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(54) **CORNER TRANSMISSION FOR WINDOW FITTINGS**

(57) Corner transmission for the perpendicular transmission of the sliding movement of sliding slats (3) and coupler locks (9) of fittings (1) of a window leaf, characterised in that the corner transmission (5) comprises a corner piece (8) with a first leg (11) and a second leg (12), whereby the coupler lock (9) is slideable over the first leg (11) and whereby the coupler lock (9) is provided with a pre-mounted locking piece (29) that snaps into place on the corner piece (8) or on the leaf when the lock position of the window is reached the first time and whereby the locking piece (29) uncouples from the coupler lock (9) and remains near the corner of the corner piece (8) when the lock position is left again.

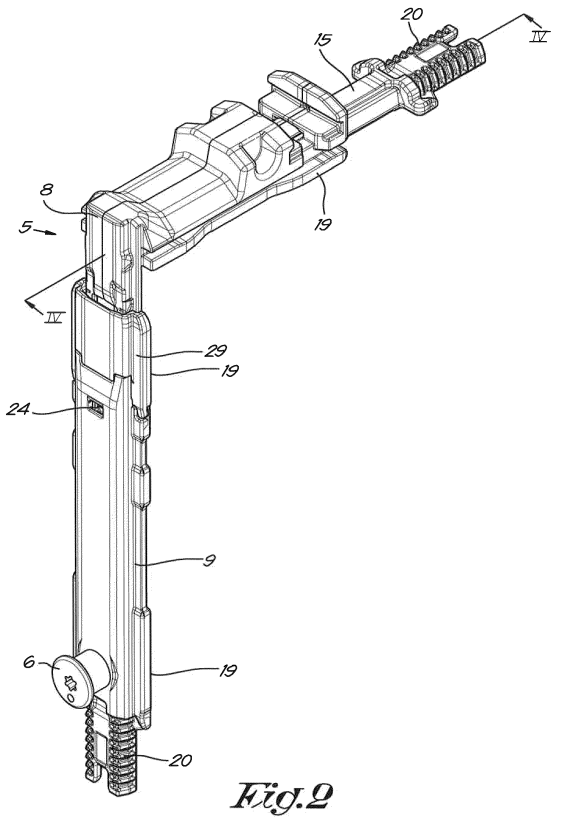

Fig.2

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Description

[0001] The present invention relates to window fittings, more specifically to the coupling between a corner piece of a window leaf and a coupler lock or the like.

[0002] Classic window fittings contain leaf fittings and frame fittings which cooperate with each other for closing and operating the window.

[0003] The leaf fittings traditionally contain a number of sliding slats, rods in technical jargon, and possibly coupler locks which are slidably mounted in a fitting groove along the contour of the leaf and which are operated by a rotatable operating crank which converts the rotation of the crank into a sliding movement of the sliding slats and coupler locks.

[0004] Depending on the configuration of the window, sliding slats and possibly coupler locks are located in the vertical and horizontal fitting grooves of the leaf, whereby for the transmission of the sliding movements of the sliding slats and coupler locks, corner transmissions are applied in the corners of the leaf.

[0005] By the movement of the sliding slats and coupler locks a number of fitting functions can be activated such as locking cams that can cooperate with locking points on the frame for closing the window and keeping said window closed.

[0006] In the case of a turn-tilt window or tilt-turn window, a link arm is applied as is known, which needs to be locked for turning open the window and unlocked for tilting open the window and simultaneously needs to limit the stroke of the tilting movement, whereby the link arm is also operated by a cam on a sliding slat or coupler lock.

[0007] Furthermore, in this type of windows it is also necessary to create a hinge function to allow the window to tilt around a horizontal axis.

[0008] Traditionally, a corner piece with a first leg and a second leg is used in which a spring assembly is slideably applied and forms a connection between the sliding slats or coupler locks on both sides of the corner.

[0009] In such classic corner piece during assembly only the first end of the spring assembly can be precoupled to a sliding slat or coupler lock to subsequently be slid into the fitting groove together. Said sliding slat or coupler lock with associated spring assembly are in a neutral position then.

[0010] The second end of the spring assembly is coupled to a sliding slat or coupler lock by means of a coupling block that is mounted on the end of the spring assembly.

[0011] To couple said second end of the spring assembly to a sliding slat or coupler lock, the spring assembly of the corner transmission needs to be slid to an extreme position or coupling position whereby the second end with the coupling block needs to be slid beyond the corner piece.

[0012] In said coupling position the coupling block has sufficient freedom of movement relative to the bottom of the fitting groove to be able to move under the coupler lock or sliding slat and click into a provided recess.

[0013] The spring assembly, with a coupler lock or sliding slat coupled thereto, is slid back into the neutral position, whereby the coupling block disappears into the corner piece.

[0014] Coupling or uncoupling the spring assembly with sliding slat or coupler lock can only take place in the coupling position. During normal operation of the window fittings, said coupling position is never reached and the coupling block thus continuously and always remains in the corner piece such that the coupling block cannot unintentionally uncouple.

[0015] A disadvantage is that said mounting method is labour-intensive and cumbersome.

[0016] Another disadvantage is that the spring assembly needs to be slid from the neutral position to a coupling position for coupling the second end of the spring assembly to a sliding slat or coupler lock such that it is impossible to deliver the corner transmission to a customer in a locked position, which implies that mistakes may occur when mounting the fittings on the leaf.

[0017] Another disadvantage is that an extra stroke must be provided in the corners to reach said coupling position. Consequently the corners become bigger, the consequence being that the smallest executable window also becomes slightly bigger.

[0018] Typically, as described above, the first leg of a corner piece is slid into the fitting groove up into a position whereby the second leg falls into an adjoining fitting groove. In principle, after coupling to a coupler lock, the second leg is also more or less locked.

[0019] A disadvantage is that such lock only suffices for corners under the crank. The corners above the crank and under the link arm are insufficiently resistant to great loads such as burglary or wrong operation in this way. Furthermore, such lock allows too much movement of the corner such that unintentional stroke loss may occur.

[0020] That is why extra separate locking pieces are provided on all corners above the operating crank.

[0021] A disadvantage is that said locking piece is an extra component to be mounted which is sometimes forgotten. When said locking piece is forgotten during mounting this may result in an unstable corner in the long term.

[0022] The purpose of the present invention is to provide one or more solutions to the aforementioned and other disadvantages.

[0023] In one aspect of the invention, a corner transmission with snap-in connection is provided for the perpendicular transmission of the sliding movement of sliding slats and coupler locks of fittings of a window leaf, whereby the corner transmission comprises a corner piece with a spring assembly therein which is slideable over the corner, whereby the corner transmission is provided with a snap-in connection for the coupling between the spring assembly and the coupler lock and whereby for the coupling between the spring assembly and the coupler lock a sliding snap-in connection is provided in

the form of a coupling block and whereby the corner piece is provided with a temporary mounting lock which holds the coupling block in the corner piece during coupling with the coupler lock, said mounting lock being breakable the first time the fittings are operated.

[0024] An advantage of this is that consequently the spring assembly no longer has to be slid into the corner piece when the spring assembly needs to be coupled to a coupler lock and moreover the coupling block can remain in the corner piece. This has the advantage that no extra stroke needs to be provided for the corner transmission to make the coupling. Another advantage is that the corner transmission can be delivered to the customer in a locked condition.

[0025] An additional advantage is that the coupling block on the end of the spring assembly and the coupler lock is executed such that the spring assembly can be easily coupled to the coupler lock by one single sliding movement.

[0026] The temporary lock is such that once the fittings are mounted in the window this lock can be broken by a first operation of the fittings by rotation of the operating crank.

[0027] This has the advantage that the coupler lock can only be connected with the corner piece according to the correct orientation.

[0028] In one embodiment according to the invention the coupling block in a window provided in the corner piece partially protrudes outwardly along the outer contour of the corner piece and is inwardly elastically compressible in the corner piece thanks to the bendability of the spring assembly on which the coupling block is mounted, for which purpose an opening is provided under the coupling block which interrupts the guide of the spring assembly. Preferably, the end of the coupler lock to be coupled is provided with a chamfer in the sliding direction of the coupler lock and adjacent thereto a recess in the coupler lock for snapping into place the section of the coupling block protruding from the corner piece.

[0029] The chamfer of the coupler lock forces the spring assembly with coupling block to bend in the aforementioned opening under the spring assembly. On sliding the coupler lock further, the coupling block is pushed in even further until it can snap into place in the provided recess of the coupler lock. From this moment, the coupler lock is connected to the spring assembly by means of the coupling block.

[0030] Said corner transmission with simple snap-in connection does not comprise extra components relative to traditional window fittings. As no extra components are required and mounting is considerably simplified, said snap-in connection has the advantage of being easier and quicker and thus cheaper than the traditional way of connecting.

[0031] Another advantage is that there is no danger of unintentional uncoupling in both closed and open or tilted condition of the window.

[0032] Preferably, except on the level of the aforementioned interruption of the guide of the spring assembly, the spring assembly is fittingly enclosed in the guide such that the spring assembly cannot bend in said places and consequently the coupling block cannot unintentionally detach.

[0033] According to a further embodiment according to the invention, the snap-in connection is a detachable snap-in connection such that after mounting the coupler lock can be simply detached from the coupling block in case the leaf fittings need to be disassembled.

[0034] To this end an access opening for a tool or the like is provided in the coupler lock on the level of the recess in which the coupling block snaps into place such that the coupling block is accessible to be pushed into the mounted condition of the window fittings, provided that the coupling block is in the corner piece on the level of the interruption of the guide for the spring assembly. Preferably, said location of the coupling block is determined by the temporary lock or by a mark applied on the corner piece to indicate the position of the coupler lock in which the coupling block is suitably located.

[0035] On the side of the coupling block that is visible through the access opening in the coupler lock, a number of profilings or surface roughnesses can be applied. By repeatedly performing sliding and pumping movements on the profilings of the coupling block using a suitable tool, for example a screwdriver, it is possible to uncouple the coupling block from the recess with the coupler lock. After uncoupling, the corner transmission can be simply slid out of an exposed fitting groove.

[0036] This provides the advantage that it is possible to simply disassemble the fittings in case of an opened window leaf, but that it is impossible for a burglar to get to and remove the coupling block in case the window is closed.

[0037] In a practical embodiment according to the invention, the coupling block is mounted on the spring assembly by means of pegs mounted in passages in the spring assembly. Furthermore, the coupling block can be provided with one or two chamfers on the level of the pegs on the front and/or back of the pegs seen in sliding direction.

[0038] In a practical embodiment according to the invention the temporary lock to hold the spring assembly with the coupling block thereon when snapping in place the coupler lock is, for example, formed by a break-off peg that is mounted on the corner piece and that is enclosed in a recess of one of the moving parts of the corner piece or vice versa. The break-off peg is dimensioned such that it breaks off the first time the leaf fittings are operated.

[0039] In another aspect of the invention, a corner transmission for fittings is provided for the perpendicular transmission of the sliding movement of sliding slats and coupler locks of the fittings, whereby the coupler locks are already provided with a locking piece snapped in place thereon before mounting. Said locking piece snaps in place on the corner piece or on the leaf when the cou-

pler lock reaches a lock position the first time. The lock position is a predetermined position in the stroke of the coupler lock which is reached by sliding the coupler lock by rotating the operating crank. Preferably the locking piece is near the corner, when the coupler lock is in the lock position. The lock position may coincide with an end of the stroke of the coupler lock but the invention is not limited to this. The lock position of the coupler lock can be reached by rotating the operating crank in a predetermined position. Said position may coincide with the close position, or the tilt position, or the turn position of the window. On leaving the lock position, the locking piece uncouples from the coupler lock and remains near the corner, where it fulfils its locking function.

[0040] This has the advantage that the locking piece can no longer be forgotten during assembly.

[0041] Another advantage is that the assembly is strongly simplified as the locking piece is simply driven into the corner the first time the fittings are closed and that the locking piece uncouples from the coupler lock and remains in the corner on leaving the close position such that the locking piece cannot interfere with the further use of the fittings.

[0042] The connections between coupler lock and locking piece can be executed in various ways, for example using weak connections such as snap-ins, pegs or breakable material weakenings.

[0043] The locking piece can be extended from an exposed fitting groove with a device suitable for this purpose, such as a screwdriver.

[0044] If relevant the lower corners of the window leaf can be provided with a locking piece. Said locking piece then contains a press or punching screw that clamps or punches on a tongue of the fitting groove. In this way the lower corners can also be additionally locked.

[0045] This has the advantage that the burglar resistance is increased even more whereas the lifespan of the corner increases and stroke loss is countered.

[0046] The coupler lock and the locking piece can for example be made from synthetic material or a metal alloy like zamak such that they can be manufactured from one piece, including the aforementioned material weakenings.

[0047] With the intention of better showing the characteristics of the invention, a preferred embodiment of a corner transmission with snap-in connection according to the invention is described hereinafter, by way of an example without any limiting nature, with reference to the accompanying drawings wherein:

figure 1 schematically shows a perspective view of window fittings for a tilt-turn window;
figure 2 shows the component indicated in figure 1 with F2 in a perspective view and on a larger scale;
figure 3 shows the component of figure 2 on a larger scale and in an exploded condition;
figure 4 shows a cross-section according to line IV-IV of figure 2;
figure 5 shows a side view of the component shown in figure 2, whereby the coupler lock is not shown in this figure;
figure 6 shows a cross-section according to line VI-VI in figure 5;
figure 7 shows a section of the cross-section indicated in figure 4 with F7 on a larger scale, with a tool for uncoupling;
figure 8 schematically shows a perspective view of a coupler lock with supplementary locking piece;
figure 9 shows a top view of the section indicated in figure 8 with F9 on a larger scale and in assembled condition;
figure 10 shows a cross-section according to line X-X in figure 9;
figure 11 shows the component of figure 2 for different coupling phases A to D.

[0048] The window fittings 1 shown in figure 1 intended for assembly between a fixed frame of a window and a leaf for opening and closing the window and for tilting the window.

[0049] For the operation, the window fittings 1 contain an operating mechanism 2, as is known, for the conversion of the rotational movement of an operating crank (not shown in the figure) to a translation movement of the ends of the operating mechanism 2.

[0050] Said translation movement is transferred to sliding slats 3 which are slidably mounted in a fitting groove of the horizontal and vertical profiles of the leaf. For the transfer of the translation from the horizontal to the vertical sliding slats 3, a corner transmission 5 is mounted on the corners of the leaf.

[0051] The fittings 1 are intended to exercise different functions, including a lock function for locking the leaf in the frame in a closed condition of the window, whereby locking cams 6 are provided which in closed condition hook behind locking points 7 and which on opening the window are slid away from behind the locking points 7.

[0052] According to the invention, the corner transmissions 5 are executed with a corner piece 8 and a coupler lock 9 couplable thereto.

[0053] The corner piece 8 with coupler lock 9 connected thereto, as shown in figure 2, is shown in disassembled condition in the upper section of figure 3 and is made from a corner-shaped housing 10 with a first leg 11 and a second leg 12.

[0054] The housing 10 is composed of a left and a right half which are symmetrical and in which a guide 13 is provided in the form of a groove with a spring assembly 14 therein which is slideable over the corner and whereby the spring assembly 14 is connected at one end to a moving leg 15 of the corner piece 8 which is slidable in the second leg 12 and whereby the other end is intended for the coupling with the coupler lock 9 via a coupling block 16 in the first leg 11 which is provided on the spring assembly 14 to this end.

[0055] The right half of the corner piece 8 is provided

with a break-off peg 17 that is enclosed in a recess 18 of the moving leg 15 to block the spring assembly 14 for coupling and is dimensioned such that it breaks off the first time the fittings 1 are operated.

[0056] The second leg 12 is provided with laterally extending ribs 19 with which the second leg 12 of the corner piece 8 can be slid into a fitting groove up to a position in which the first leg 11 falls into an adjoining fitting groove.

[0057] Both the moving leg 15 and the coupler lock 9 are provided with toothing 20 at their free end for coupling a fittings section that is provided with complementary toothing 20, for example a sliding slat 3, which may or may not be in the form of a sliding slat with control coupling 6a.

[0058] In figures 2 and 3 the corner piece 8 is shown together with a coupler lock 9 which is provided with lateral extending ribs 19 with which the coupler lock 9 is slideable in the vertical fitting groove and is provided with an adjustable locking cam 6 that can cooperate with a locking point 7A which is provided on the frame and is slideable up to over the coupling block 16 for coupling with the spring assembly 14.

[0059] When the corner piece 8 is not coupled with the coupler lock 9, the coupling block 16 partially protrudes outwardly along the outside of the corner piece 8 and is inwardly elastically compressible in the corner piece 8 thanks to the bendability of the spring assembly 14 on which the coupling block 16 is mounted, for which purpose an opening 21 is provided which interrupts the guide 13 of the spring assembly 14.

[0060] As illustrated in figure 4, the coupler lock 9 is provided at the coupled end with a chamfer 22 in the sliding direction of the coupler lock 9 and adjacent thereto a recess 23 in which the coupling block 16 is snapped in place. Furthermore, under the coupling block 16, an interruption is provided in the guide 13 of the spring assembly 14 in which the spring assembly 14 with coupling block 16 can locally bend or be pushed in toward the inside, which means the side of the corner piece 8 that is mounted against the leaf.

[0061] As shown in figure 7, the coupler lock 9 on the outside of the corner piece 8 is provided with a window 24 through which the coupling block 16 is accessible with a suitable tool, such as a screwdriver.

[0062] Just under the aforementioned window 24, the coupling block 16 is provided with two profilings 25, as shown in figure 5, with which the coupling block 16 can be detached again by performing some sliding and pumping movements with the tool on the profilings 25.

[0063] As shown in figure 3, 4 and 6, the coupling block 16 is provided with pegs 26 which are mounted in passages 27 in the spring assembly 14 and are moreover provided with a chamfer 28 on the level of the pegs 26, seen in the sliding direction.

[0064] Said chamfer 28 lowers the force for realising the snap-in connection.

[0065] The coupler lock 9 can be equipped with a supplementary locking piece 29 in the extension of the coupler lock 9, as shown in figures 8 to 11.

[0066] The locking piece 29 and the coupler lock 9 are provided with ribs 19 on their lateral sides which lie in each other's extension and which can slide in the fitting groove.

[0067] The locking piece 29 can hereby be snapped on the coupler lock 9 by means of a reusable snap-in connection as shown in detail in figure 9 and 10. Said snap-ins 30 are mounted on the two lateral sides of the locking piece and hook into recesses 31 provided on the coupler lock 9.

[0068] The locking piece 29 provides extra strength to the corner and is mostly applied but not limited to the corners above the operating crank

[0069] Realising the snap-in connection and assembly of the locking piece 29 in the corner is very simple and as follows:

[0070] Figures 11A to 11D show the different phases in which the snap-in connection and locking the corner are realised, whereby the phases shown in figures 11A and 11B occur upon the first assembly of the window fittings 1 on the window leaf, whereas figures 11C and 11D occur upon using the window fittings 1 when the operating mechanism 2 is operated the first time.

[0071] Figure 11A shows the corner transmission with corner piece 8 whereby the coupler lock 9, together with locking piece 29, is already slid over the first leg 11 of the corner piece 8 in the direction of the arrow, but not yet snapped into place. In this phase, the spring assembly 14 is still locked with the temporary lock, in this case a break-off peg 17 as mentioned above. Note here that the locking piece 29 is connected to the coupler lock 9 by means of snap-ins 30 which are provided on the locking piece 29 for this purpose and hook into snap-in details 31 applied on the coupler lock 9.

[0072] In 11B the coupler lock 9 is slid further over the first leg 11 up to over the coupling block 16 of the spring assembly 14. The coupling block 16 is now enclosed in the recess 23 provided in the coupler lock 9, such that the spring assembly 14 is now unslideably connected to the coupler lock 9.

[0073] Upon sliding further, for example by rotating the operating mechanism 2, in the direction of the arrow of the coupler lock 9, the break-off peg 17 breaks off and the temporary lock is consequently no longer locked. From hereon the spring assembly 14 can be slid along the coupler lock 9 connected thereto. Figure 11C shows a coupler lock 9 slid up into a lock position whereby the locking piece 29 on the end of the coupler lock 9 is now driven completely into the corner. The locking piece 29 now snaps into place on the corner piece 8 by means of snap-ins 32 which are provided on the locking piece 29 for this purpose and which hook into snap-in details 33 applied on the corner piece.

[0074] The snap-in connection between the corner piece 8 and locking piece 29 is hereby stronger than the snap-in connection between locking piece 29 and coupler

lock 9.

[0075] On rotating back the operating mechanism 2, the coupler lock 9 is slid back in an opposite direction, in other words in the direction away from the corner as shown by the arrow in figure 11D. The snap-ins 30 hereby leave the snap-in details 31 such that the locking piece 29 uncouples from the coupler lock 9 and the locking piece 29 consequently remains behind near the corner where it fulfills its locking function.

[0076] The locking piece 29 can also be provided on a classic coupler lock with classic coupling connection.

[0077] Furthermore, the invention is not limited to window fittings 1 with a turn-tilt of tilt-turn function but is equally applicable to a window that can only turn or only tilt.

[0078] The connection between coupling block 16 and spring assembly 14 can be made in all kinds of ways.

[0079] The end of the spring assembly 14 of the second leg 12 does not necessarily have to be coupled to a moving leg 15 for the coupling with a sliding slat 3, but could alternatively be directly connected to the sliding slat 3.

[0080] According to a special aspect of the invention as shown in figure 1, the sliding slats 3 are applied in three zones, namely one zone vertically under the operating mechanism 2 and two zones above the operating mechanism 2.

[0081] The sliding slats 3 are, for example, components as specified in the pending Belgian Patent application BE202105021 which is considered as being included herein by reference.

[0082] The sliding slats 3 shown in figure 1 do not necessarily have to be applied in relationship with the corner transmission and snap-in connection according to the invention but can also be applied in fittings with a classic corner transmission without the snap-in connection.

[0083] The present invention is by no means limited to the embodiments described as an example and shown in the figures, but a corner transmission with snap-in connection according to the invention can be realised in all kinds of forms and dimensions, without departing from the scope of the invention.

Claims

1. - Corner transmission for the perpendicular transmission of the sliding movement of sliding slats (3) and coupler locks (9) of fittings (1) of a window leaf, **characterised in that** the corner transmission (5) comprises a corner piece (8) with a first leg (11) and a second leg (12), whereby the coupler lock is slideable over the first leg (11) and whereby the coupler lock (9) is provided with a pre-mounted locking piece (29) that snaps into place on the corner piece (8) or on the leaf when the lock position of the window is reached the first time and whereby the locking piece (29) uncouples from the coupler lock (9) and remains near the corner of the corner piece (8) when the coupler lock (9) leaves the lock position again.

2. Corner transmission according to claim 1, **characterised in that** the locking piece (29) and the coupler lock (9) are provided with ribs (19) on their lateral sides which lie in each other's extension.

3. Corner transmission according to any one of the previous claims, **characterised in that** the locking piece (29) comprises snap-ins (30) that hook into recesses (31) on the coupler lock (9) for connecting the locking piece (29) to the coupler lock (9).

4. Corner transmission according to claim 1 or 2, **characterised in that** the locking piece (29) comprises snap-ins (32) which hook into snap-in details (33) applied on the corner piece (8) for connecting the locking piece (29) to the corner piece (8).

5. Corner transmission according to claim 4, **characterised in that** the locking piece (29) comprises further snap-ins (30) which hook into recesses (31) on the coupler lock (9) for connecting the locking piece (29) to the coupler lock (9), and whereby the connection between the corner piece (8) and locking piece (29) is stronger than the connection between locking piece (29) and coupler lock (9).

6. Corner transmission according to any one of the previous claims, **characterised in that** the locking piece (29) and the coupler lock (9) are made from a metal alloy.

7. Corner transmission according to any one of the previous claims, **characterised in that** the lock position corresponds with a close position, turn position, or tilt position of the fittings.

8. - Window **characterised in that** it comprises at least one corner transmission (5) according to any one of the previous claims.

9. - Window according to claim 8, **characterised in that** it is a turn-tilt window or tilt-turn window.

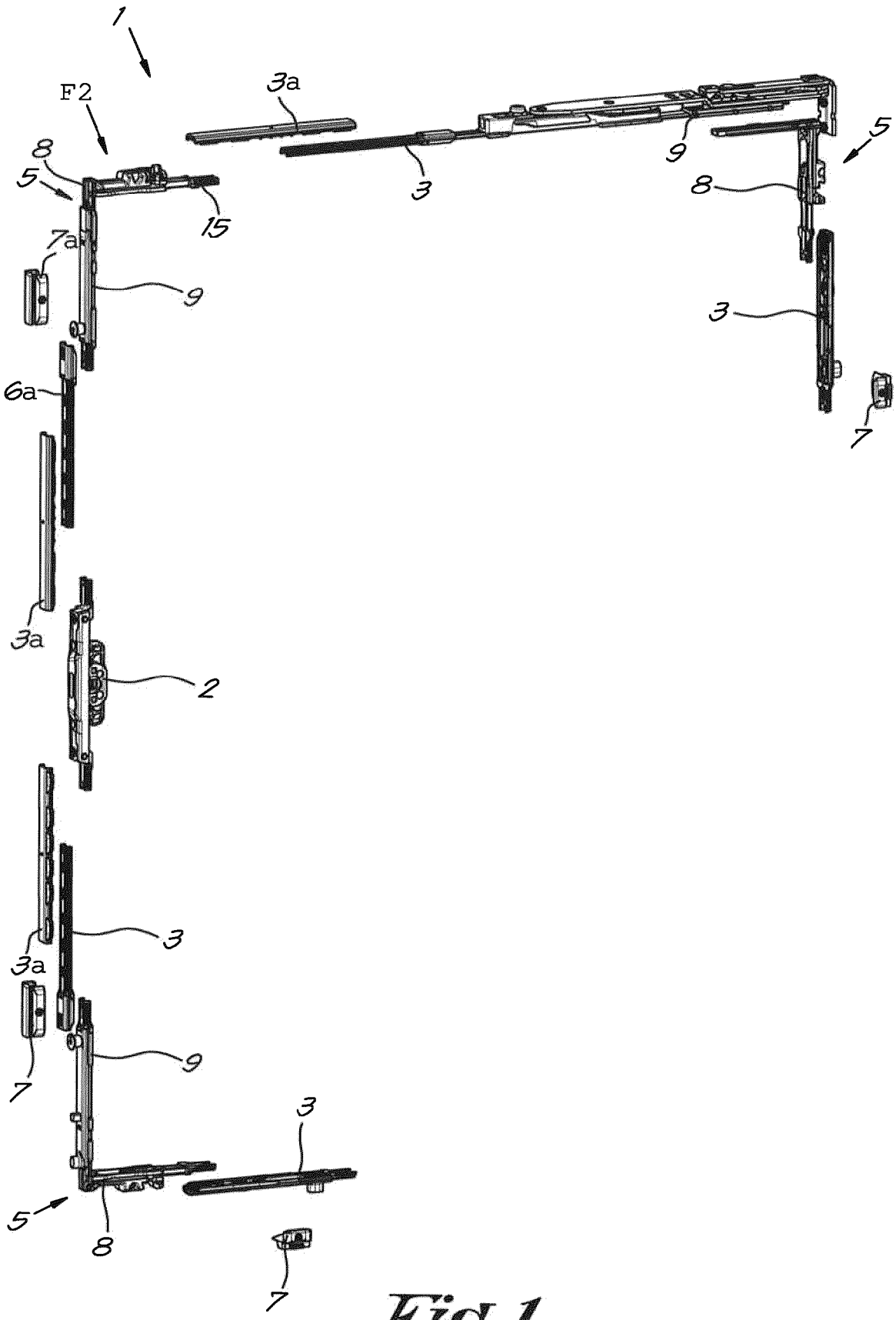

Fig. 1

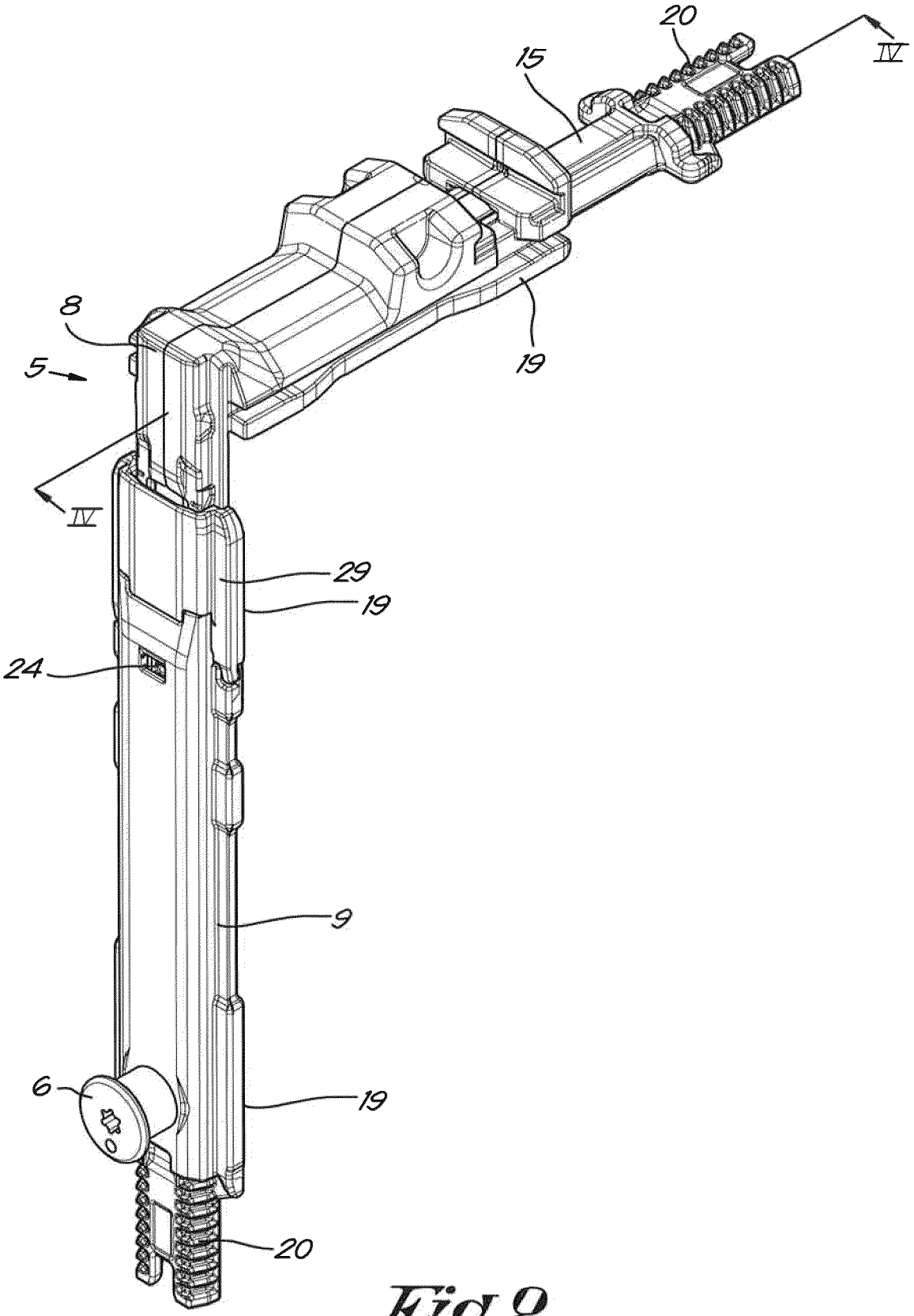

Fig.2

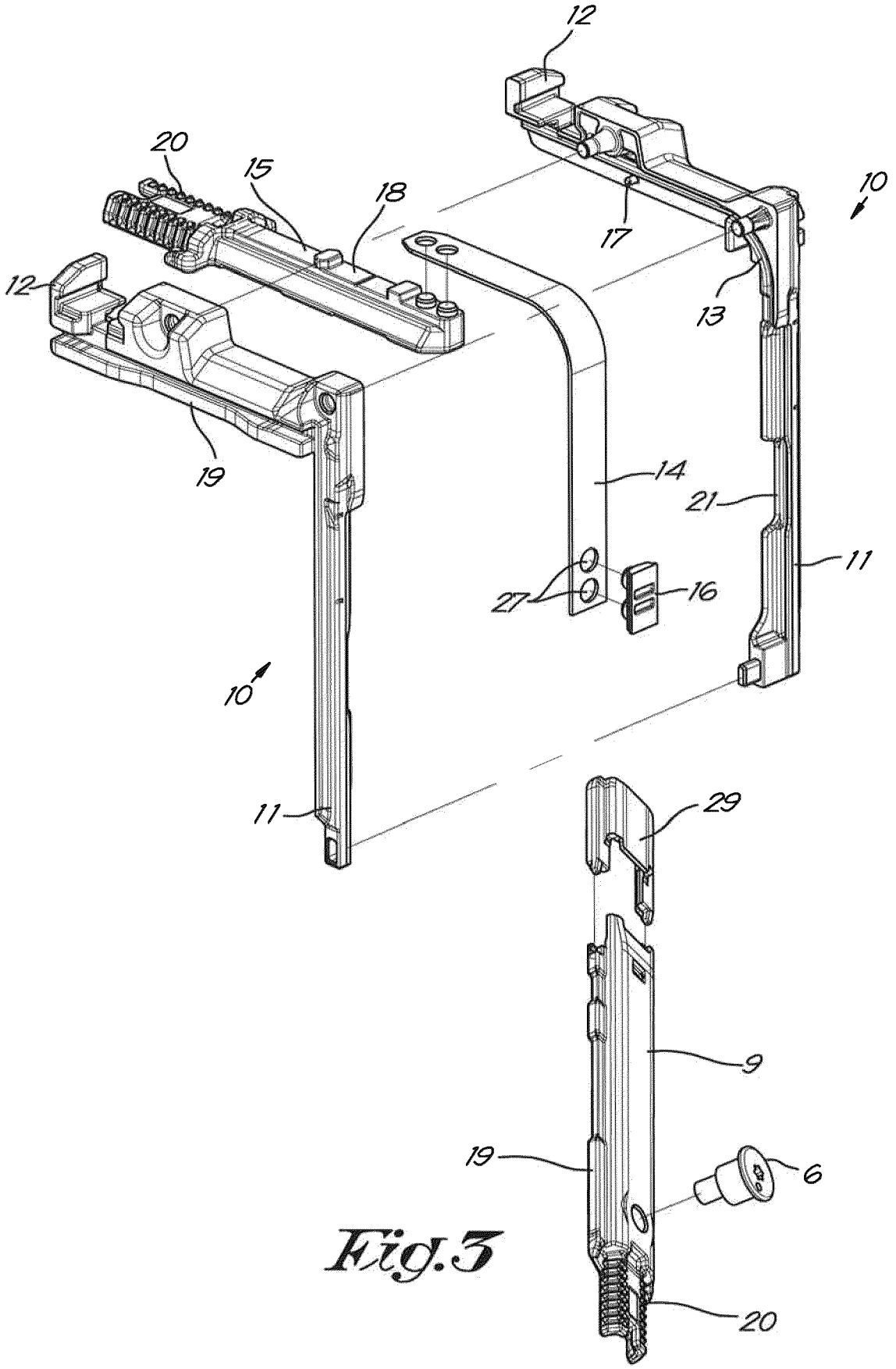

Fig.3

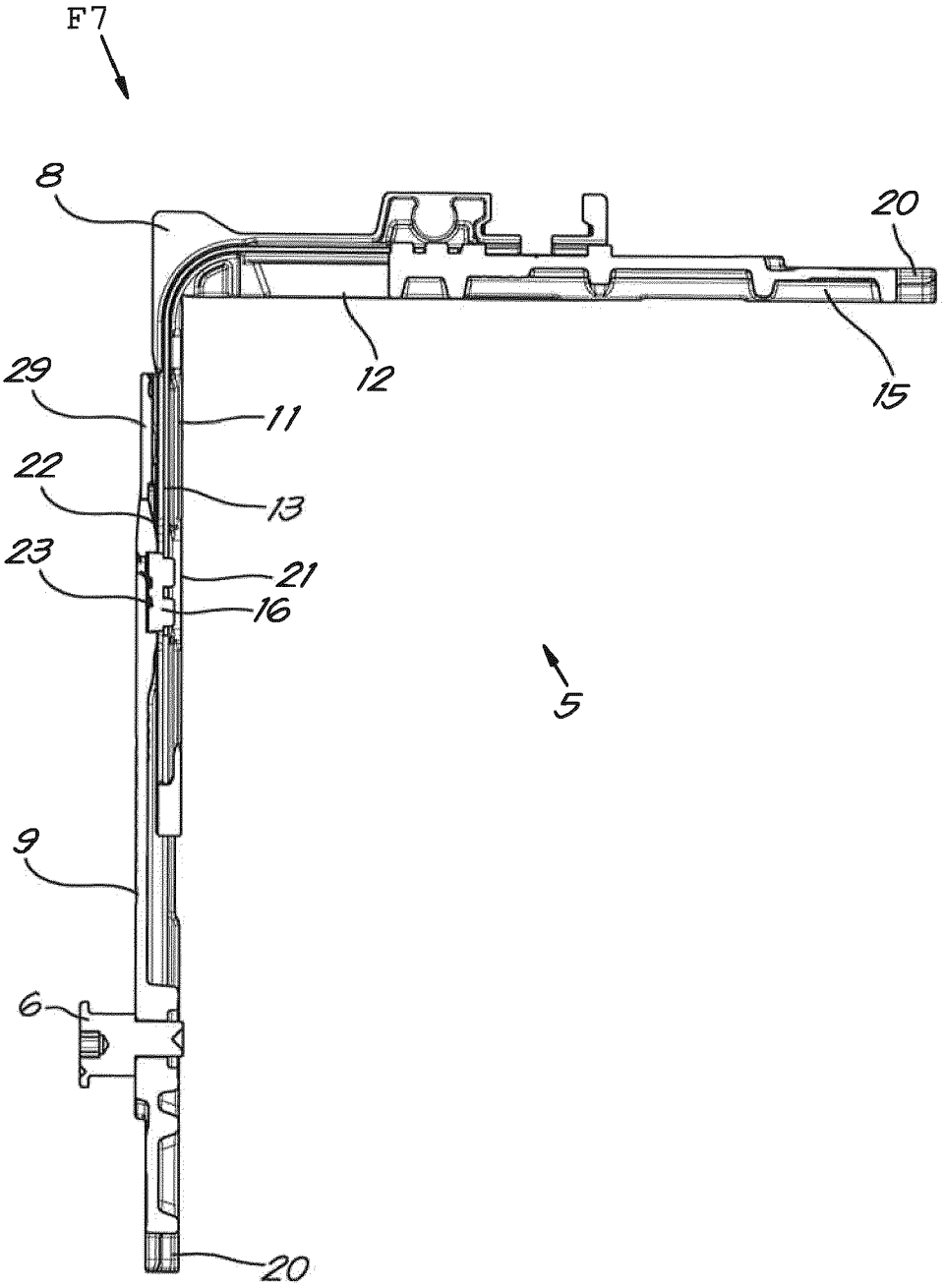

Fig. 4

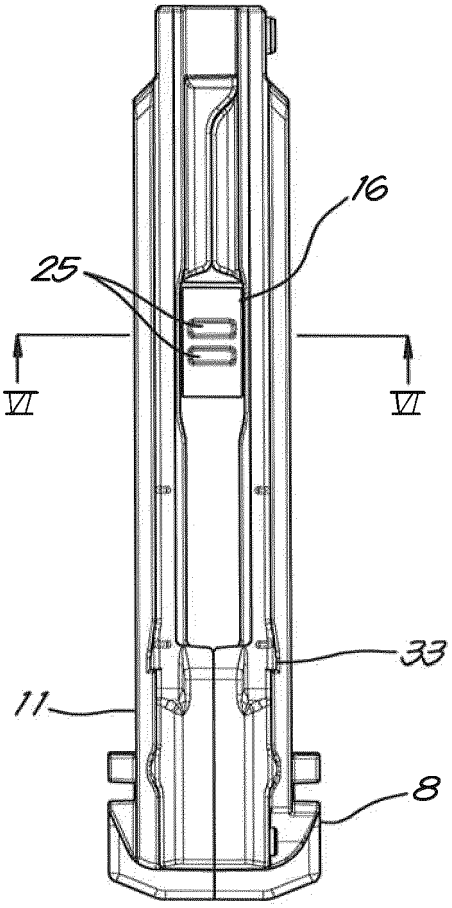

Fig.5

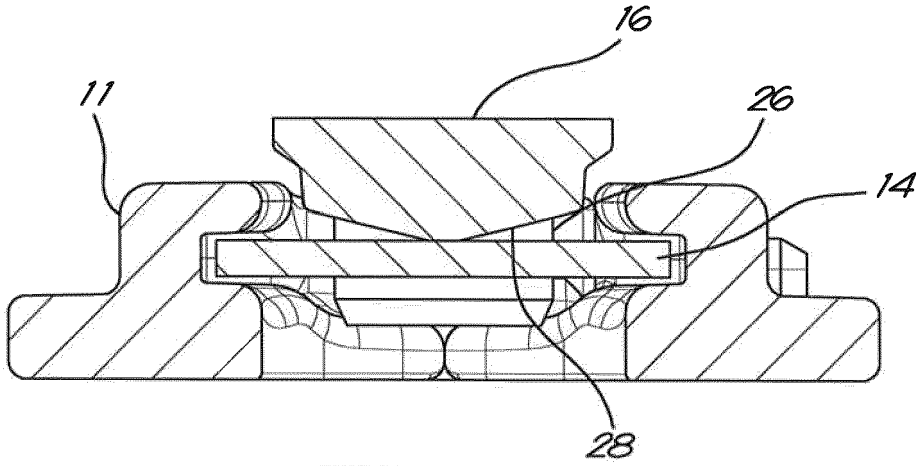

Fig.6

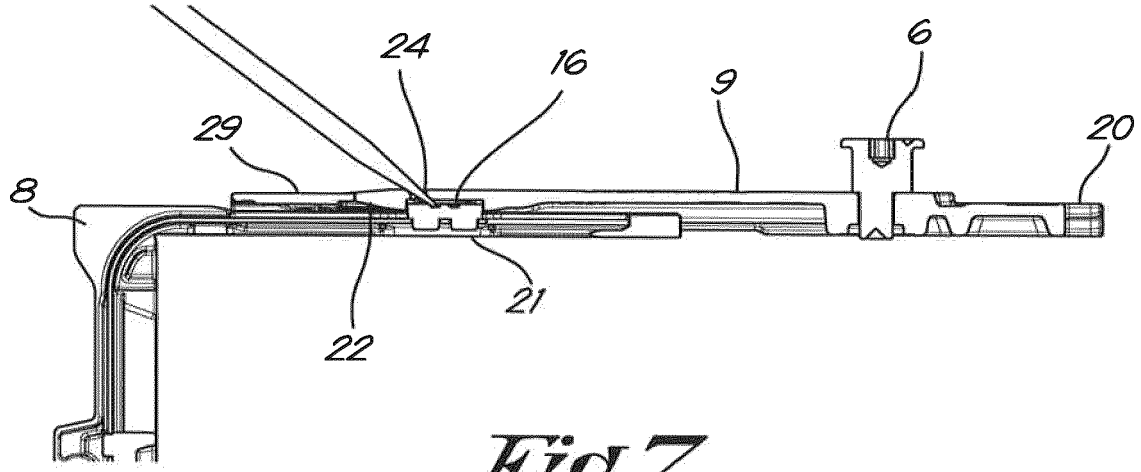

Fig.7

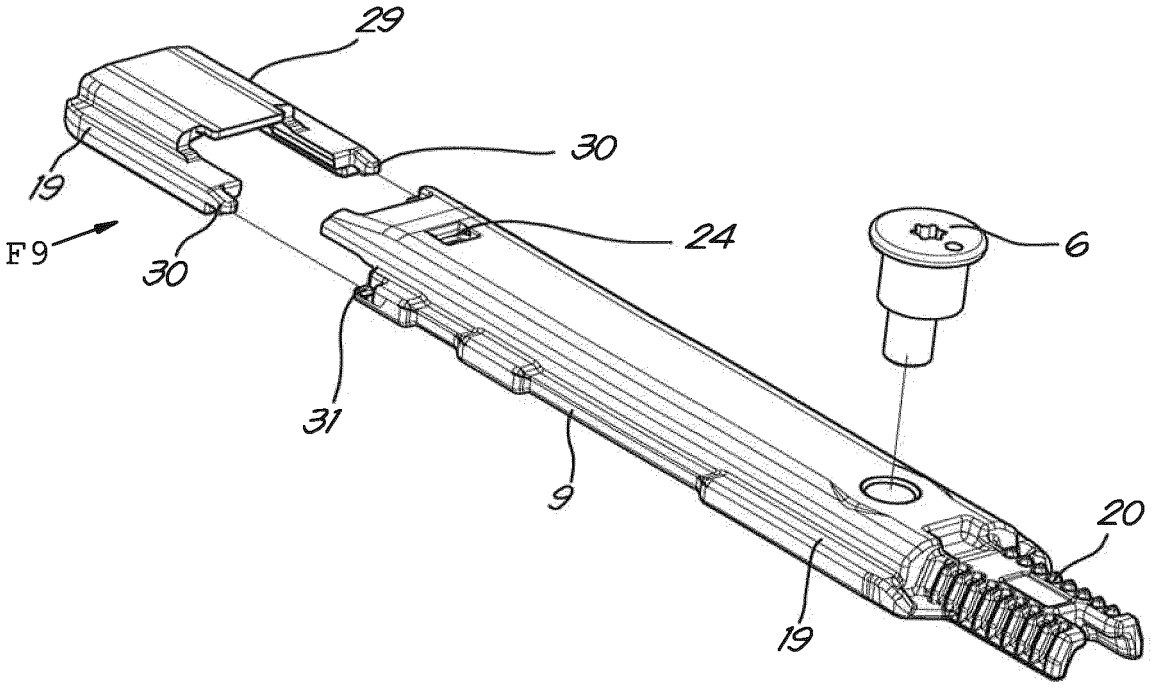

Fig.8

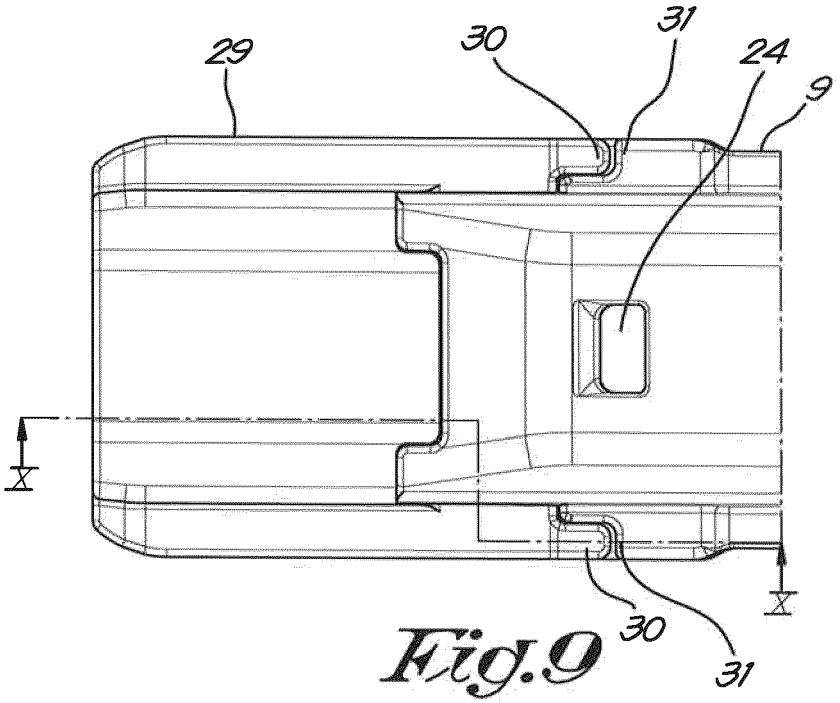

Fig.9

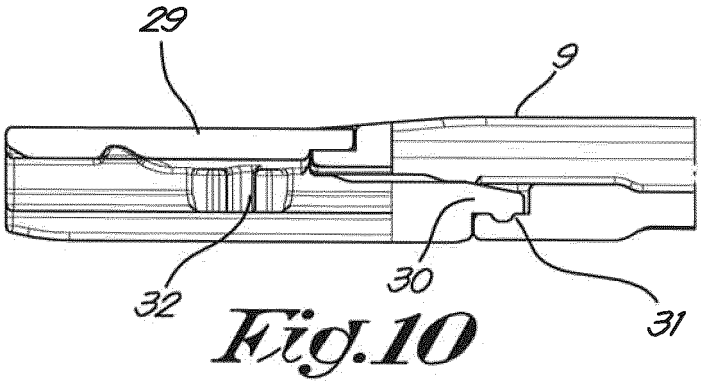

Fig.10

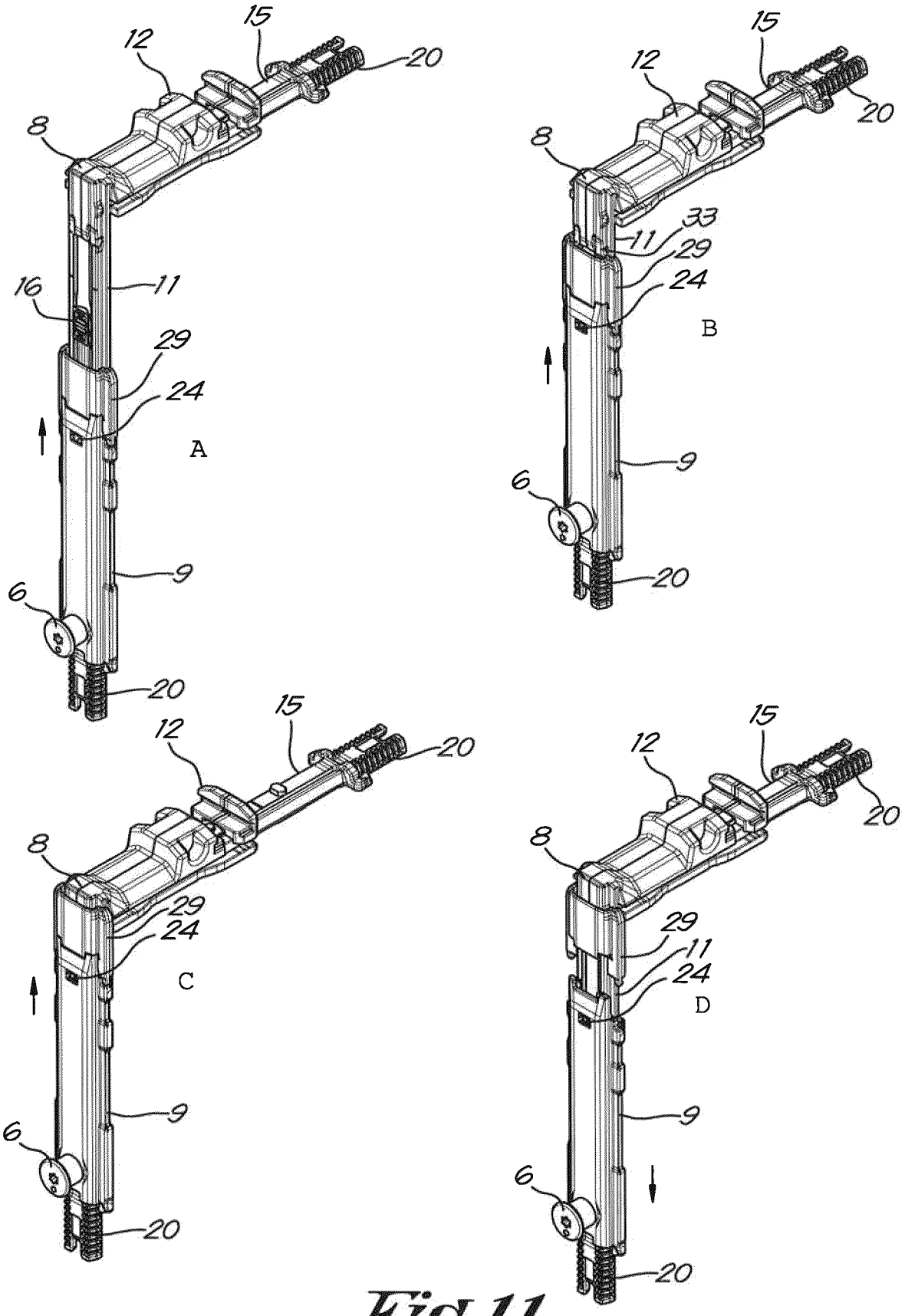
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Fig.11

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EUROPEAN SEARCH REPORT

Application Number
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E05B
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	16 May 2023	Antonov, Ventseslav

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