such as to pass through slots 7a of bar 1, extending into a bottom pair of legs 17c being expanded during the riveting process of fixedly securing latch means 7 onto the sequentially arranged plurality of points 7b along movable bar 2. The top of main body 17a of latch means 7 is a rectilinear enlarged head 17b that enters into a channel of the receiving member 11 and becomes encaged therein because of the inwardly bent side flanges 11 a thereof.

**[0014]** As shown in fig. 6, each receiving member 11 is a rectangular plate provided with a pair of end openings 11b receiving a corresponding pair of bolts 14 by means of which the receiving member 11 is fixedly mounted onto the vertically extending length of the frame profile member 16. A pair of inwardly bent side flanges 11a of the receiving member 11 forms a channel for inserting through sliding latch means 7 and in particular of the rectilinear enlarged head 17b thereof and subsequently encaging the same therein. With a scope of enhancing the robust structure of the receiving member, an additional plate 12 of similar rectangular section can be employed. Plate 12 is provided with a pair of upper and lower openings 12b, axially coincident with openings 11b of the rectangular plate 11 of the receiving member, sequentially receiving the same abovementioned pair of bolts 14. Plate 12 is marginally longer than plate 11 of the receiving member and extends into parallel upper and lower protrusions 12a intermediately of which is received the receiving member plate 11.

**[0015]** In accordance with a preferred embodiment of the invention, with a scope of rapidly and accurately marking the position of fixedly mounting receiving members 11 along the vertically extending length of the frame profile member 16 so as to obtain functional relationship thereof with the sequential arrangement of latch means 7, terminal stop members are used, preferably one at the top and another at the bottom of the vertically extending abutting sliding and frame profile members. Each terminal stop member as illustratively shown in Fig. 8 comprises a pair of matching parts, on the one hand a metal pin 8b fixedly mounted onto the fixedly mounted bar 1 and extending outwardly therefrom and a pin receiving cylinder 8a fixed onto an opposite location of the frame profile member 16, wherein the pin receiving cylinder 8a is made from soft plastic material thereby ensuring a smooth, noiseless closure of the sliding profile member 15 onto the frame profile member 16, as pin 8b enters into receiving cylinder 8a, onto the frame profile member 16.

**[0016]** In accordance with a preferred embodiment of the invention each one of the herein proposed receiving members for the latch means of the invention further comprises an independent terminal stop member 13 ensuring engagement of the latch means 7 within the channel being formed by the inwardly bent side flanges 11a

and inhibiting release of latch means 7 from the receiving member 11 that might be attempted by upwardly raising the sliding panel. The terminal stop member 13 has a rectangular section and extends to a bottom leg 13a that fits within the channel being formed by the inwardly bent flanges 11a of the receiving member and includes an opening 13b whereby a bolt 14 passing through this opening 13b and coincident opening 11b of the receiving member fixedly attaches the terminal stop member 13 onto the receiving member.

**[0017]** The connection of the pair of abutting bars 1 and 2 of the multipoint latching assembly of the invention is being performed on the one hand by means of bolts 3 that accordingly pass through supporting blocks 23 by means of which bar 1 is fixedly mounted against the walls of the sliding profile member and on the other hand by means of the connection means providing the advantageous automatic retraction of bar 2 from bar 1 to inhibit potential damage of protruding latch means due to undesirable collision of the sliding panel onto the fixed frame profile member, wherein bar 2 automatically returns into a condition of abutment onto bar 1 after the abovementioned undesirable collision and return of the multipoint latching assembly at an unlocked condition.

**[0018]** As illustratively shown in Fig. 9, each supporting block 23 comprises a pair of elevated side extensions 23a symmetrically extending on either side of a central opening 23b through which passes the abovementioned bolt 3 and a central recession 23c on the basement thereof. Different sliding profile series may employ supporting blocks 23 with slight variations in the configuration and dimensions thereof.

**[0019]** Employment of supporting blocks 23 introduces a novel method of installation of the multipoint latching assembly of the invention. In principle, the width of supporting blocks 23, as well as the length of the central recession 23c at the basement thereof corresponds to the width of abutting bars 1 and 2 of the multipoint latching assembly, so that the width of supporting blocks 23 does not surpass the width of bars 1 and 2 when such blocks extend linearly along bars 1 and 2, whilst being capable of providing a matching recession of fixedly mounted bar 1 within the recessions 23c at the basement thereof, as supporting blocks 23 are turned at the position of fixedly mounting thereof extending perpendicularly to the abutting bars 1, 2.

**[0020]** The novel method of installation of the multipoint latching assembly the invention comprises a first step of assembling the multipoint latching assembly with a plurality of supporting blocks 23 mounted along the abutting bars 1 and 2, so that bolts 3 may sequentially pass through the central openings 23b of the supporting blocks, through the internally threaded openings 3a of bar 1 and through the slots 3b of bar 2, a second step of longitudinal alignment of supporting blocks 23 along abutting bars 1 and 2 so that the assembly of abutting bars 1, 2 and supporting blocks 23 mounted thereupon might be freely inserted through a frontal opening 15c of the sliding profile member 15, a third step comprising a 90° rotation of each one of the supporting blocks 23 so that they may extend perpendicularly onto the abutting bars 1, 2 (Fig. 2), whereby the side extensions 23a of each one of the supporting blocks 23 abut into frontal lateral side walls 15a of the sliding profile member 15 and a fourth step of further screwing bolts 3 until the frontal end of each bolt abuts onto an interior rear lateral wall 15b of the sliding profile member 15 thereby fixedly mounting the multipoint latching assembly of the invention within the sliding profile member.

**[0021]** As mentioned hereinabove, the installation of the multipoint locking assembly of the invention is completed with the installation of a plurality of latch means receiving members 11 onto the vertically extending length of the frame profile member 16, opposite to the sliding profile member 15, each receiving member 11 comprising incorporated additional plate 12 and terminal stop member 13. The number and spacing of receiving members 11 is determined by the number and spacing of the latch means 7 of the multipoint latching assembly protruding through the frontal opening 15c of the sliding profile member 1.

**[0022]** The multipoint latching assembly of the invention can be connected to a locking operation handle means already installed onto the sliding profile member, whereby as shown in Fig. 4, a bolt 10 is employed instead of the bolt lock of the locking operation assembly, said bolt 10 sequentially passing through a slot 10a of the frontal fixedly mounted bar 1 and through an opening 10b of the movable rear bar 2 and ending up into being screwed into the mechanism of the locking assembly. Subsequently all latch means 7 mounted onto the multipoint latching assembly of the invention might be alternatively set at a locked or unlocked condition through clockwise or anticlockwise rotation of locking handle means 4a that results in a corresponding upward or downward movement of the movable bar 2 bearing the latch means 7.

**[0023]** Alternatively as shown in Fig. 5, the multipoint latching assembly as shown in Fig. 5, comprises a self operating handle means 4b and in this case the movable bar 2 comprises a mechanism 20 being mounted by means of rivets 21 passing through openings 21a of bar 2, whereby a shaft means 4b' of the rotatable handle means 4b passes through an opening in the frontal wall of sliding profile member 15 (not shown) to be connected into a central opening 20a of mechanism 20, whereby as handle means 4b rotates, such rotational movement is converted into linear reciprocating movement of bar 2 by means of mechanism 20 and the plurality of latch means 7 are simultaneously set in a locked or unlocked condition correspondingly into the receiving members 11 being installed along the fixed frame profile member 16 by means of a single clockwise or counterclockwise rotation of handle means 4b respectively.

**[0024]** As mentioned herein above, abutting bars 1 and 2 are also being connected by means of a plurality

of connection means providing the advantageous automatic retraction of bar 2 from bar 1 as shown in Fig. 13, thereby averting damage of the latch means 7 and receiving members 11 in case of an undesirable collision thereof whilst latch means are set at a locked condition, and subsequently providing automatic return of bar 2 at an abutting contact with bar 1 as soon as the multipoint latching assembly is set back into an unlocked condition. A desirable number of such connection means providing for the automatic retraction of bar 2 from bar 1 and subsequent return thereof in abutting contact with bar 1 is employed and preferably a pair of such connection means corresponds to each one of the latch means 7.

**[0025]** An illustrative embodiment of such connection means providing the automatic retraction and return capacity is shown in Fig. 7 as an arrangement of elements bearing the general reference numeral 6 comprising a tubular internally threaded shaft 18a and a bolt 18b. Shaft 18a enters through an opening 6a of bar 1 and bolt 18b enters through a corresponding opposite slot 6b of bar 2, whereby a connection is accomplished with spring 5 being encaged in between tubular shaft 18a and bolt 18b and subsequent screwing of bolt 18b into the internally threaded tubular shaft 18a.

**[0026]** A tensile force is exerted onto spring 5 when bar 2 moves away from bar 1 (Fig. 13), thereby storing energy for an automatic return of bars 1, 2 in an abutting condition as soon as one corrects the position of the latch means and the sliding panel may smoothly close onto the fixed frame profile member.

**[0027]** In accordance with a preferred embodiment of the invention, the proposed multipoint latching assembly comprises means 9 for the stabilizing thereof at locked condition. Such stabilizing means 9 as shown in Fig. 14 comprises an internally threaded tubular pin 22 including a head with two differing diameters 22a, 22b, a pin 22c and a spring 19. Pin 22 enters through slot 9b of bar 2 and protrudes through opening 9a of bar 1 thereby being wound with spring means 19 and receiving pin 22c that is being screwed therein. As shown in Fig. 14, slot 9b adapted to receiving the stabilizing assembly has a characteristic form with an elongated portion 9b' and a rounded end portion 9b" with an enlarged diameter. As long as the assembly of the internally threaded tubular pin 22 being wound with spring means 19 slides along the elongated slot portion 9b', the latching assembly of the invention is free to perform a reciprocating movement. However when pin 22 arrives at the rounded end portion 9b", then head 22b thereof having a relatively smaller diameter sits within this rounded end portion 9b" thereby stabilizing the multipoint latching assembly of the invention, since head 22b of pin 22 cannot move out of such position unless an axial pressure is exerted along the stabilizing assembly 9 to result in temporary compression of spring means 19 and storage of energy therein such energy being released whenever said pin 22 again arrives at the rounded end portion 9b" of slot 9b.

**[0028]** It is hereby noted that the description of the invention was made by reference to illustrative but not confining examples. Thus any modification that does not include an inventive step in itself is considered part of the scope of the invention as defined in the following claims.

## Claims

1. Multipoint latching assembly for sliding doors including a sliding profile member (15) with a frontal opening (15c) and a frame profile member (16), **characterized by** that it comprises a pair of cooperatively abutting longitudinally extending first and second bars (1,2) with said second bar (2) performing a linear reciprocating movement, said abutting bars (1,2) being introduced through the frontal opening (15c) of the sliding profile member (15) with said first bar (1) being fixedly mounted at a plurality of points of the sliding profile member and said second bar (2) being provided with a plurality of latch means (7) and being alternatively set at a locked or unlocked condition as said latch means (7) thereof engage within a corresponding plurality of receiving members (11) fixedly mounted along the vertically extending length of the frame profile member (16) or are released therefrom, said multipoint latching assembly further comprising:

   means for mounting said cooperatively abutting bars (1,2) within said sliding profile member (15) whereby said first bar (1) is fixedly mounted thereupon whilst said second bar (2) maintains the capacity of performing a linear reciprocating movement;
   means for an automatic retraction of said second bar (2) being provided with said plurality of latch means (7), thereby averting damage of said latch means (7) in case of an unsuitable closure action of the sliding profile member (15) onto the frame profile member (16) whilst said latch means (7) are set at a locked condition, and for an automatic return of said second bar (2) at a position of abutment onto said first fixedly mounted bar (1), and
   means of connection of said multipoint latching assembly onto a locking operation handle means (4a,4b), said locking operation handle means (4a,4b) being employed in activating a linear reciprocating movement of said second bar (2) thereby appropriately setting the multipoint latching assembly at a locked or unlocked condition.

2. Multipoint latching assembly for sliding doors according to the above claim 1, **characterized by** that

said means for mounting said cooperatively abutting bars (1,2) within said sliding profile member (15) comprises a plurality of supporting blocks (23), each supporting block (23) comprising a trapezoidal body extending into a pair of elevated side extensions (23a) symmetrically extending on either side of a central opening (23b), said supporting block further including a central recession (23c) at the basement thereof, a plurality of bolts (3) sequentially passing through said central openings (23b) of the supporting blocks (23) and through both bars (1,2), said bolts (3) being screwed until the frontal ends thereof abut onto an interior rear lateral wall (15b) of the sliding profile member (15), whereby said elevated side extensions (23a) of each one of said supporting blocks abut onto frontal side walls (15a) of said sliding profile member (15) thereby providing counter support and whereupon said first bar (1) is fixedly mounted within the sliding profile member (15) whilst said second bar (2) is free to perform a linear reciprocating movement, wherein the width of each one of said supporting blocks (23) corresponds to the width of abutting bars (1) and (2) of the multipoint latching assembly, so that the width of supporting blocks (23) does not exceed the width of bars (1) and (2) when said supporting blocks (23) are aligned linearly along abutting bars (1) and (2) and the length of the central recession (23c) at the basement of each one of the supporting blocks (23) also corresponds to the width of the abutting bars (1,2) thereby providing a matching recession of bar (1) within the recessions (23c) at the basement of said supporting blocks (23) as said supporting blocks (23) are turned at the position of fixedly mounting bar (1) extending perpendicularly to the abutting bars (1, 2).

**3.** Multipoint latching assembly for sliding doors according to the above claim 1, **characterized by** that said means for an automatic retraction and automatic return of said second bar (2) being provided with said plurality of latch means (7) is an arrangement (6), one such arrangement (6) provided on either side of each one of said latch means (7), each arrangement (6) comprising a tubular internally threaded shaft (18a) with an enlarged head section and a bolt (18b) with an enlarged head section, wherein said shaft (18a) enters through an opening (6a) of bar (1) and said bolt (18b) enters through a corresponding opposite slot (6b) of bar (2), whereby a connection is accomplished with a spring (5) being encaged in between tubular shaft (18a) and bolt (18b) and subsequent screwing of bolt (18b) into the internally threaded tubular shaft (18a), wherein in case of an unsuitable closure operation of said sliding profile member (15) with said latch means (7) set at a locked condition, a tensile force is exerted onto said spring (5) as bar (2) moves away from bar (1) and energy is stored in said spring (5) for an automatic return of bars (1,2) in an abutting condition as soon as one corrects the position of the latch means (7) and the sliding profile member (15) may smoothly close onto the fixed frame profile member (16).

**4.** Multipoint latching assembly for sliding doors according to the above claim 1, **characterized by** that each one of said plurality of latch means (7) comprises a main body (17a) with a generally thin rectilinear configuration of dimensions such as to pass through slots (7a) along said first bar (1), extending into a bottom pair of legs (17c) being expanded during the riveting process of fixedly securing latch means (7) along the movable said bar (2), said main body (17a) extending into a rectilinear enlarged head (17b), each one of said receiving members (11) being formed as a rectangular plate provided with a pair of end openings (11b) receiving a corresponding pair of bolts (14) by means of which the receiving member (11) is fixedly mounted onto the vertically extending length of the frame profile member (16), said receiving member (11) comprising a pair of inwardly bent side flanges (11a) forming a channel for inserting through sliding and encaging of the rectilinear enlarged head (17b) of said latch means (7) as said multipoint latching assembly is set at a locked condition.

**5.** Multipoint latching assembly for sliding doors according to the above claim 4, **characterized by** that each one of said receiving members (11) further comprises an additional plate (12) of similar rectangular section provided with a pair of upper and lower protrusions (12a) intermediately of which is received the receiving member plate (11) and upper and lower openings (12b), axially coincident with said openings (11b) of the receiving member (11), said pair of bolts (14) sequentially passing through said openings (12b) and (11b), said receiving member (11) further comprising a terminal stop member (13) ensuring engagement of the latch means (7) within the channel being formed by said inwardly bent side flanges (11a) and inhibiting release of latch means (7) from the receiving member (11) that might be attempted by upwardly raising the sliding panel, said terminal stop member (13) having a rectangular section and extending to a bottom leg (13a) that fits within the channel being formed by said inwardly bent side flanges (11a) of the receiving member and including an opening (13b), said bolt (14) also passing through said opening (13b) and fixedly attaching the terminal stop member (13) onto the receiving member (11).

**6.** Multipoint latching assembly for sliding doors according to the above claim 1, **characterized by** that

said cooperatively abutting longitudinally extending bars (1, 2) have a width such as to pass through said frontal opening (15c) of the vertically extending length of the sliding profile member (15) and a length representing a portion that might correspond even to approximately the entire length of the vertically extending sliding profile member (15), said bars (1, 2) correspondingly including:

a plurality of points (7b) wherein are riveted the latch means (7) at a desired predetermined spacing along bar (2) and a corresponding plurality of elongated slots (7a) along bar (1), said slots (7a) being provided directly opposite to points (7b), wherein each one of said slots (7a) has a length such as to allow for the sliding stroke of reciprocatingly moving latch means (7) from an unlocked condition to a locked condition and vice versa;
a plurality of openings (6a) along bar (1) and a corresponding plurality of elongated slots (6b), directly opposite openings (6a), along bar (2), wherein said internally threaded tubular shafts (18a) pass through said openings (6a) of bar (1) and slots (6b) of bar (2) to receive oppositely passing said bolts (18b) with resilient springs (5) interimposed between each tubular shaft (18a) and bolt (18b) of said arrangement (6) for the automatic retraction of latch means (7) in case of undesirable collision thereof onto the receiving members (11) mounted onto the vertical length of the frame profile member;
a plurality of internally threaded openings (3a) along bar (1) and a corresponding plurality of elongated slots (3b) along bar (2) lying opposite to openings (3a), wherein said bolts (3) passing consecutively through said supporting blocks (23), said internally threaded openings (3a) of bar (1) and said slots (3b) of bar (2) fixedly mount bar (1) of said multipoint latching assembly onto the sliding profile member, and
a position of connection of said multipoint latching assembly onto said locking operation handle means (4a,4b).

**7.** Multipoint latching assembly for sliding doors according to the above claims 1 and 6, **characterized by** that it is alternatively being connected to either an existent locking operation handle means (4a) whereby said cooperatively abutting bars (1,2) comprise an additional elongated slot (10a) along bar (1) and an opening (10b) along bar (2) lying opposite to said slot (10a) of bar (1), a bolt (10) passing consecutively through slot (10a) and opening (10b) to connect the multipoint latching assembly comprising said cooperatively employed bars (1,2) to said already existent locking operation handle means (4a) or to a self operated locking operation handle means (4b) whereby bar (2) of said cooperatively abutting bars (1,2) comprises openings (21 a) used to mount thereupon by means of rivets (21) a mechanism (20) adapted to convert the rotational motion of a handle means (4b) of the multipoint latching assembly into linear-reciprocating motion of the latch means bearing bar (2).

**8.** Multipoint latching assembly for sliding doors according to the above claims 1 and 6, **characterized by** that it further comprises means (9) for the stabilizing thereof at locked condition, said stabilizing means (9) comprising an internally threaded tubular pin (22) including a head with two differing diameters (22a, 22b), a pin (22c) and a spring means (19), said cooperatively abutting bars (1,2) further including an opening (9a) along bar (1) and a slot (9b) along bar (2), wherein said pin (22) enters through slot (9b) of bar (2) and protrudes through opening (9a) of bar (1) thereby being wound with said spring means (19) and receiving pin (22c) that is being screwed therein, said slot (9b) of bar (2) comprising an elongated portion (9b') and a rounded end portion (9b") with an enlarged diameter, wherein as long as said means (9) for stabilizing the multipoint latching assembly at locked condition comprising said internally threaded tubular pin (22) including a head with two differing diameters (22a, 22b), said pin (22c) and said spring means (19), slides along said elongated slot portion (9b'), the latching assembly of the invention is free to perform a reciprocating movement, whilst when said pin (22) arrives at the rounded end portion (9b"), said head (22b) thereof having a relatively smaller diameter sits within said rounded end portion (9b") thereby stabilizing the multipoint latching assembly at a locked condition, whereby said pin (22) is being released outwards of said rounded end portion (9b") when an axial pressure is exerted along said stabilizing means assembly (9) resulting in a temporary compression of said spring means (19) and storage of energy therein, such energy being released whenever said pin (22) again arrives at the rounded end portion (9b") of slot (9b) of bar (2).

**9.** Method of installation of the multipoint latching assembly claimed in the above claims 1-8 in sliding doors including a sliding profile member (15) with a frontal opening (15c) and a frame profile member (16), **characterized by** that it comprises the following steps:

a first step of assembling the multipoint latching assembly with a plurality of supporting blocks (23) mounted along the abutting bars (1,2), so that bolts (3) may sequentially pass through the central openings (23b) of the supporting blocks (23), through the internally threaded openings

(3a) of bar (1) and through the slots (3b) of bar (2),

a second step of longitudinal alignment of supporting blocks (23) along abutting bars (1,2) so that the assembly of abutting bars (1,2) and supporting blocks (23) mounted thereupon might be freely inserted through the frontal opening (15c) of the sliding profile member (15),

a third step comprising a 90° rotation of each one of the supporting blocks (23) so that they may extend perpendicularly on the abutting bars (1, 2), whereby the side extensions (23a) of each one of the supporting blocks (23) abut onto frontal lateral side walls (15a) of the sliding profile member (15),

a fourth step of further screwing said bolts (3) until the frontal end of each bolt (3) abuts onto an interior rear lateral wall (15b) of the sliding profile member (15) thereby fixedly mounting the multipoint latching assembly within the sliding profile member (15),

a fifth step of mounting onto the vertically extending length of the frame profile member (16), opposite to said vertically extending length of sliding profile member (15), of said receiving members (11) with additional plates (12) and terminal stop members (13) thereof, wherein the plurality and spacing of said receiving members (11) corresponds to the plurality and spacing of said latch means (7) mounted along said sliding profile member (15), and

a sixth step of connection of said multipoint latching assembly to either an already existent locking operation handle means (4a) or to a self operating locking operation handle means (4b), whereby by means of a single clockwise or anticlockwise rotation of said locking operation handle means (4a,4b) the entire plurality of said latch means (7) of the multipoint latching assembly is alternatively set at a locked and at an unlocked condition.

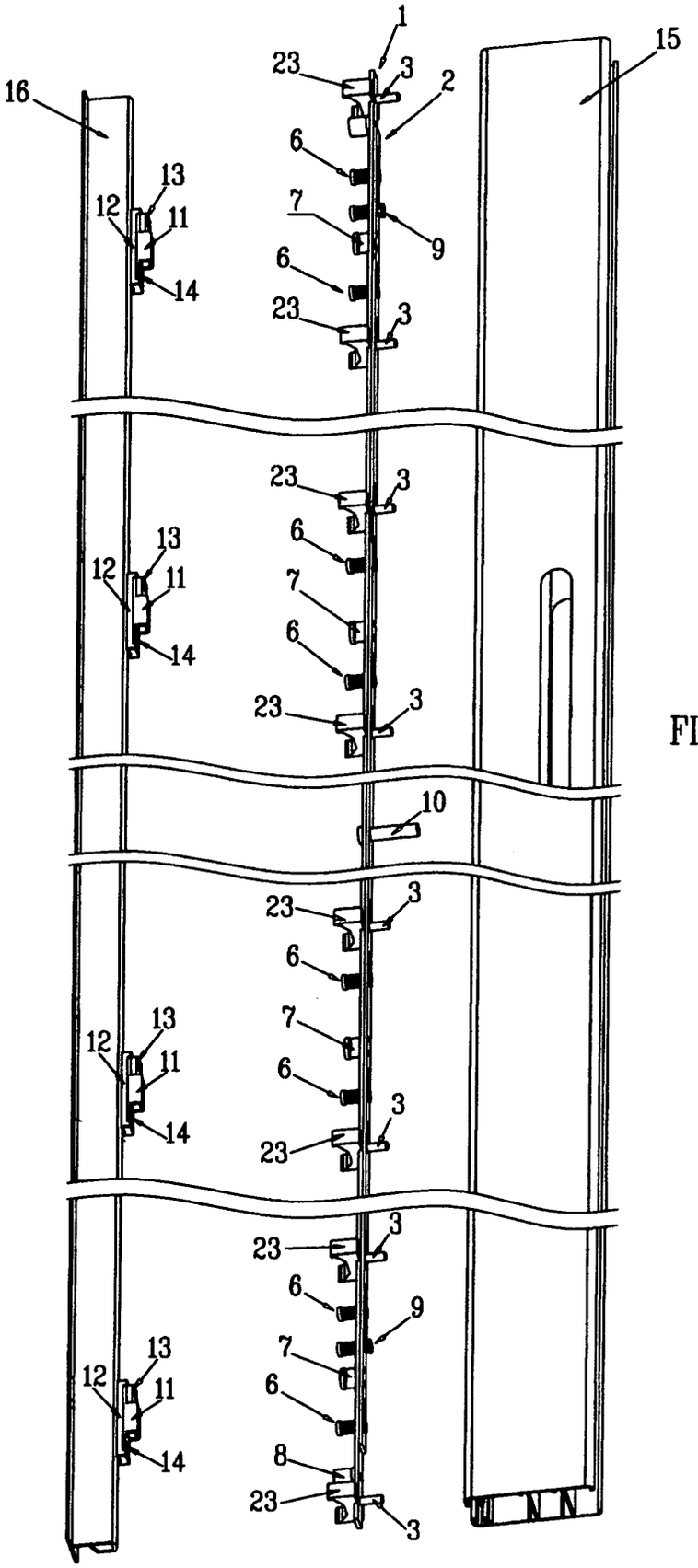


FIG.1

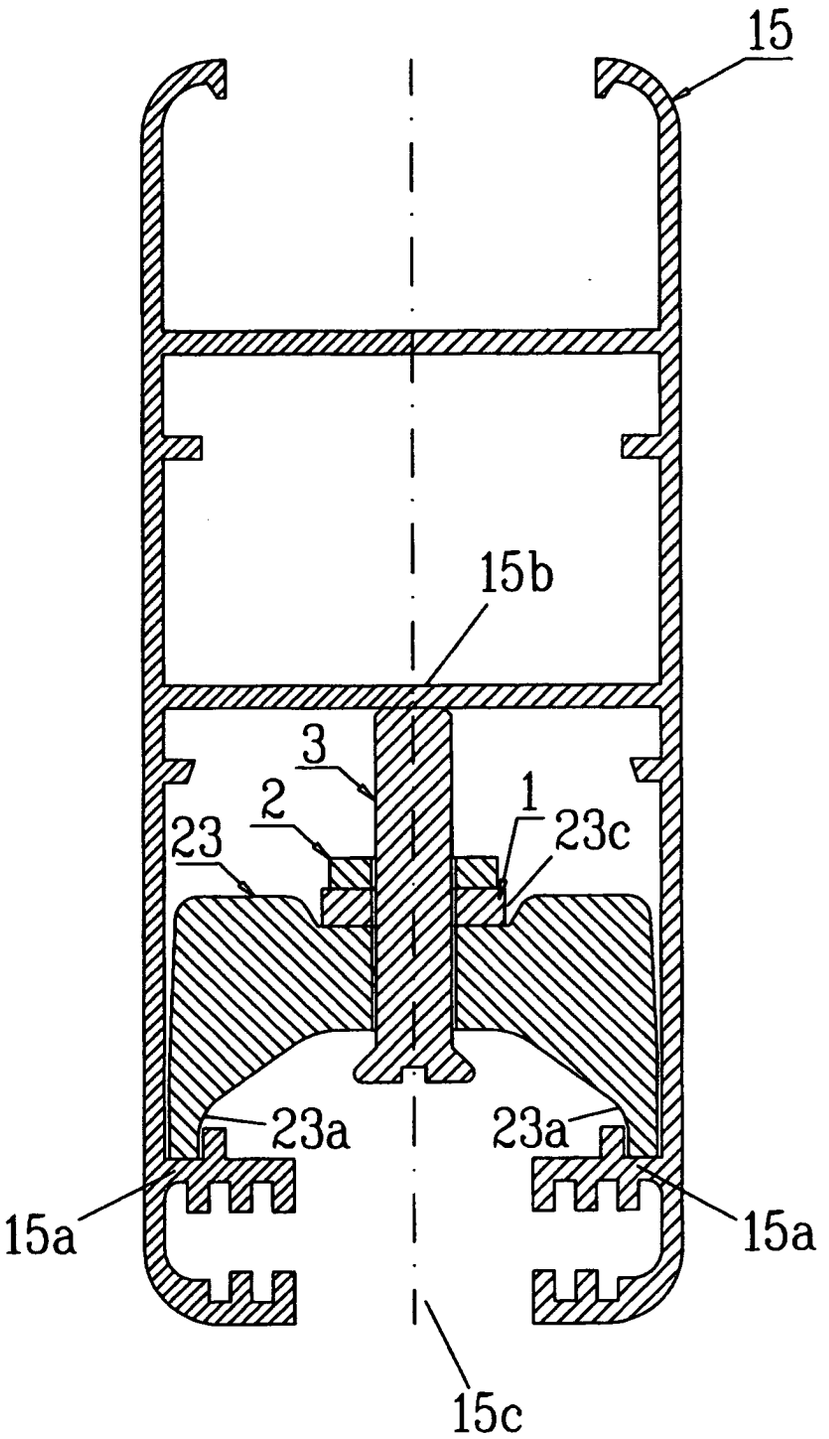


FIG. 2

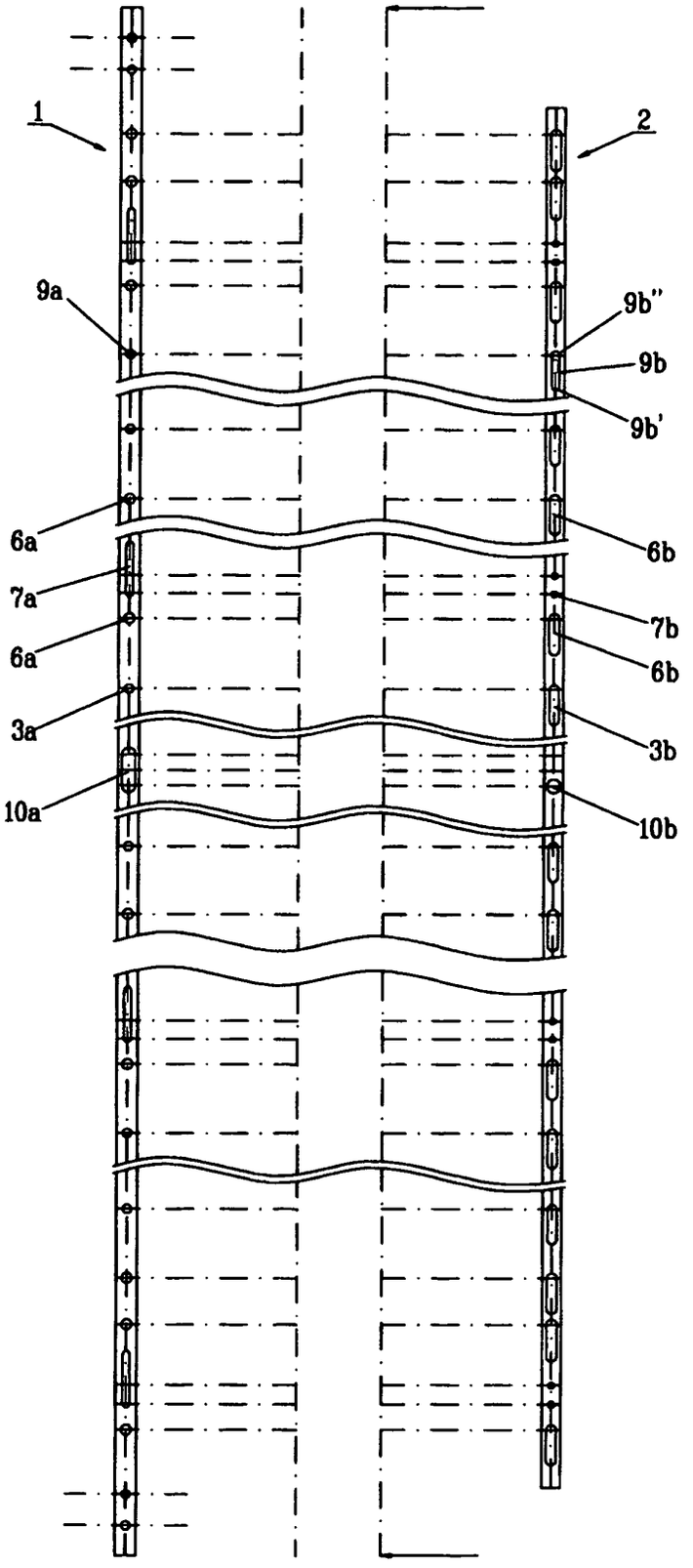


FIG.3

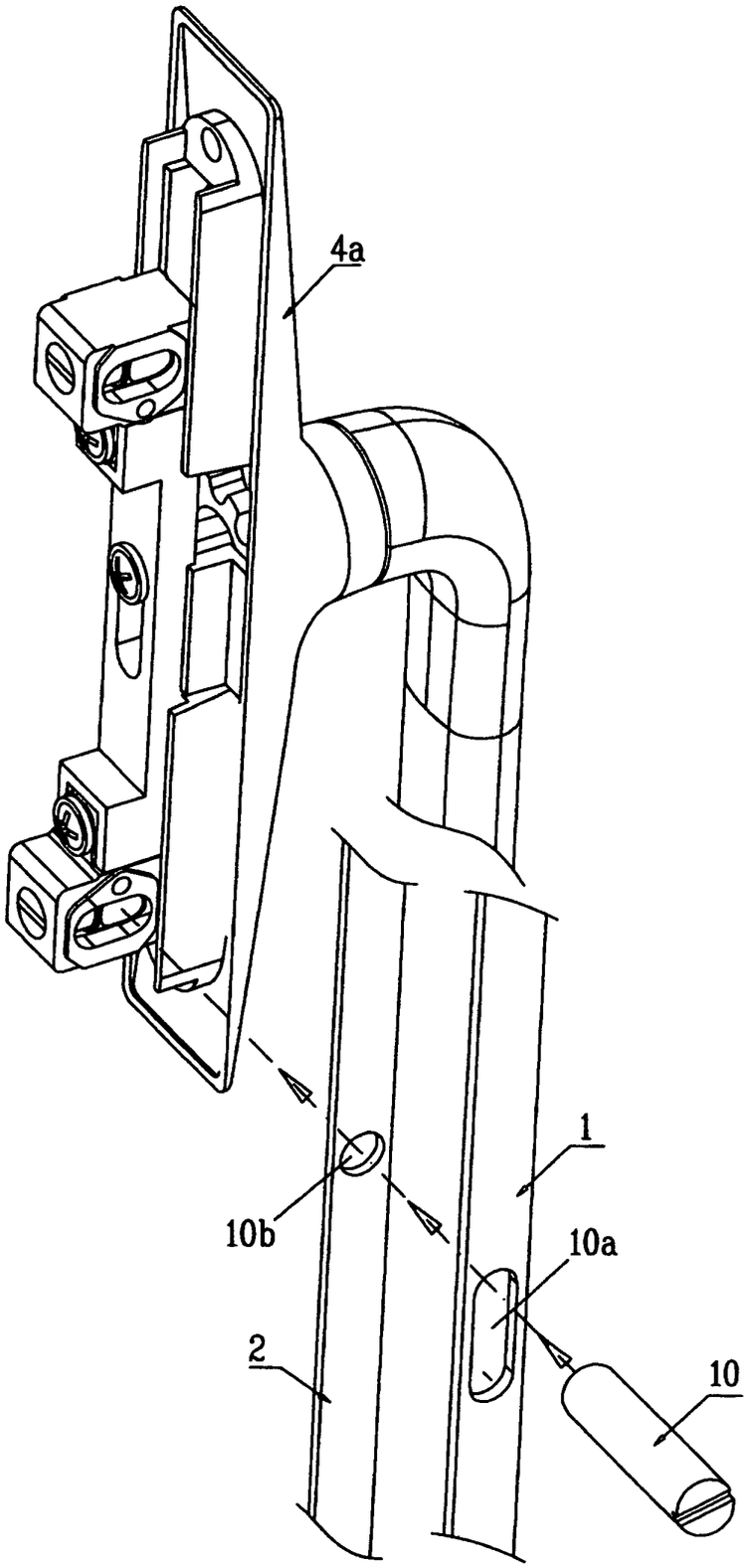


FIG. 4

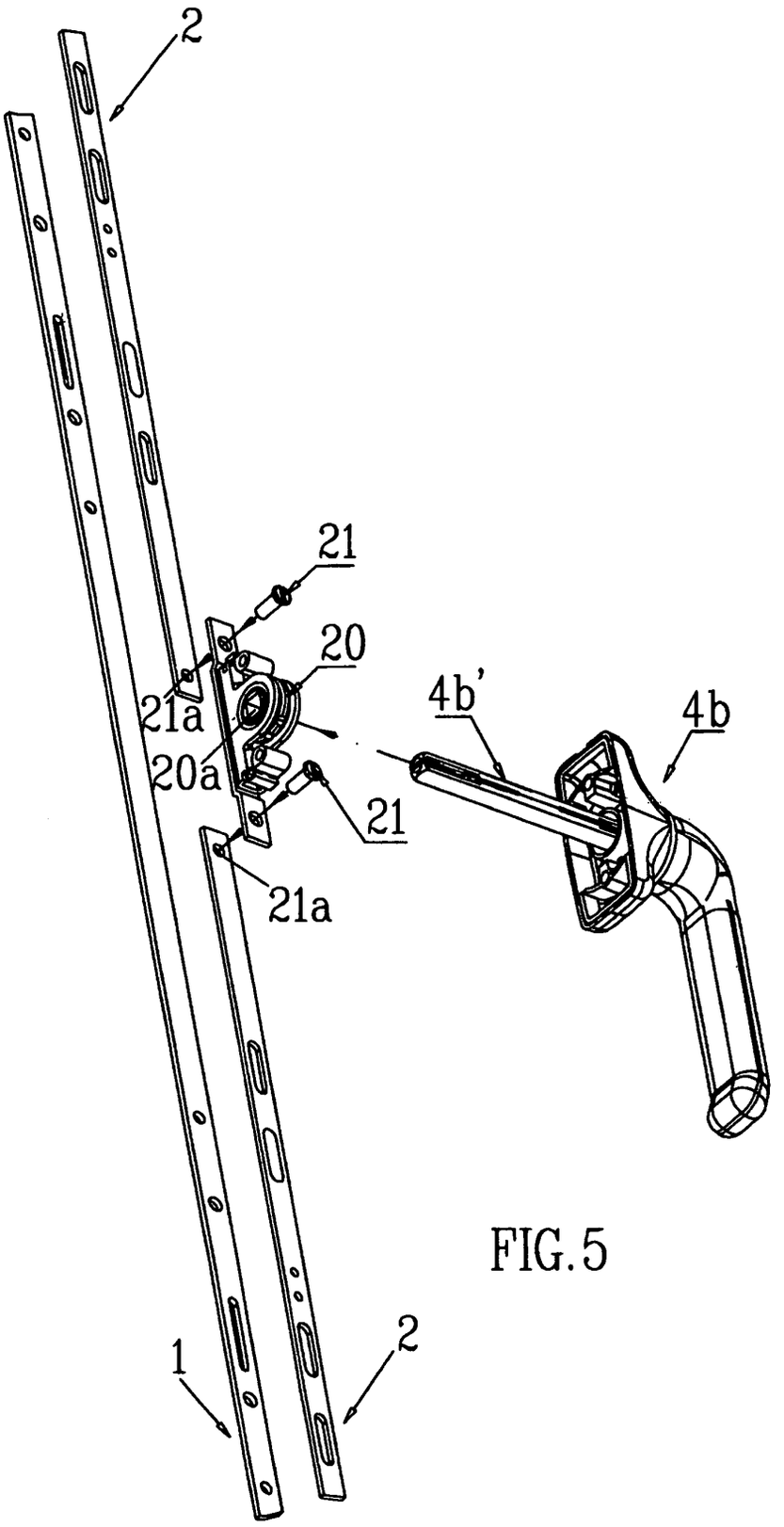


FIG.5

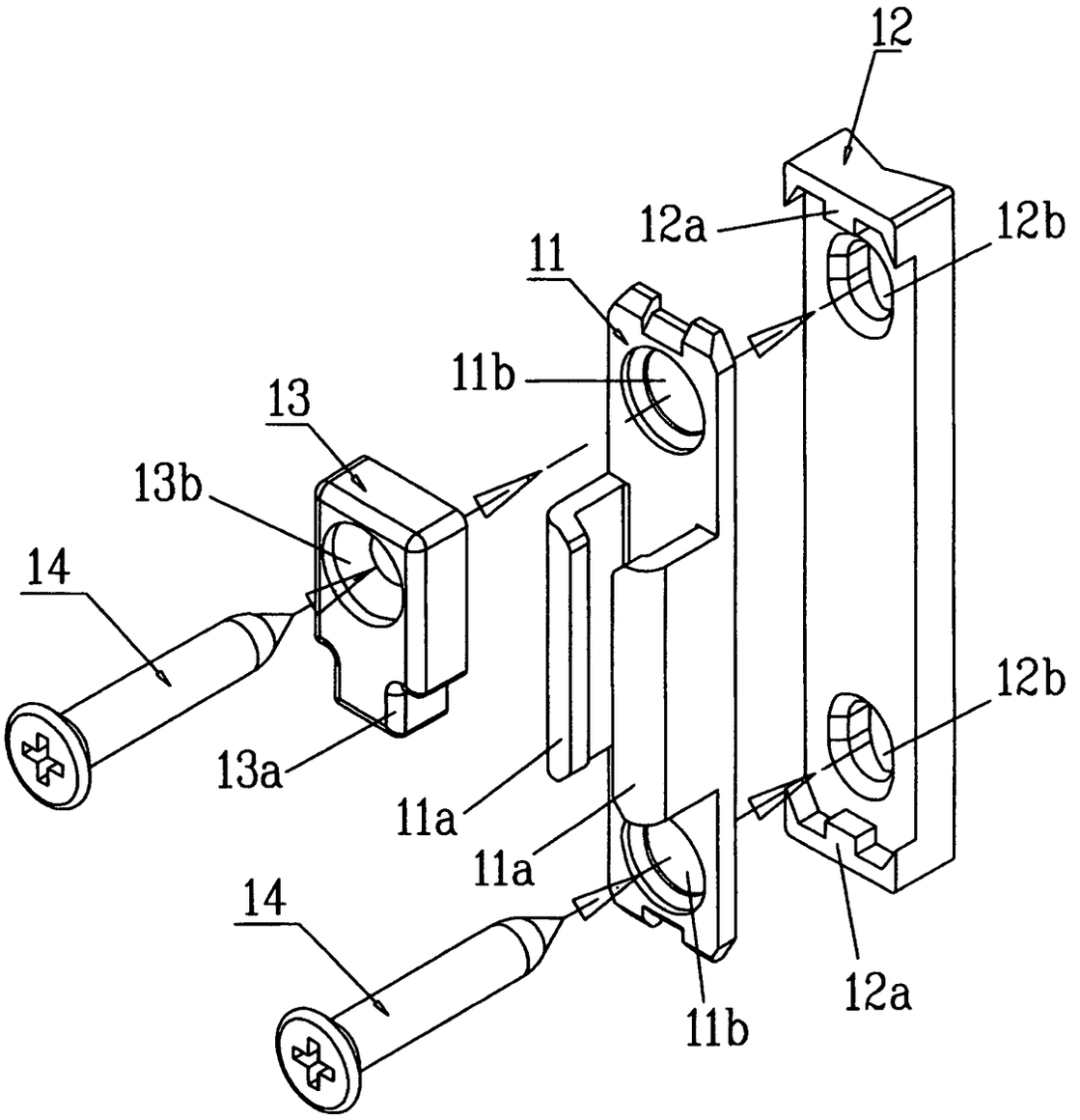


FIG.6

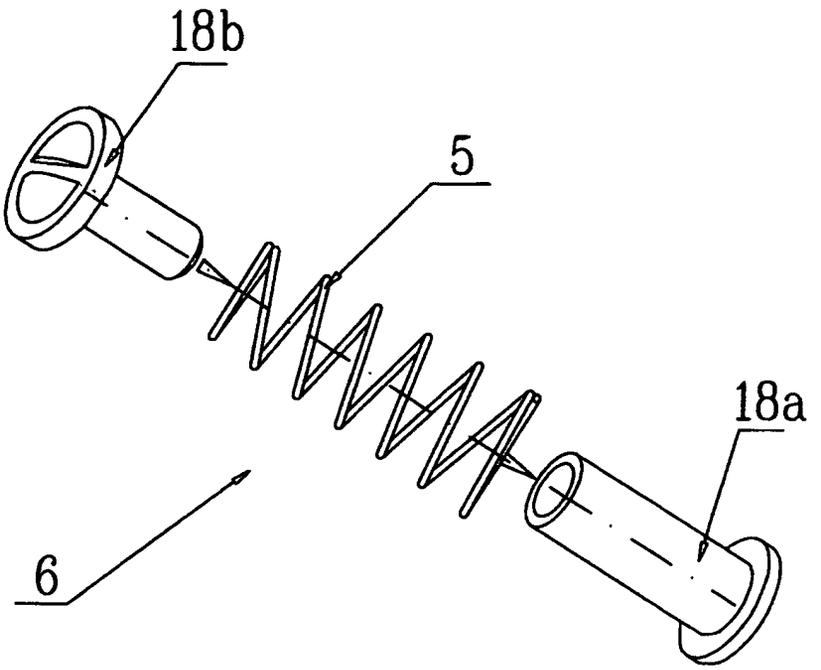


FIG. 7

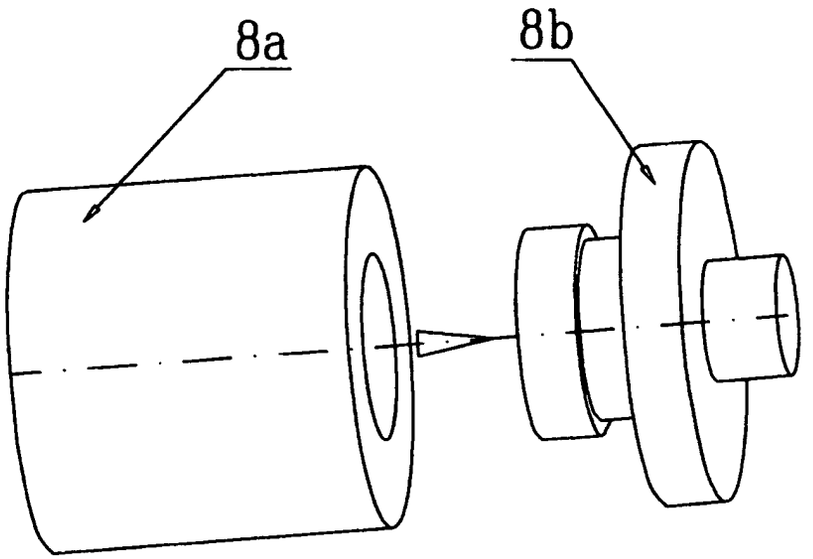


FIG.8

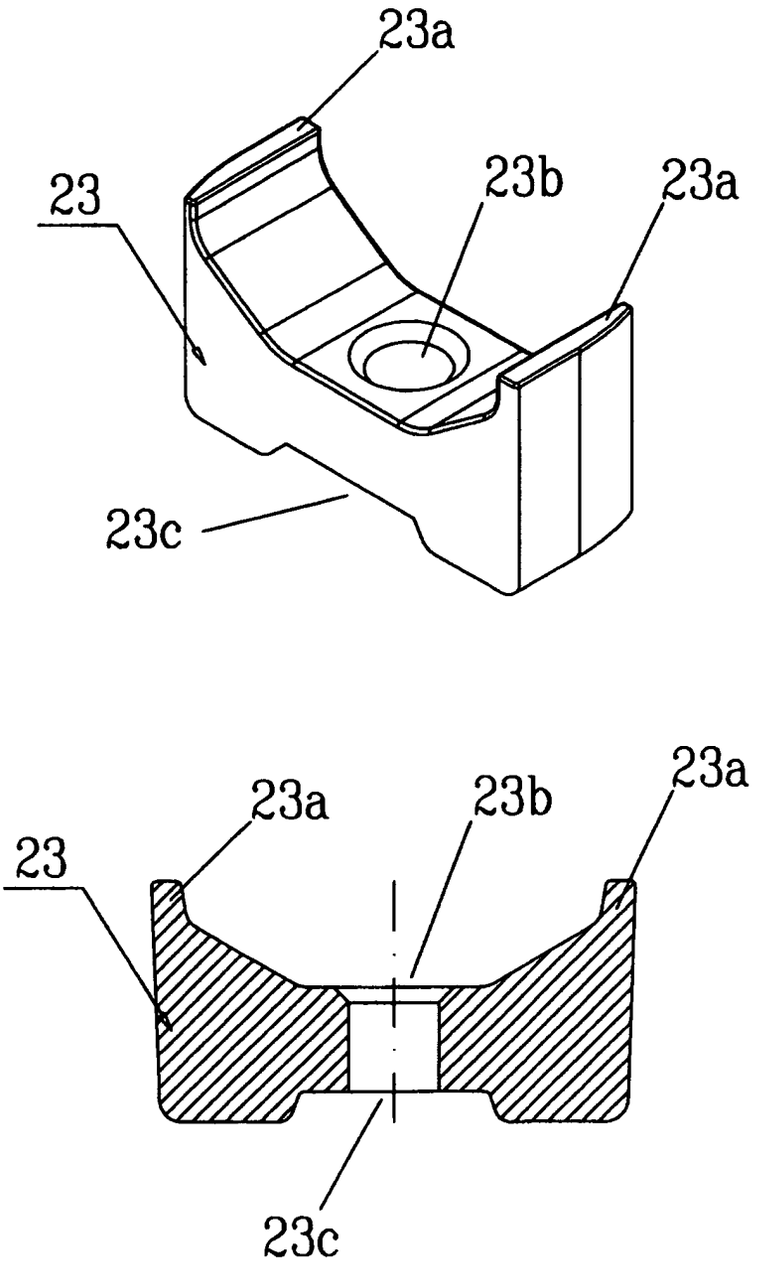


FIG. 9

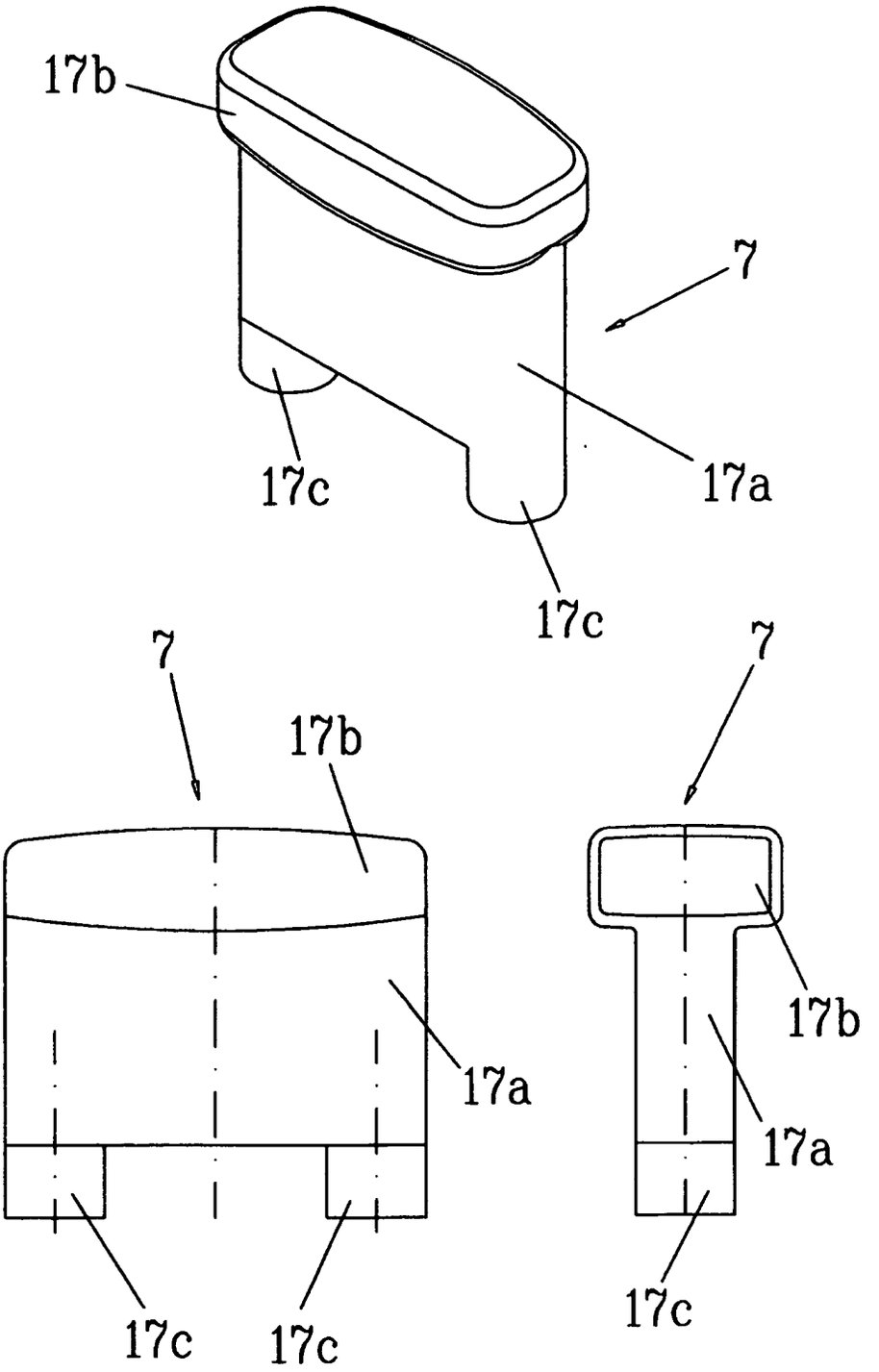


FIG.10

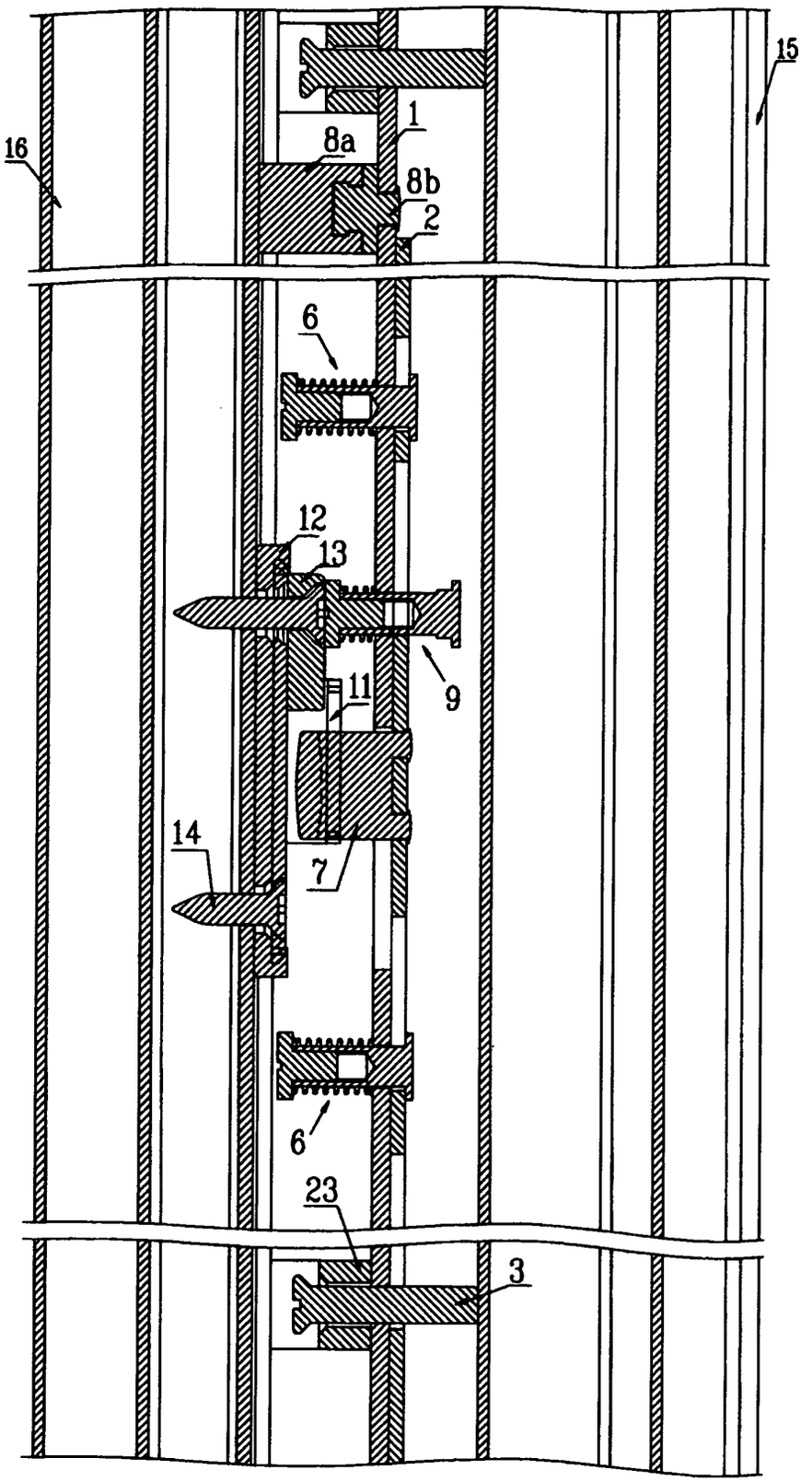


FIG.11

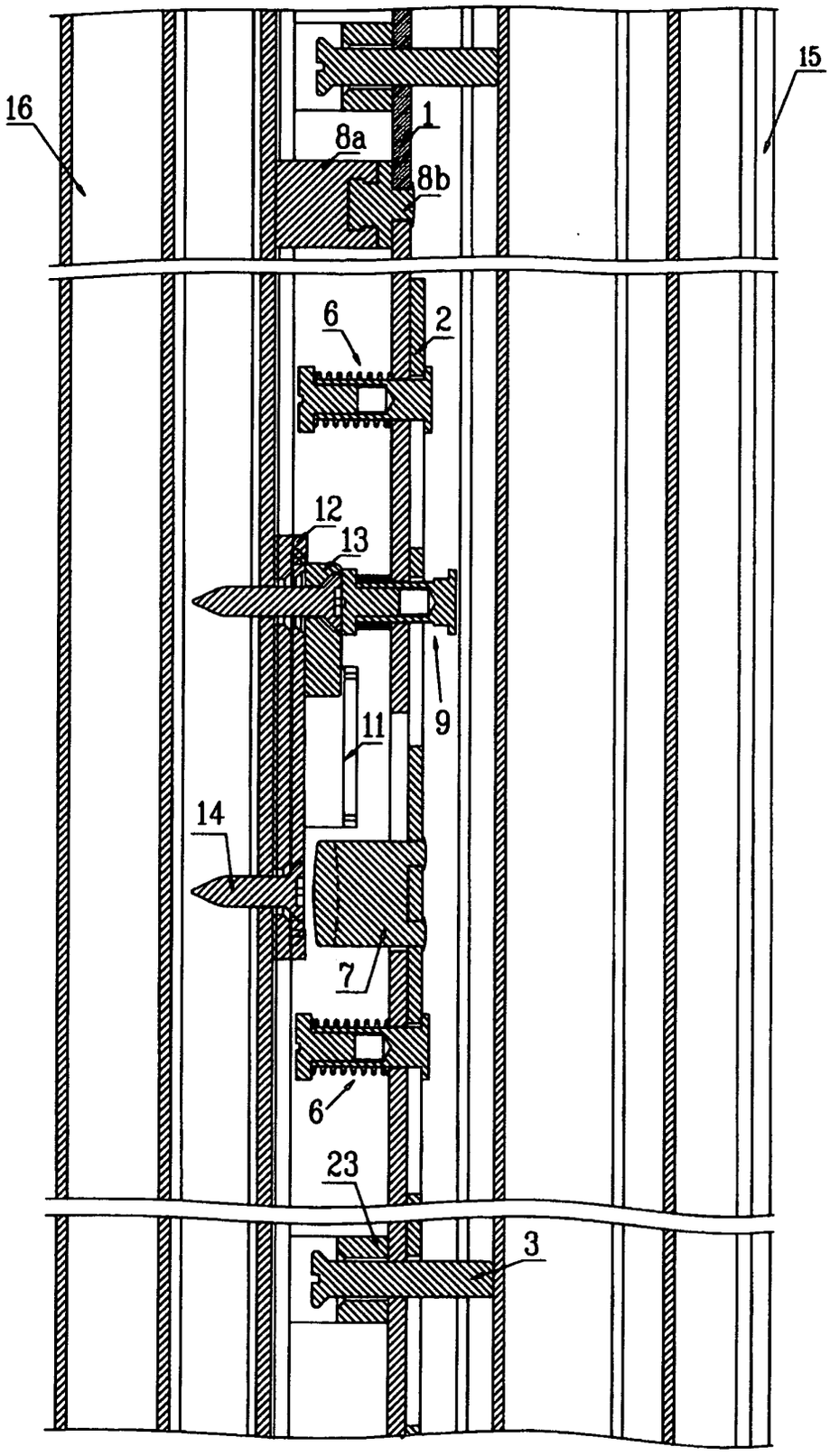


FIG.12

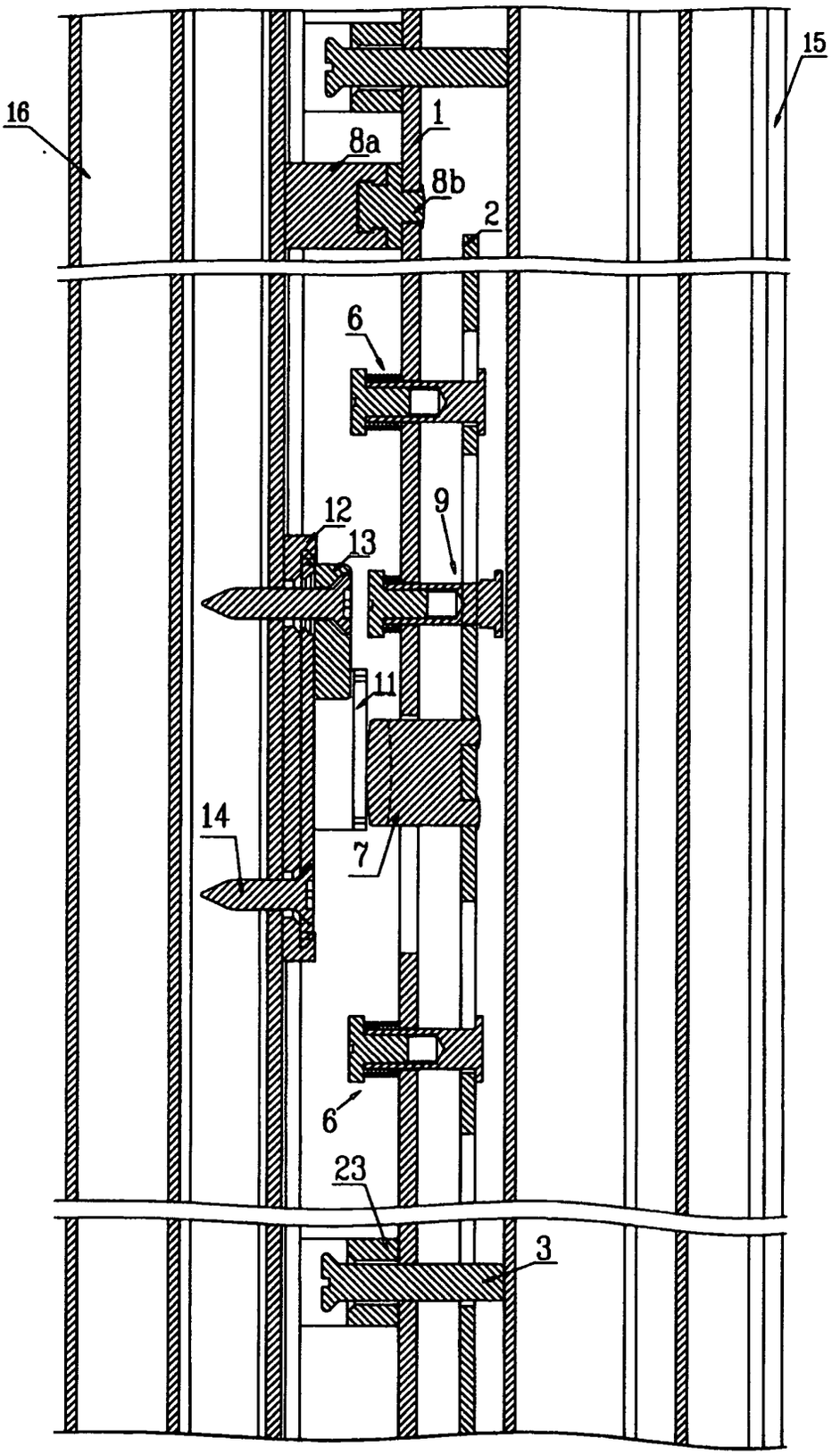


FIG.13

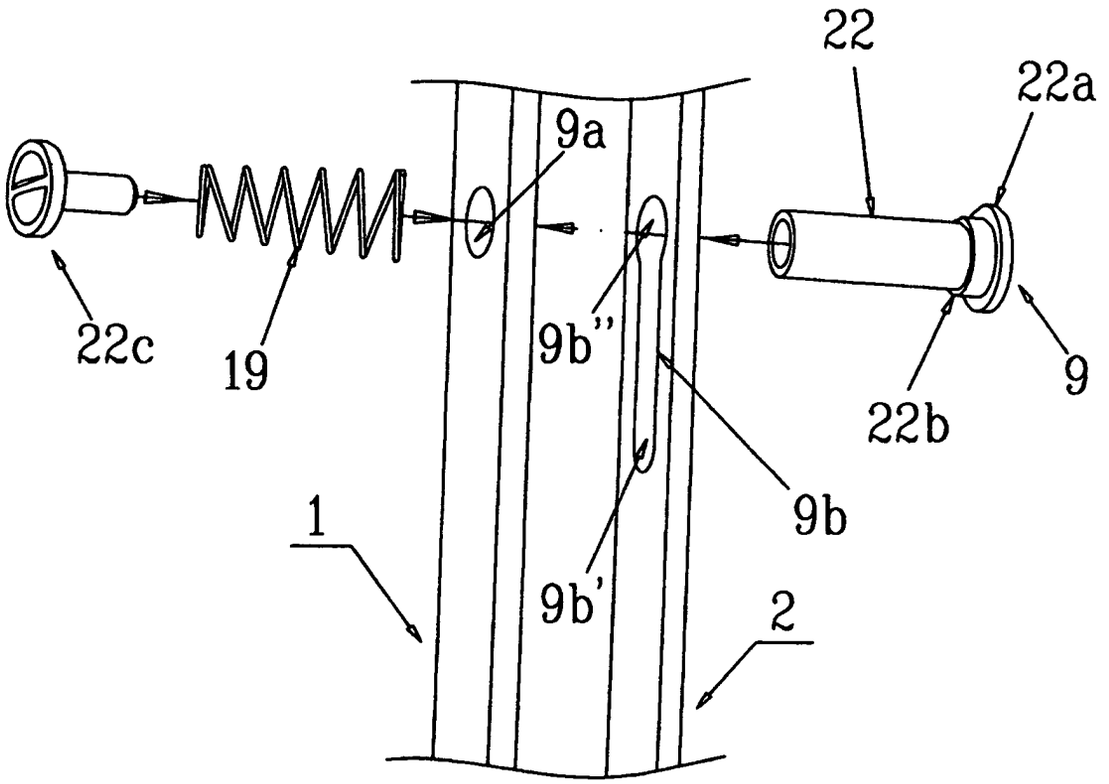


FIG.14

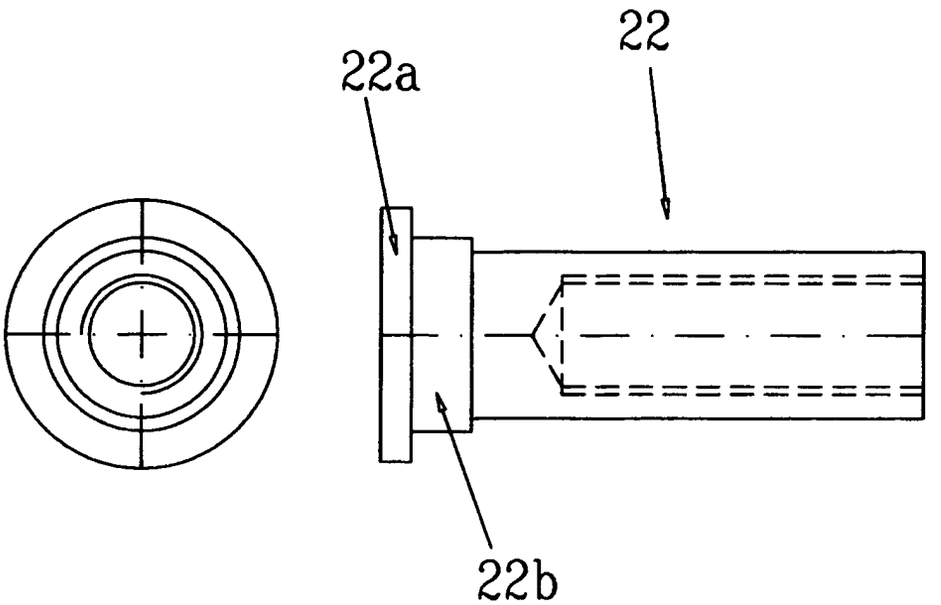


FIG.15

European Patent Office

# EUROPEAN SEARCH REPORT

Application Number
EP 05 38 6013

## DOCUMENTS CONSIDERED TO BE RELEVANT

| Category | Citation of document with indication, where appropriate, of relevant passages | Relevant to claim | CLASSIFICATION OF THE APPLICATION (Int.Cl.7) |
|---|---|---|---|
| A | EP 1 361 327 A (GRETSCH-UNITAS GMBH BAUBESCHLÄGE) 12 November 2003 (2003-11-12) * paragraph [0007] * | 1,9 | E05C9/18 E05C9/00 |
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| A | FR 2 824 355 A (FERCO INTERNATIONAL FERRURES ET SERRURES BATIMENT SA) 8 November 2002 (2002-11-08) * the whole document * | 1,9 | |

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 | 5 September 2005 | Van Beurden, J |

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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D : document cited in the application
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EPO FORM 1503 03.82 (P04C01)

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05-09-2005

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82