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(54) **SET OF OPERATING LEVERS FOR A CASEMENT WINDOW**

(57) The invention provides for a set of two asymmetric operating levers (9a,b) for mounting on a secondary leaf of a casement window. Each operating lever can be coupled to a slideable upper latch and lower latch, whereby, in mounted condition on the secondary leaf, the operating levers of the set are coupled with the slideable upper latch and lower latch respectively and the operating lever coupled to the upper latch is configured in a mirrored way relative to the operating lever coupled to the lower latch.

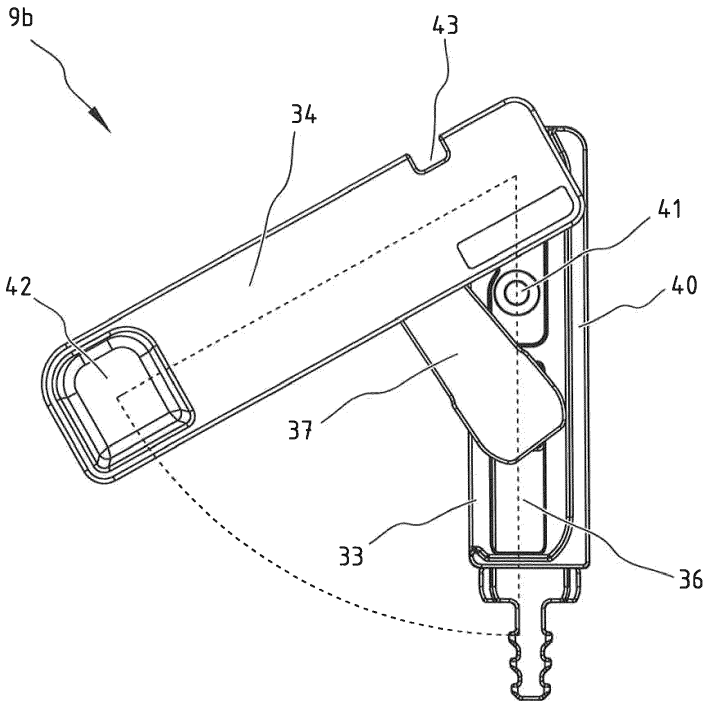

Fig. 7

EP 4 477 827 A1

Description

[0001] Typically, standard windows contain a fixed frame and a leaf that is rotatably mounted around a vertical axis on the opposite side of the handle and/or can tilt around a horizontal axis. To this end, window fittings are provided which consist of a leaf section that is mounted on the leaf and a frame section, complementary to the leaf section, that is mounted on the fixed frame of the window. The fittings on the leaf are provided with a handle mechanism for the operation of the fittings by rotating a handle a quarter turn from a vertical close position facing down in which the window is closed, to a horizontal position corresponding with the rotation or tilt position and subsequently to a vertical position facing up corresponding with the remaining turn or tilt position if provided.

[0002] As is known the handle mechanism converts the rotational movement of the handle into a translation movement of sliding slats and/or latches of the leaf fittings which are slideably mounted in a fitting groove, provided to that end, along the contour of the leaf said sliding slats and/or latches, for example, being provided with locking cams which upon rotating the handle to the closed position can hook in or behind a locking piece on the frame and as such close the window in several points making sure the window is more firmly closed and burglar-proof.

[0003] In addition to the aforementioned standard windows, so-called casement windows also exist. A casement window is a double-hung window with a fixed frame and two leaves which can at least rotatably open around parallel axes near the frame edge and which meet and connect in the frame opening. In other words, no fixed frame section is provided between both leaves such that in fully opened condition, the window opening has a surface which is practically equal to the combined surface of both leaves. The leaf of the casement window that opens first is called the primary leaf. The other leaf is called the secondary leaf.

[0004] If two standard leaves were to be used as primary and secondary leaf of a casement window, the closure between the primary and secondary leaf where said leaves meet in closed condition would often probably be insufficient. The two opposite mullions are indeed the same and not complementary to each other.

[0005] A known solution is to replace the profile of the secondary leaf in closed condition adjacent to the primary leaf with an adapted profile, a so-called casement profile, which is complementary to the opposite mullion of the primary leaf, thus obtaining a better connection between the primary and the secondary leaf. In this case fixed locking pieces for closing the primary leaf and the sliding fittings for closing the secondary leaf are mounted in the same fitting groove.

[0006] Another known solution is to keep the profile of the secondary leaf in closed condition adjacent to the primary leaf but attaching an alternating profile thereon to obtain a better connection between the primary and the secondary leaf. In this case two fitting grooves are available for the fittings. The lower fitting groove on the leaf profile for the sliding fittings analogue to the standard fittings of a primary leaf, the other fitting groove on the alternating profile for fixed fittings elements such as locking pieces, latches and levers.

[0007] The primary leaf of a casement window can be operated with a handle and associated handle mechanism in a similar way as a standard window with one single leaf. For operating the secondary leaf, one or several operating levers are required which are provided with an associated operating mechanism and are mounted in a fitting groove of the profile of the secondary leaf which in closed condition is located adjacent to the primary leaf, such as for example in the casement profile or the alternating profile. The operating levers with operating mechanism are hereby executed such that in closed condition of the casement window, said operating levers are located between the adjacent profiles of the primary and secondary leaf and consequently are not visible.

[0008] The invention relates more specifically to the operating levers for operating the secondary leaf of a casement window.

[0009] An objective of the invention is to provide a set of operating levers for operating the secondary leaf of a casement window that is applicable for both right-hand opening and left-hand opening secondary leaves.

[0010] A further objective of the invention is to provide a set of operating levers for operating the secondary leaf of a casement window that prevents or at least makes burglary more difficult.

[0011] A further objective of the invention is to provide a set of operating levers for operating the secondary leaf of a casement window which is easy to use and is applicable for a casement profile and alternating profile.

[0012] To at least partially achieve one or several of the aforementioned objectives, the invention in one aspect relates to a set of two operating levers for mounting on a secondary leaf of a casement window. Characteristic is that every operating lever of the set comprises an oblong body, an operating arm at an end hingedly connected to the oblong body, a sliding element, and a connecting arm at one end hingedly connected to the sliding element and at the other end hingedly connected to the operating arm, whereby each operating lever is configured such that a rotation of the operating arm is converted into a translation of the sliding element, and each operating lever can be coupled to a slideable upper latch and lower latch, whereby, in mounted condition on the secondary leaf, the operating levers are coupled with the slideable upper latch and lower latch respectively and the operating lever coupled to the upper latch is configured in a mirrored way relative to the operating lever coupled to the lower latch.

[0013] An advantage linked to the fact that the operating levers of the set are executed in a mirrored way is that thus the set is applicable for both a left and right embodiment of the secondary leaf.

[0014] The oblong body of the operating lever is pro-

vided with an upright rib near a longitudinal side. The upright rib protrudes at least partially from the aforementioned longitudinal side. In closed condition of the operating lever, the upright rib acts as a stop for the operating arm. This makes it easier for the user to operate because the operating lever can easily be put in close position by pulling or pushing the operating arm against the stop. To further increase the ease of operation, the operating arm can be provided with a recess at its free end in which one or several finger tips can at least be partially placed for rotating the operating arm. The rib also prevents the lever from being operated from the outside in the event of a burglary attempt. The lever cannot be pulled because of the rib. The lever cannot be pushed because of a closed primary leaf. Optionally, an upright rib can be provided additionally to an end face of the oblong body of the operating lever which extends at least partially along the aforementioned end face and which in closed condition delimits the operating arm. An advantage of this is that in the event of a burglary attempt, forced access to the operating arm from the outside via the end face is also prevented.

[0015] In another embodiment, the oblong body of the operating arm is provided with a threaded hole for mounting the operating lever on the leaf, whereby the threaded hole forms a delicate zone which is located between the hinge point of the operating arm and the sliding element in closed condition of the operating lever. Preferably, the dimensions and the positioning of the connecting arm and the operating arm are aligned to the positioning of the threaded hole such that the threaded hole is only accessible in open condition of the operating lever. Typically, the operating lever is mounted such that the operating lever opens inwardly. This, together with the fact that the threaded hole is only accessible in open condition enhances the window's burglar proof quality. Further, the operating arm can be provided with a notch on the side, preferably the inwardly facing side in mounted condition, through which in closed condition a screw can be applied or removed respectively for mounting or removing the operating lever on or from the leaf.

[0016] In a further embodiment, the operating lever is configured such that in closed condition, the hinge connection between the connecting arm and the operating arm does not lie on an imaginary straight line which connects the hinge connection between the operating arm and the oblong body with the hinge connection between the connecting arm and the sliding element.

[0017] Preferably, the operating lever is configured such that in closed condition, the shortest distance from the hinge connection between the connecting arm and the operating arm to the upright rib is less than the shortest distance from the hinge connection between the operating arm and the oblong body to the upright rib and is less than the shortest distance from the hinge connection between the connecting arm and the sliding element to the upright rib.

[0018] In another aspect the invention relates to casement fittings for mounting on a passive leaf of a casement window whereby the casement fittings comprise an upper latch, a lower latch, and the set of two operating levers according to one of the previously described embodiments or a random combination thereof, and whereby in mounted condition of the casement fittings, the sliding element of the first operating lever is connected to the slideable lower latch and the sliding element of the second operating lever is connected to the slideable upper latch.

[0019] In an embodiment, the lower latch and the upper latch of the casement fittings are each provided with a latch locking piece which ensures a firm closure in cooperation with locking cams on the leaf fittings of the primary leaf. Further, the lower latch of the casement fittings can be provided with cams which cooperate with cams on the lower latch of the primary leaf which in combination with each other and in a specific operating position of the handle of the primary leaf makes tilting the primary leaf possible.

[0020] In a further embodiment the lower latch and the upper latch of the casement fittings are each provided with a ruler for determining the mounting position of the corresponding operating lever when mounting the casement fittings.

[0021] In a further aspect the invention relates to a casement window comprising a secondary leaf and the casement fittings according to one of the previously described embodiments or a random combination thereof, whereby the casement fittings are mounted in a fitting groove of the leaf. Alternatively, a casement window comprises a secondary leaf on which an alternating profile is attached, and the casement fittings according to one of the previously described embodiments or a random combination thereof, whereby the casement fittings are mounted in a fitting groove of the alternating profile.

[0022] With the intention of better showing the characteristics of the invention, preferred embodiments according to the invention of a set of operating levers for the secondary leaf of a casement window and casement fittings comprising such set are described hereinafter by way of an example, without any limiting nature, with reference to the accompanying drawings, wherein:

figure 1 schematically shows an embodiment of fittings according to the invention for the secondary leaf of a casement window, whereby on the secondary leaf an alternating profile is attached;

figure 2 on a larger scale, and in a cross-section in the symmetry plane of the fitting groove, shows the components indicated in figure 1 with F1, but in a mounted condition on the secondary leaf with alternating profile of the casement window;

figure 3 schematically shows a cross-section on the level of the bridging piece of the vertical profile of a secondary leaf with alternating profile on which the fittings are mounted according to an embodiment of

the invention;

figure 4 schematically shows a perspective view of an example of a part of fittings for mounting on the primary leaf of a casement window;

figure 5 schematically shows a perspective view of a bridging latch and a bridging piece of fittings according to an embodiment of the invention.

figure 6 schematically shows a perspective view of a casement latch of fittings according to an embodiment of the invention;

figure 7 schematically shows a top view in open condition of an operating lever for mounting in a fitting groove of the secondary leaf or the alternating profile of a casement window mounted hereon according to an embodiment of the invention;

figure 8 schematically shows a top view in closed condition of an operating lever mounted in a fitting groove of the secondary leaf of a casement window according to an embodiment of the invention;

figure 9 schematically shows a top view of a cross-section of the vertical profile of the secondary leaf with alternating profile with the mounted operating lever as shown in Fig. 8;

figure 10 schematically shows a perspective view in open condition of a set of operating levers for mounting in a fitting groove of the secondary leaf of a casement window according to an embodiment of the invention.

[0023] The fittings shown in figures 1 to 3 are fittings for the secondary leaf of a casement window on which an alternating profile is attached. The secondary leaf (with the alternating profile) is rotatably attached around a vertical axis near the side of the fixed frame of the casement window.

[0024] The fittings shown contain leaf fittings 2 that are provided for mounting on the secondary leaf and casement fittings for mounting on the alternating profile. In mounted condition, the leaf fittings 2 cooperate with a part of the fittings mounted on the fixed frame, i.e. the frame fittings. In mounted condition, the casement fittings 1 cooperate with both the frame fittings and the leaf fittings 3 of the primary leaf as partially shown in figure 4.

[0025] For operating the secondary leaf, the casement fittings 1 provide two operating levers 9a,9b which are mounted in a fitting groove 8 of the alternating profile 4. The operating levers are provided with a mechanism that converts the rotation of the operating arm 34 into a translation of a casement latch which is connected to the operating lever and is slideably mounted in the fitting groove 8 of the alternating profile 4. The fittings shown in Fig. 1 to 3 are shown in closed condition of the secondary leaf. The operating levers 9a,9b are also shown in closed condition, the operating arm being practically parallel with the fitting groove 8 of the alternating profile 4 in which the operating levers 9a,9b are mounted. In closed condition the latch points 11 of the casement latches 10a,10b engage with frame locking pieces 12 which are mounted complementarily to the fixed frame of the casement window. After release, the secondary leaf can be opened by respectively rotating the operating arm of the upper operating lever 9a to the open position such that the upper casement latch 10a slides downwardly in the fitting groove 8 of the alternating profile and thus causing its latch point 11 to leave the complementary frame locking piece 12, and the operating arm of the lower operating lever 9b to the open position such that the lower casement latch 10b slides upwardly in the fitting groove 8 of the alternating profile and thus causing its latch point 11 to leave the complementary frame locking piece 12.

[0026] Moreover, the casement latches 10a,10b, the upper latch of which is magnified in Fig. 6, are provided with latch locking pieces 13 which cooperate with locking cams 14 of the leaf fittings 3 of the primary leaf.

[0027] The leaf fittings 3 of the primary leaf are shown partially in Fig. 4. The leaf fittings 3 of the primary leaf are provided with an operating mechanism with an operating handle (not shown) to close the window and to be able to bring the primary leaf from the closed position in a turn position and, if applicable, also in a tilt position. The operating mechanism of the operating handle converts the rotational movement of the operating handle into a translation movement of sliding parts, such as for example sliding slats 17 and/or latches 15 and/or corner transmissions 16 of the leaf fittings which are slideably mounted in a fitting groove, provided to that end, along the contour of the primary leaf.

[0028] In the embodiment shown in Fig. 4 the primary leaf fittings 3, which in mounted condition are applied in a fitting groove, provided to that end, on the vertical profile of the primary leaf on the side which connects to the secondary leaf, provide coupling latches 15 which at one end are slideably connected to the operating handle possibly via intermediate sliding parts, such as, for example, sliding slats, and at the other end are coupled to a corner transmission 16. Typically, the corner transmissions 16 are in connection with sliding slats and/or latches which are slideably applied in fitting grooves, provided to that end, on the outer contour of the primary leaf on the horizontal profiles. Said sliding slats or latches can be provided with locking cams which upon rotating the operating handle to the close position move and can hook into or behind a frame locking piece on the frame. Locking cams 14 are also provided on the coupling latches 15 which upon rotating the operating handle to the close position move and can hook into or behind the complementary latch locking piece 13 of the casement fittings 1. As such not only a closure of the primary leaf is obtained on several points along the frame but a closure on several points between the primary and secondary leaf is also obtained making sure the window is more firmly closed and burglar-proof. An additional advantage is that the leaf fittings 3 of the primary leaf of a casement window in essence do not differ from leaf fittings for a standard window with one single leaf.

[0029] If the secondary leaf with alternating profile would only be provided with fittings in the alternating profile, from a burglar-proofing perspective a.o. there would be room for improvement on the closure of the secondary leaf as said closure would then be limited to the latch points 11 of the casement latches 10a,10b hooking in the frame locking pieces 12. However, for leaves with a compact size and basic burglar-proofing level this may suffice.

[0030] However, as shown in figures 1 to 3, for example, and hereinafter further described, the fittings for the secondary leaf with alternating profile also contain leaf fittings 2 and the solution shown contains means that enable said leaf fittings 2 to be operated with the operating levers 9a,9b.

[0031] The leaf fittings 2 of the secondary leaf contain sliding parts, such as sliding slats 17 and/or latches which are slideably applied in leaf fitting grooves 7, provided to that end, on the outer contour of the secondary leaf on the horizontal profiles. Corner transmissions 16 applied in the leaf fitting groove 7 are in connection with the sliding parts in the horizontal leaf fitting grooves at the top and underside of the secondary leaf and are slideably connected to bridging latches 18 applied in the leaf fitting groove 7 of the secondary leaf on the outer contour of the secondary leaf on the vertical leaf profile 5 on which the alternating profile 4 is or will be attached too.

[0032] Typically, the corner transmission comprises a corner piece in which a spring assembly is slideably applied and forms a connection between the sliding slats 17 on the one side of the corner or coupling latches on both sides of the corner. The corner transmission shown by way of an example in Fig. 1 and 2 is also described in our pending patent application EP22212424.0 with filing date 9 December 2022. The content of EP22212424.0 is deemed to be fully included in the description by this reference. The corner transmission shown is constructed from a corner-shaped housing with a first leg and a second leg. The housing is composed of a left and a right half which are symmetrical and in which a guide is provided in the form of a groove with a spring assembly therein which is slideable over the corner and whereby the spring assembly is connected at the one end to a moving leg of the corner piece that is slideable in the second leg and whereby the other end is intended for coupling with the bridging latch 18. The second leg is provided with laterally extending ribs with which the second leg of the corner piece can be slid into a leaf fitting groove up into a position in which the first leg falls into an adjoining fitting groove.

[0033] The bridging latches 18 are provided with lateral extending ribs 19 with which the bridging latches 18 are slideable in the vertical leaf fitting groove 7 and with a recess 21 with an upright peripheral edge 23. Threaded holes 22 are provided at the two opposite ends of the recess 21.

[0034] Optionally, prior to mounting the bridging latches 18 can already be provided with a securing piece 20 snapped thereon. Said securing piece snaps in place on the corner piece or on the secondary leaf the first time when the bridging latch 18 reaches a secure position. The secure position is a predefined position in the stroke of the bridging latch that is achieved by moving the bridging latch. Preferably, the securing piece 20 is near the corner, when the bridging latch 18 is in the secure position. The secure position may coincide with an end of the stroke of the coupling latch. On leaving the secure position, the securing piece uncouples from the bridging latch and remains near the corner, where it fulfils its securing function.

[0035] In mounted condition the bridging latches 18 are slideably applied in the vertical leaf fitting groove 7 and the casement latches 10a,10b are slideably applied in the vertical fitting groove 8 of the alternating profile. In the embodiment shown the vertical leaf fitting groove 7 and the vertical fitting groove 8 of the alternating profile are placed practically parallel and overlapping relative to each other, each with their opening oriented outwardly in the same direction, whereby the distance between the bottom of the vertical leaf fitting groove 7 and the top of the vertical fitting groove 8 of the alternating profile is indicated with X in Fig. 3.

[0036] The upper 10a and lower casement latch 10b are in connection with the upper and lower bridging latch 18 respectively. To this end two slots 6 are milled near the ends in the vertical fitting groove 8 of the alternating profile 4. In the hollow space of the alternating profile 4, a bridging piece 26 is provided on the level of each of the grooves 6, as shown, for example, in disassembled condition in Fig. 5. The extending part 24 of the bridging piece is applied in the recess 21 of the corresponding bridging latch 18, provided to that end, its stop 25a being against the upperside of the upright peripheral edge 23 of the recess. Each bridging piece 26 is connected to the associated bridging latch 18 by screwing in two button head screws 28 via the screw openings 27 in the threaded holes 22. Alternatively, only one threaded hole 22 and associated screw opening 27 or a plurality of threaded holes 22 and associated screw openings 27 can be provided in combination with button head screws 28 or other types of screws.

[0037] In mounted condition, each casement latch 10a,b is connected to the associated bridging piece 26 using a coupling pin 29 which on the upperside is provided with thread with which the coupling pin 29 is screwed into the threaded hole 31 of the casement latch 10a,b provided to that end and extends through the associated slot 6 up into a passage in the bridging piece 26. The diameter of the screw section of the coupling pin 29 is greater than the diameter of the section of the coupling pin that extends in the passage, preferably but not necessarily up into the recess 21.

[0038] The section of the coupling pin 29 that extends into the passage of the bridging piece 26 is not provided with thread such that the coupling pin can slide in the passage in the direction of its longitudinal axis. The

advantage of this configuration is that the distance X between the bottom of the vertical leaf fitting groove 7 and the top of the vertical fitting groove 8 of the alternating profile does not have to be fixed but may vary such that in case of deviating specifications of profile constructors, for example deviating specifications in dimensions of fitting grooves or of the alternating profile, a connection can still be made between casement latch 10a,b and bridging latch 18 using the same components. Moreover, optionally the coupling pin 29 near the end that is or will be applied in the passage of the bridging piece 26 is provided with an O-ring. This not only simplifies fittingly inserting the coupling pin 29 in the passage but also prevents the coupling pin 29 from rattling in the passage, for example, when moving the bridging latch 18. Not only the distance X can be variable, as due to the choices made by manufacturers relating to the dimensions of the fitting grooves there can also be variation on the distance Y as shown in Fig. 3. i.e. the distance between the centre line in longitudinal direction of the vertical leaf fitting groove 7 and the centre line in the longitudinal direction of the vertical fitting groove 8 of the alternating profile 4, i.e. a distance in the direction practically perpendicular to the centre line and to the longitudinal axis of the coupling pin 29 in mounted condition. An exemplary configuration to accommodate variations in the distance Y is to execute the threaded holes 27 in the bridging piece 26 in which the button head screws 28 are screwed for attaching the bridging piece 26 as small slots.

[0039] In mounted condition of the fittings, the coupling pin 29 is placed practically perpendicularly to the sliding direction of the casement latch 10a,b and of the bridging latch 18 or the longitudinal direction of the fitting grooves in which said latches are placed. This allows a compact execution of the connection between the casement latch 10a,b and the bridging latch 18 near the corners of the leaf such that there is still sufficient space for a proper attachment of the alternating profile 4 on the secondary leaf.

[0040] In mounted condition the coupling pin 29 that is screwed in the casement latch 10a,b is moveable in the associated slot 6 in the longitudinal direction of the vertical fitting groove 8 of the alternating profile 4 in which the casement latch is slideably applied. The slot 6 is dimensioned such that it allows the casement latch 10a,b and coupling pin to move freely over the full stroke which corresponds with rotating the operating mechanism from the open to the close position or vice versa. The movement of the casement latch 10a,b is transferred to a similar movement of the associated bridging latch 18, said movement being transferred perpendicularly by the corner transmission 16 to sliding parts in the relevant horizontal profile of the secondary leaf, said sliding parts being provided with locking cams 14 which upon rotating the operating handle of the secondary leaf to the close position slide into or behind the complementary frame locking pieces 12 of the frame fittings. As such, due to the coupling of the casement fittings 1 with the leaf fittings 2 of the secondary leaf, a closure is obtained on several points between the secondary leaf and the fixed frame making sure the window is more firmly closed and burglar-proof. An additional advantage is that the leaf fittings 2 of the secondary leaf, apart from the adapted bridging latches, in essence barely differ from leaf fittings for a standard window with one single leaf.

[0041] Figure 7 shows an operating lever 9b for mounting in a vertical fitting groove of the secondary leaf of a casement window. This can be a fitting groove in the vertical profile of the secondary leaf which in closed condition of the window is located adjacent to the primary leaf. Said vertical profile can be a casement profile. If an alternating profile is used, this can also be a fitting groove 8 of the alternating profile 4 of the secondary leaf, for example. The operating lever 9b in figure 7 is shown in opened condition while the same operating lever 9b is shown in figures 8 and 9 in closed condition mounted in the alternating profile 4 and connected to the lower casement latch 10b. The operating lever 9a,b comprises an oblong body 33 on which an operating arm 34 is hingedly attached with hinge point 35. The operating lever 9a,b is further provided with a sliding element 36 that is slideable in the fitting groove and a connecting arm 37. At one end, the connecting arm 37 is hingedly connected to the sliding element 36 with hinge point 38. The other end of the connecting arm 37 is hingedly connected to the operating arm 34 with hinge point 39. At its free end, the sliding element of the operating lever 9a,b is provided with a toothing for coupling with a complementary toothing of the casement latch 10a,b.

[0042] Said configuration ensures that a rotation of the operating arm 34 is converted into a translation of the sliding element 36. To facilitate the operation, the operating arm 34 is provided with a recess 42 at its free end in which one or several finger tips can at least be partially placed for rotating the operating arm 34 around its hinge point 35.

[0043] The oblong body 33 is further provided with an upright rib 40 on a longitudinal side. On rotating the operating arm 34 to the close position, the upright rib 40 acts as a stop that makes it impossible to rotate the operating arm further. In other words, the lever is executed asymmetrically and from the close position can only rotate in one direction. In mounted condition as also shown in the embodiment in Fig. 8, this is only inwardly and the upright rib 40 is thus positioned on the outside of the operating lever 9a,b. For the operator this is easy. The upright rib 40 indeed acts as a clear stop and the operating lever 9a,b can be simply closed by pulling or pushing the operating arm 34 up against the upright rib 40.

[0044] In the embodiment of the operating lever 9a,b shown (see Fig. 10), an upright rib is also provided at the end face of the oblong body 33 which in closed condition of the operating lever delimits the operating arm 34 at its free end.

[0045] The upright rib 40 at the longitudinal side and the upright rib at the end face of the oblong body 33

complicate access to the delicate zones of the operating lever 9a,b from the outside of the window which is an advantage in terms of burglar proofing. Moreover, if unauthorised access were to be sought, the resistance against forced rotation of the operating arm is increased by choosing hinge points 35 38 39 such that in closed condition of the operating lever 9a,9b, said hinge point do not lie on one straight line. More specifically, in closed condition, the hinge point 39 between the connecting arm 37 and the operating arm 34 does not lie on the imaginary straight line that connects the hinge points 35 and 38 but said hinge point 39 is located closer to the upright rib 40. Consequently, upon unauthorised attempts to move the fittings, the lever will only be pushed more firmly into the close position and the window will not open.

[0046] Fig. 10 shows a set of operating levers 9a,b for mounting on the secondary leaf of a casement window. The set consists of the asymmetric operating lever 9b, as shown and described in Fig. 7 and 8, and a mirrored version 9a thereof. Both operating levers 9a,b can only open in one direction from the close position, said direction being the same direction for both operating levers 9a,b due to the mirrored execution. Preferably, mounting on the secondary leaf of a casement window is such that they can only rotate inwardly from a close position. The set as shown is for mounting on a secondary leaf that acts as left leaf. However, the same set can also be mounted on a secondary leaf which acts as right leaf. However, in the latter case the operating lever 9a is placed at the bottom and the operating lever 9b at the top.

[0047] Mounting the casement fittings 1 can be realised easily. The method comprises the steps of:

- sliding the operating lever 9a,b in closed condition in a fitting groove of the vertical profile of the secondary leaf, said profile in closed condition of the window being located adjacent to the primary leaf
- sliding the casement latch 10a,b in the fitting groove 8 and coupling the casement latch to the operating lever 9a,b
- positioning the coupled casement latch 10a,b and operating lever 9a,b in the fitting groove using the ruler 32 provided on the casement latch and attaching a press-fitting screw 44 via the notch 43 in the operating arm 34;
- rotating the operating arm 34 to the open condition and optionally screwing in an extra self-tapping screw 45 via the threaded hole 41 of the operating lever 9a,b.

[0048] Mounting the casement fittings 1 on an alternating profile 4 and on-coupling the leaf fittings 2 of the secondary leaf can be realised easily. The method comprises the steps of:

- sliding the bridging latch 18, optionally with securing piece 20, in a vertical leaf fitting groove 7 of the secondary leaf on the side where the alternating profile 4 is attached;
- sliding the corner transmission 16 into a horizontal and the vertical leaf fitting groove 7, and connecting, for example by snapping in, the applied bridging latch 18 to the corner transmission 16;
- placing the alternating profile 4 on the secondary leaf;
- sliding the coupling pin 29 into the passage of the bridging piece 26 and positioning the bridging piece through a slot 6 in the fitting groove 8 of the alternating profile 4 on the bridging latch 26;
- connecting the bridging piece 26 to the bridging latch 18 by screwing in button head screws 28 through the screw openings 27 in the threaded holes 22, and removing the coupling pin 29;
- sliding the operating lever 9a,b in closed condition into the fitting groove 8 of the alternating profile 4
- sliding the casement latch 10a,b into the fitting groove 8 and coupling the casement latch to the operating lever 9a,b
- positioning the coupled casement latch 10a,b and operating lever 9a,b in the fitting groove 8 using the ruler 32 provided on the casement latch and attaching a press-fitting screw 44 via the notch 43 in the operating arm 34;
- rotating the operating arm 34 to the open condition and optionally screwing in an extra self-tapping screw 45 via the threaded hole 41 of the operating lever 9a, b;
- attaching the coupling pin 29 in the threaded hole 31 of the casement latch 18 such that it extends via the slot 6 up into the passage of the bridging piece 26.

[0049] The present invention is by no means limited to the embodiments described as an example and shown in the figures, but a set of operating levers for the secondary leaf of a casement window according to the invention and casement fittings according to the invention comprising such set can be realised in all kinds of forms and dimensions without departing from the scope of the invention.

Claims

1. A set of two operating levers (9a,b) for mounting on a secondary leaf of a casement window, **characterised in that** every operating lever of the set comprises an oblong body (33), an operating arm (34) at an end hingedly connected to the oblong body, a sliding element (36), and a connecting arm (37) at its one end hingedly connected to the sliding element and at its other end hingedly connected to the operating arm, whereby each operating lever is configured such that a rotation of the operating arm is converted into a translation of the sliding element, and
each operating lever can be coupled to a slideable upper latch and lower latch, whereby, in mounted

condition on the secondary leaf, the operating levers are coupled with the slideable upper latch and lower latch respectively and the operating lever coupled to the upper latch is configured in a mirrored way relative to the operating lever coupled to the lower latch, and whereby the oblong body near a longitudinal side is provided with an upright rib (40) which in closed condition of the operating lever acts as stop for the operating arm.

2. The set according to claim 1, **characterised in that** the oblong body (33) is provided with a threaded hole (41) for attaching the operating lever (9a,b) on the leaf, whereby the threaded hole is located between the hinge point (35) of the operating arm (34) and the sliding element (36) in closed condition of the operating lever.

3. The set according to claim 2, **characterised in that** the dimensions and positioning of the connecting arm (37) and the operating arm (34) are aligned such that on the positioning of the threaded hole (41) said threaded hole is only accessible in open condition of the operating lever (9a,b).

4. The set according to any one of the previous claims, **characterised in that** at its free end the operating arm (34) is provided with a recess (42) in which one or several finger tips can be placed at least partially for rotating the operating arm.

5. The set according to any one of the previous claims, **characterised in that** the operating arm (34) is provided with a notch (43) on the side, through which in closed condition a screw (44) can be applied or removed for mounting or removing the operating lever (9a,b) on or from the leaf respectively.

6. The set according to any one of the previous claims, **characterised in that** in closed condition of the operating lever (9a,b) the hinge connection (39) between the connecting arm (37) and the operating arm (34) does not lie on an imaginary straight line which connects the hinge connection (35) between the operating arm and the oblong body (33) with the hinge connection (38) between the connecting arm and the sliding element (36).

7. The set according to any one of the previous claims, **characterised in that** in closed condition of the operating lever (9a,b) the shortest distance from the hinge connection (39) between the connecting arm (37) and the operating arm (34) to the upright rib (40) is less than the shortest distance from the hinge connection (35) between the operating arm and the oblong body (33) to the upright rib and less than the shortest distance from the hinge connection (38) between the connecting arm and the sliding element (36) to the upright rib.

8. The set according to any one of the previous claims, **characterised in that** the oblong body (33) of the operating lever (9a,b) is provided at an end face with an upright rib which at least partially extends along the aforementioned end face and which in closed condition of the operating lever delimits the operating arm (34).

9. Casement fittings (1) for mounting on a secondary leaf of a casement window whereby the casement fittings comprise an upper latch, a lower latch, and the set of two operating levers (9a,b) according to any one of the previous claims, and whereby in mounted condition of the casement fittings the sliding element of the first operating lever is connected to the slideable lower latch and the sliding element of the second operating lever is connected to the slideable upper latch.

10. The casement fittings according to claim 9, **characterised in that** the lower latch and the upper latch are each provided with a latch locking piece (13).

11. The casement fittings according to claim 9 or 10, **characterised in that** the lower latch and the upper latch are each provided with a ruler (32) for determining a mounting position of the corresponding operating lever when mounting the casement fittings.

12. Casement window comprising a secondary leaf and the casement fittings according to any one of the claims 9 to 11, whereby the casement fittings are mounted in a fitting groove (7) of the leaf.

13. Casement window comprising a secondary leaf on which an alternating profile (4) is attached, and the casement fittings according to any one of the claims 9 to 11, whereby the casement fittings are mounted in a fitting groove (8) of the alternating profile.

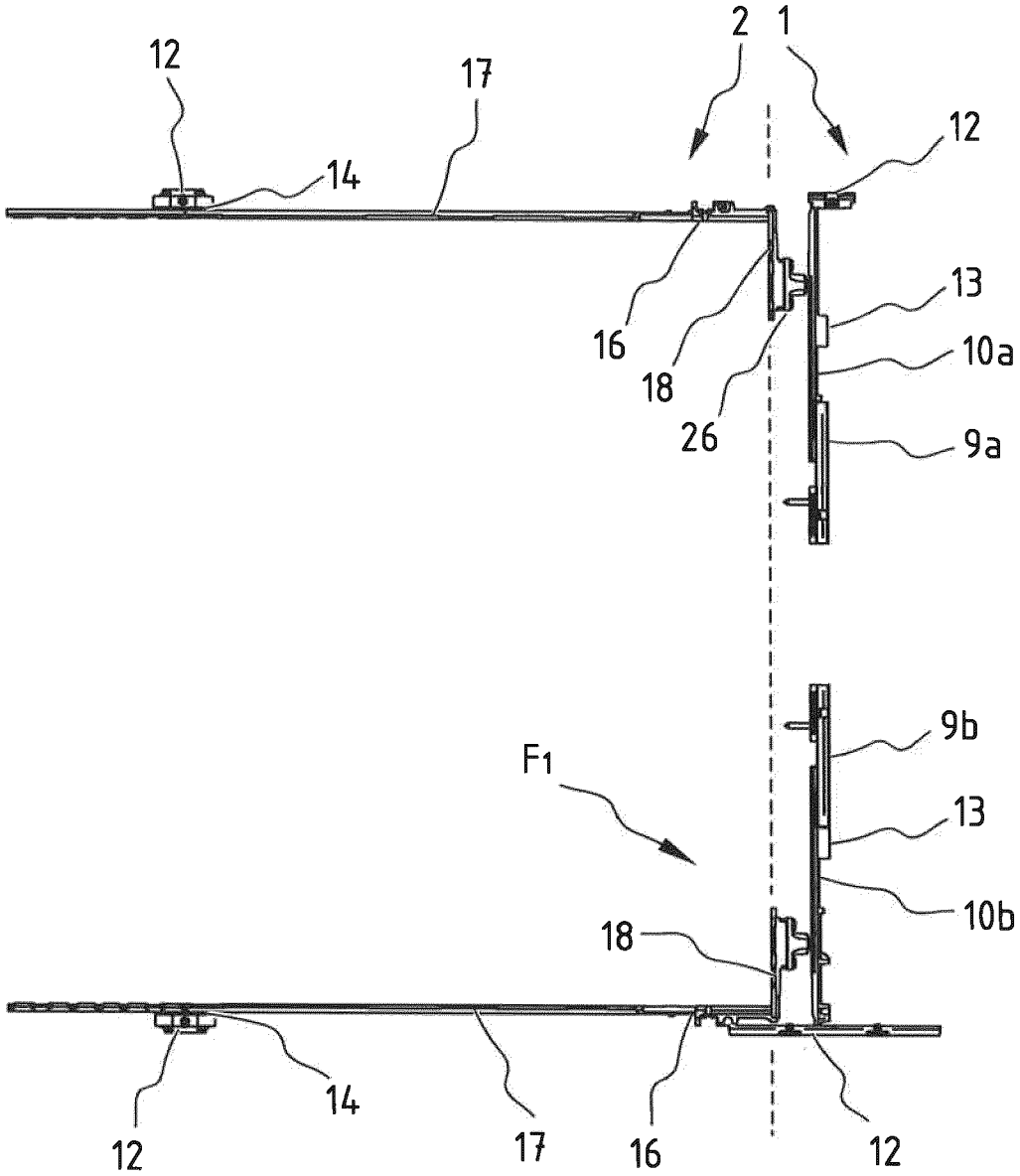

Fig. 1

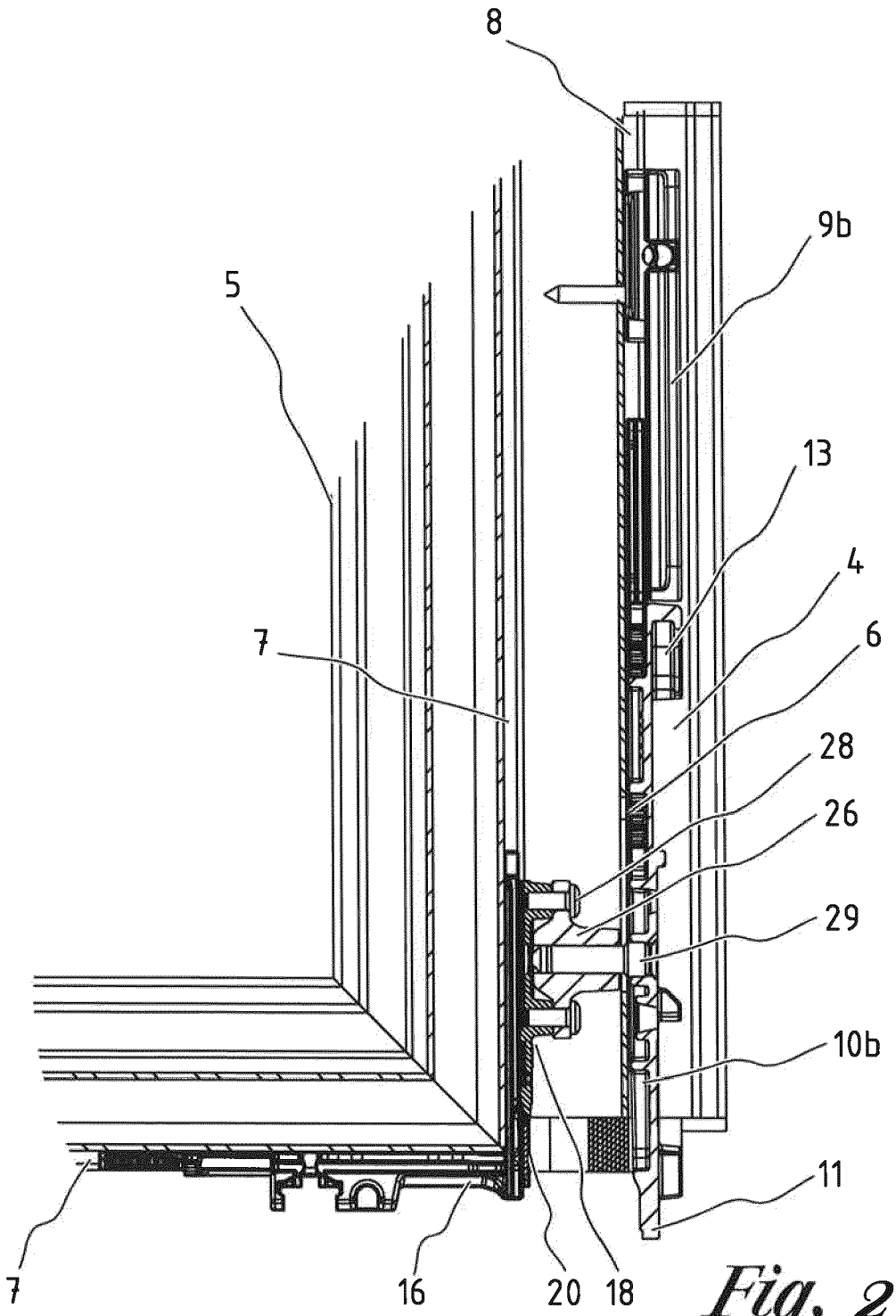

Fig. 2

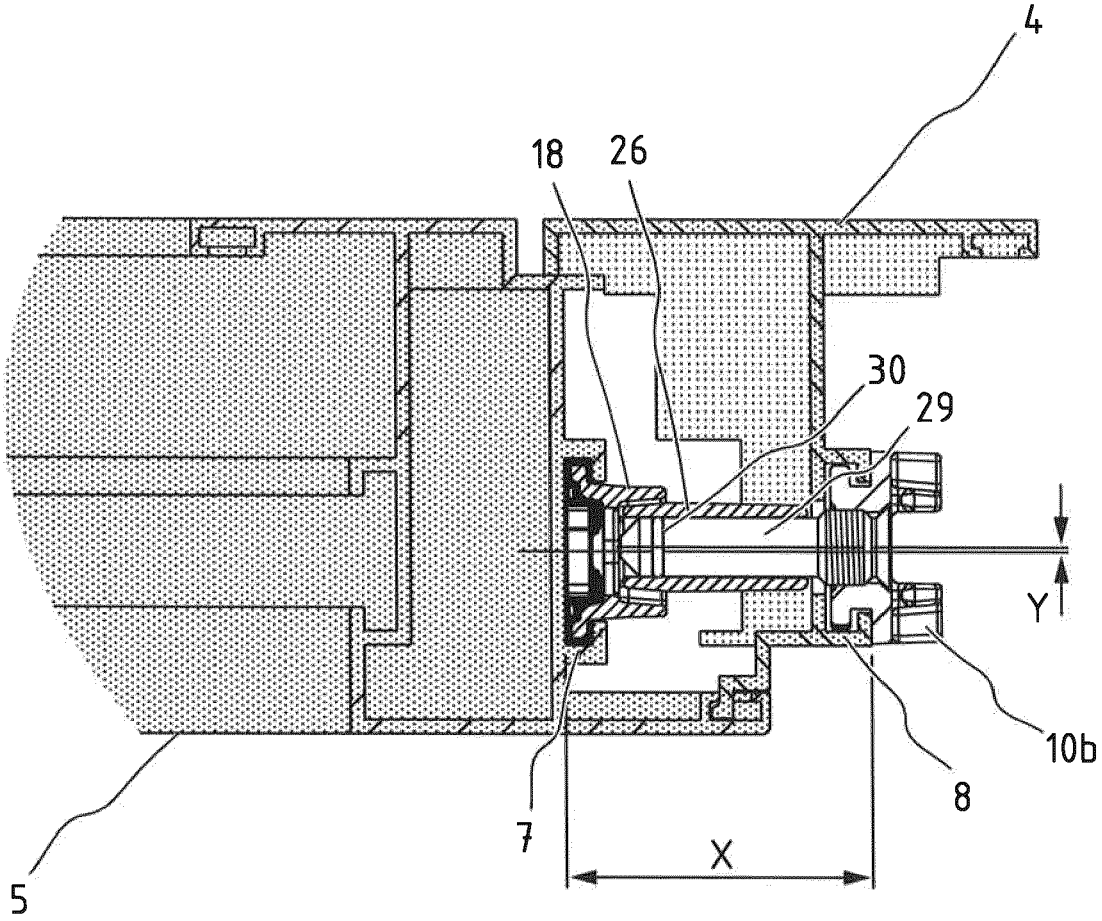

Fig. 3

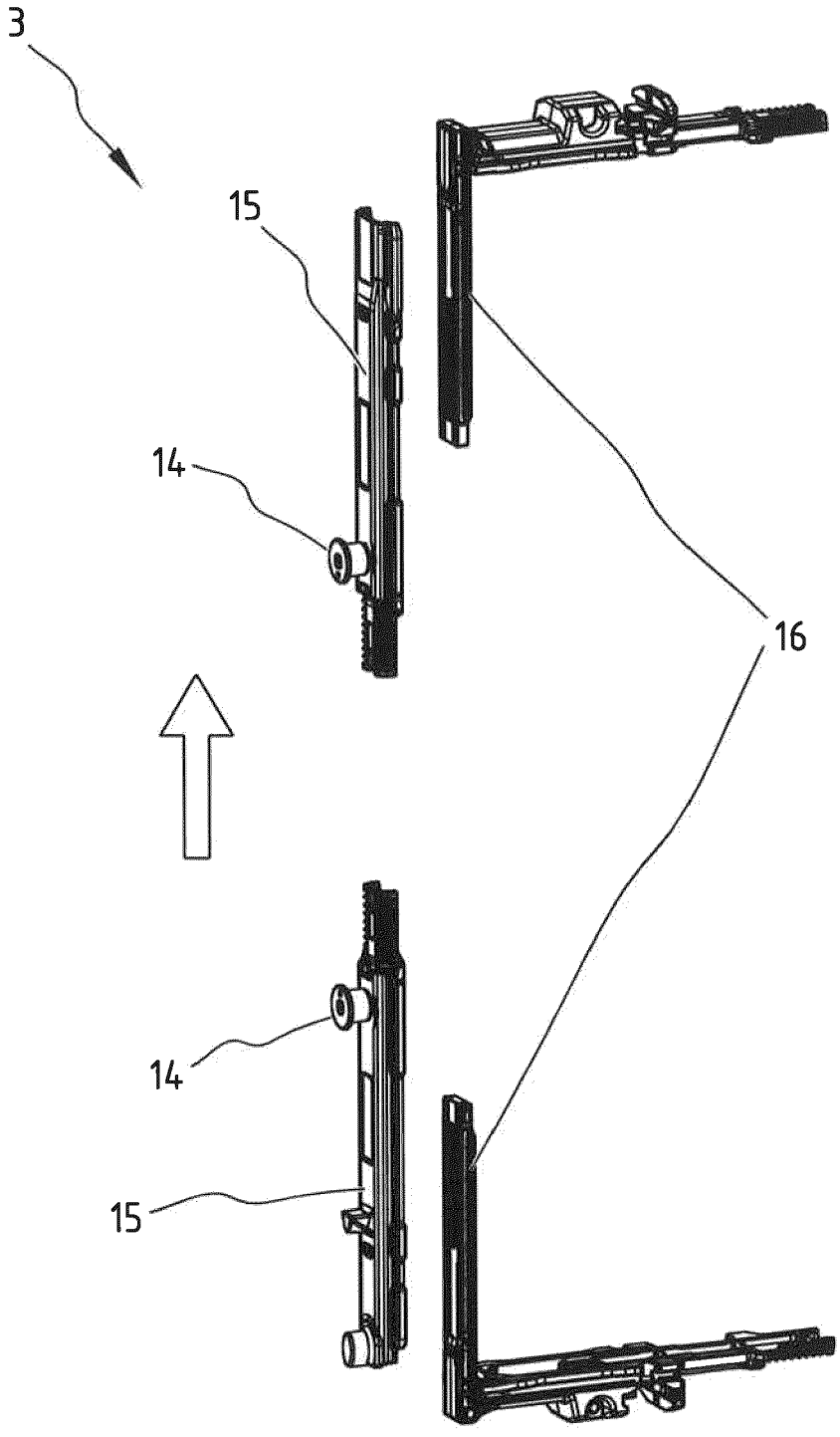

Fig. 4

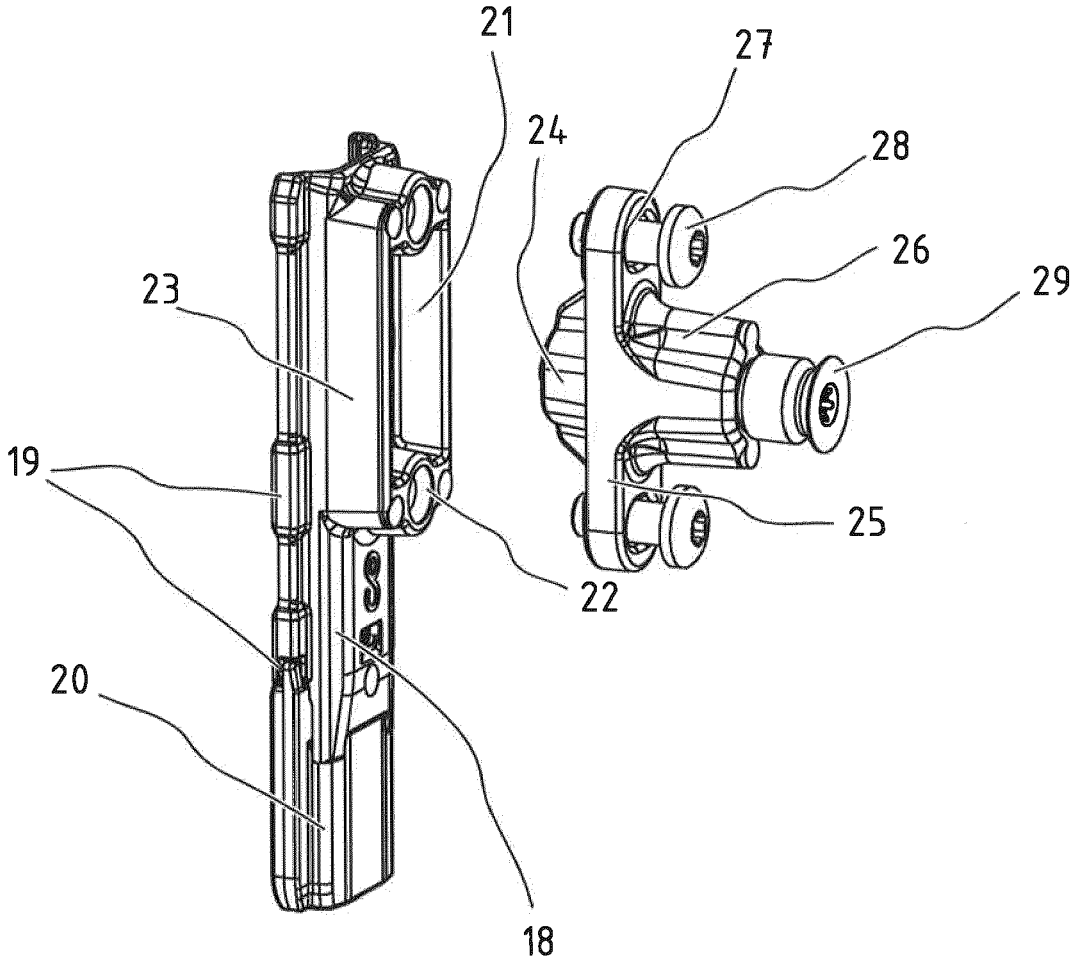

Fig. 5

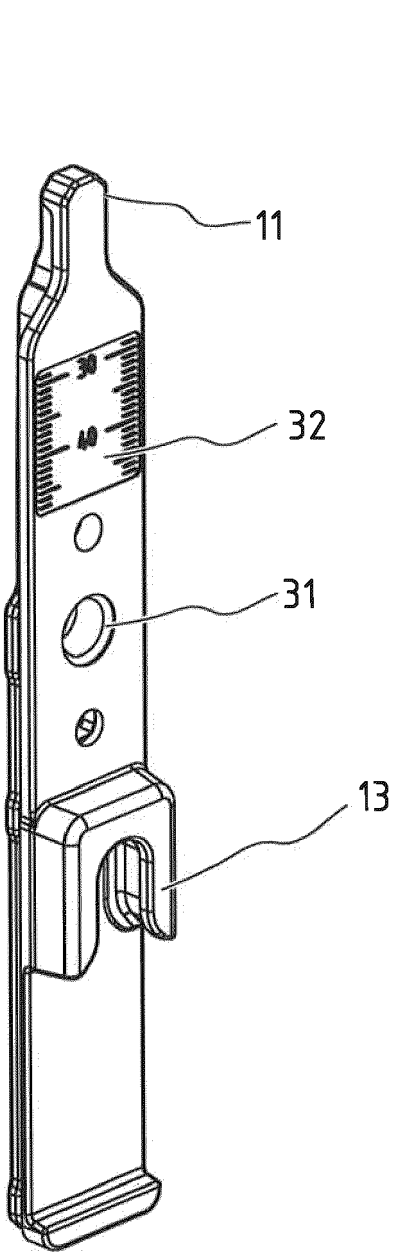

Fig. 6

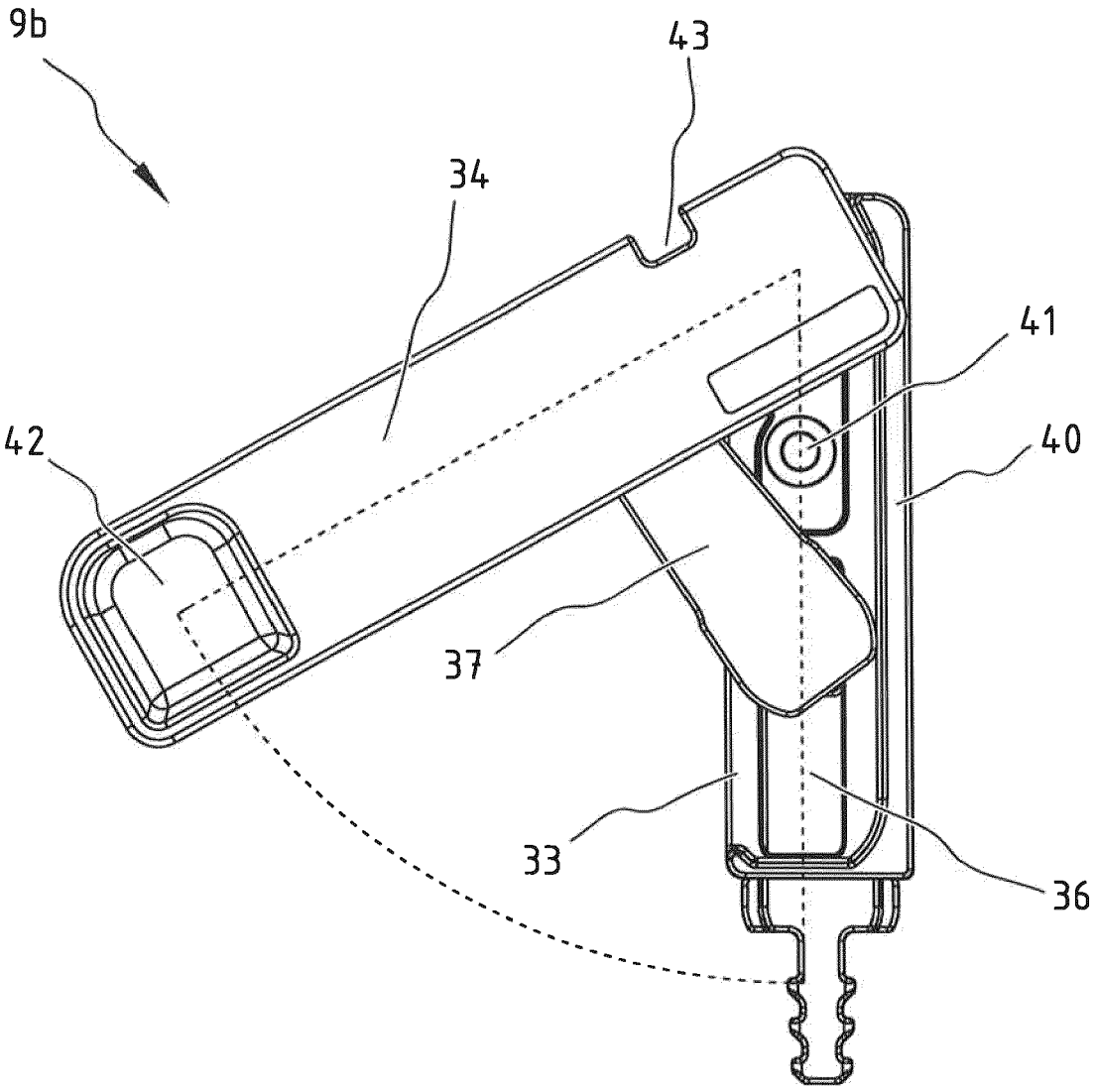

Fig. 7

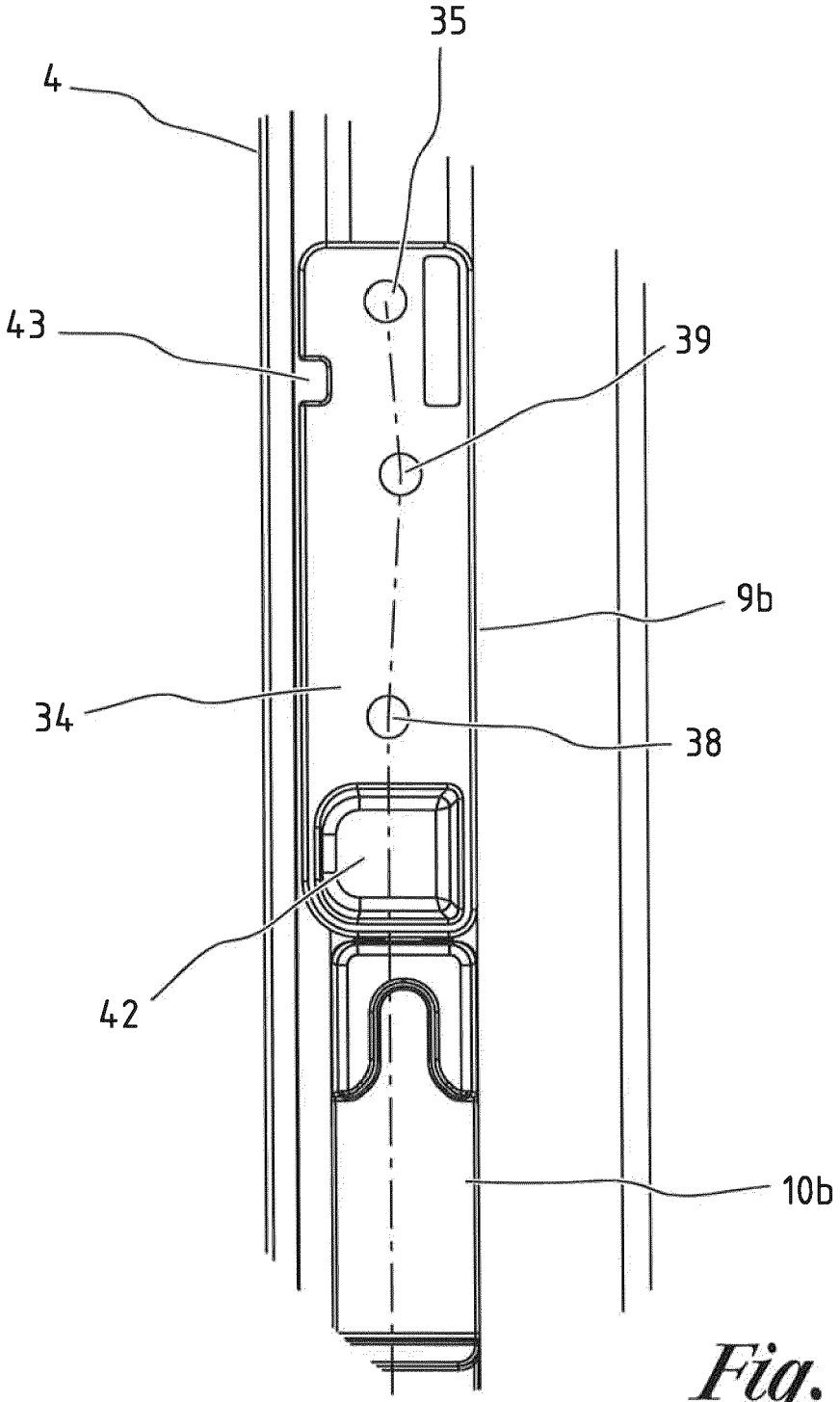

Fig. 8

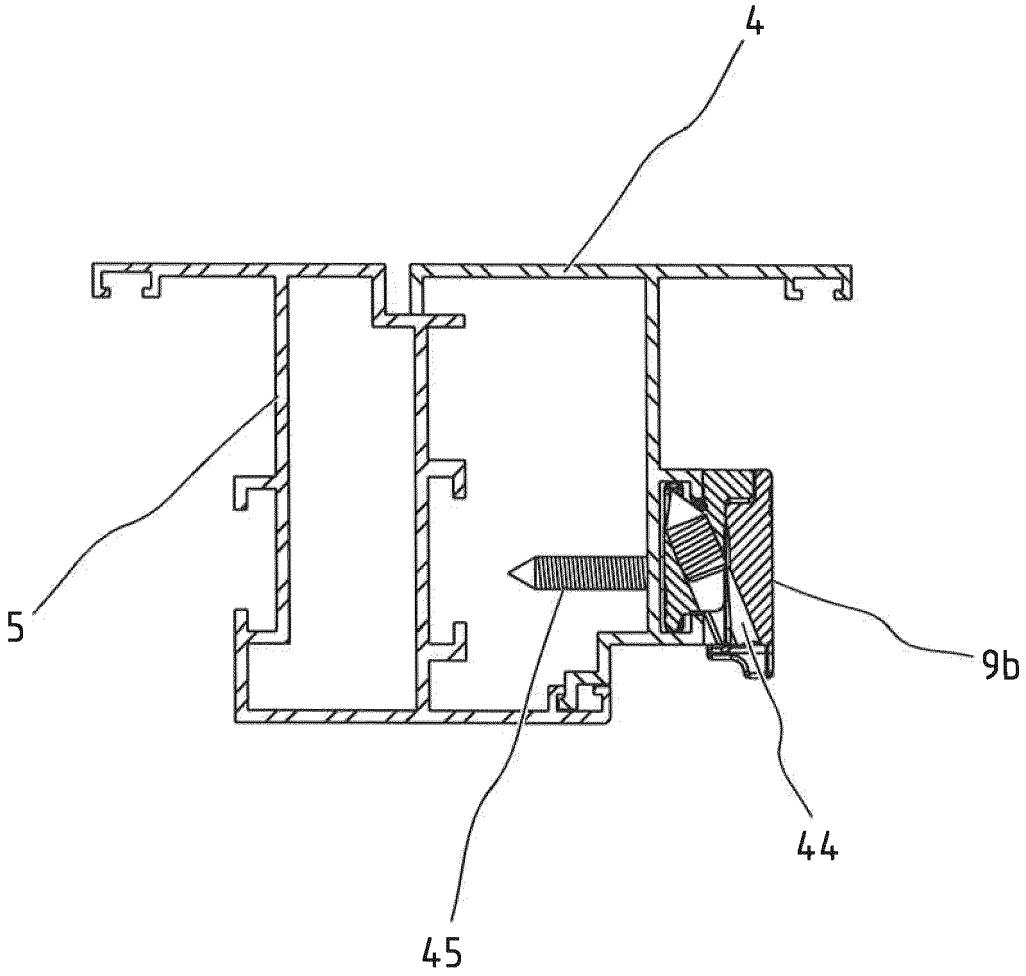

Fig. 9

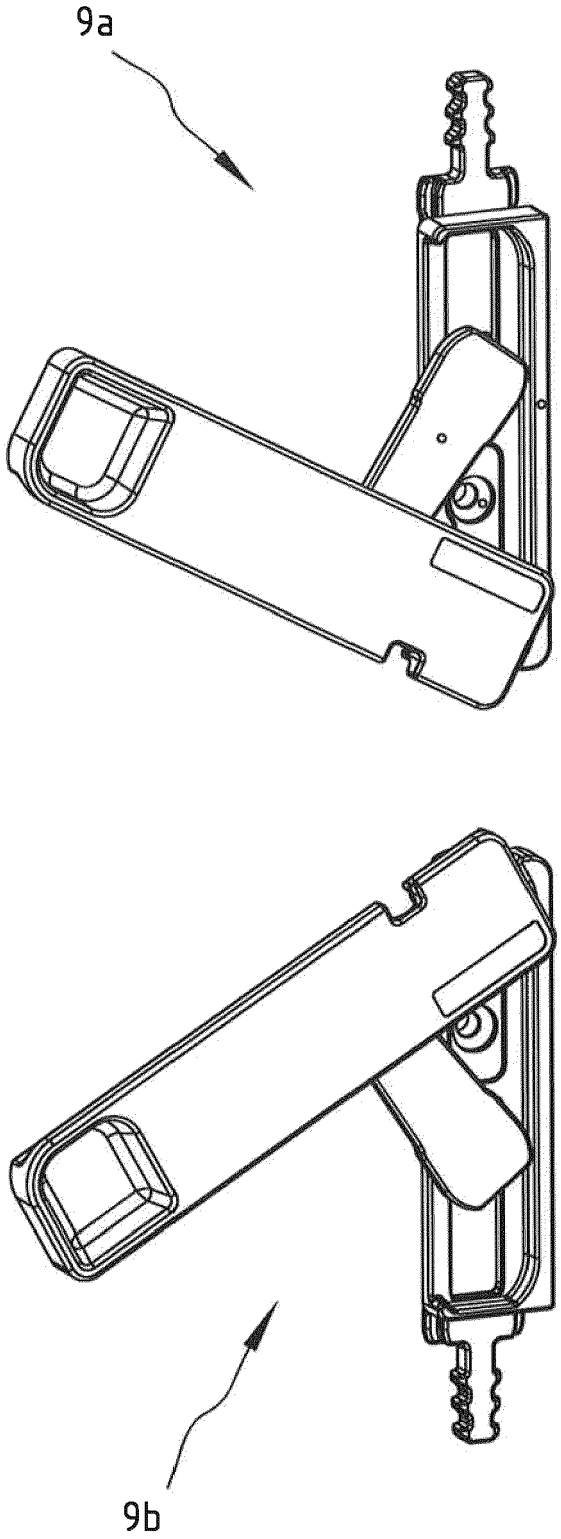

Fig. 10

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EUROPEAN SEARCH REPORT

Application Number
EP 24 17 8225

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	FR 2 825 401 A1 (FERCO INT USINE FERRURES [FR]) 6 December 2002 (2002-12-06) * the whole document *	1-13	INV. E05C1/06 E05C7/04 E05C9/24
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A	US 2007/029812 A1 (MONTS DE OCA JERRY L [US]) 8 February 2007 (2007-02-08) * the whole document *	1-13	
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TECHNICAL FIELDS SEARCHED (IPC)

E05C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	24 October 2024	Geerts, Arnold

CATEGORY OF CITED DOCUMENTS

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24-10-2024

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

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