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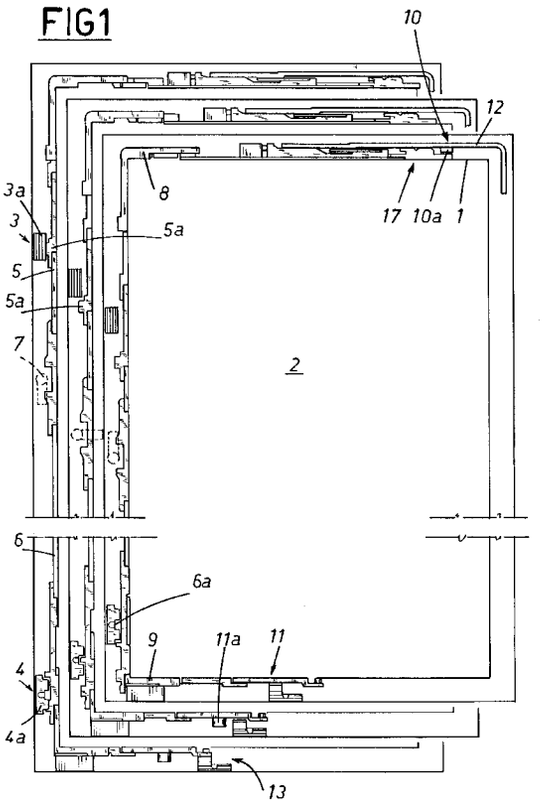
(54) An assembly of elements in operating mechanisms for tilt-and-turn window fixtures.

(57) The fixed surround frame (1) of the window carries a bottom locating element (13) slidably adjustable in relation to a bottom locking element (11) and affording a first vertical stop (15) positioned to engage a relative catch (11a), whilst the sash (2) carries a top locating element (17) embodied in two distinct component parts (17a, 17b), the first of which a base affording a pair of mutually opposed second vertical stops (19) at one end, positioned to engage the catch (10a) of a top stay rod (12), and a seating (20) at the other end ; the second component (17b) affords a pair of mutually opposed third stops (21) positioned likewise to engage the catch (10a) and is insertable to an exact fit in the first in two different positions, 180° apart, in such a manner as to alter the distance between the two pairs of stops (19, 21) and thus select a different sequence of interaction between the stops and the catch (10a).

FIG1



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The present invention relates to an assembly of elements forming part of the operating mechanism for a tilt-and-turn type window fixture, that is, with a sash rotatable on combined bottom and side hinges.

To ensure their correct operation, conventional tilt-and-turn window fixtures need to incorporate a considerable number of primary accessories, i.e. components which act directly in the operation and manoeuvre of the sash (e.g. handles, open and shut control rods, stops or catches etc.), and secondary accessories serving to secure or lock the primary accessories one in relation to another.

Two opening systems are adopted currently for these dual-function fixtures, which reflect two clearly definable constructional approaches: the one may be referred to as "turn-tilt" (traditional), and the other as "tilt-turn", the dissimilarity consisting solely in the operating position of the handle, which is determined clearly enough by a different arrangement of the primary accessories mentioned above.

Whichever the system, the closed position of the sash coincides with the return of the handle to a position of vertical alignment, with the heel of the handgrip directed downwards; from this same position, rotation of the handle through 90°, i.e. substantially horizontal in relation to the fixture as a whole, enables a "turn-tilt" sash to be swung on its side hinges, and a "tilt-turn" sash to tip forward in the manner of a fanlight.

A further rotation of the handle through 90° from horizontal back to vertical (though in this case with the heel of the handgrip directed upwards) will enable the "turn-tilt" sash to tilt, and the "tilt-turn" sash to swing.

According to circumstances, naturally enough, each individual manufacturer has opted for one or other of these two constructional approaches, whether by reason of necessity (not least in view of the stock considerations) or of the market at which the end product is targeted. Beyond the mere duplication of manufacturing and inventory operations to cover two entire ranges of components, however, the drawbacks of such a division between two different systems become most apparent at the moment of installing the tilt-and-turn fixture, inasmuch as the decision as to which system is adopted must be made prior to installation; currently indeed, it is not possible to change over from one system to another with work already under way, and selection a priori is thus an unavoidable requirement.

Accordingly, the object of the present invention is to overcome the drawbacks in question through the adoption of an assembly of elements forming part of the primary control mechanisms for a tilt-and-turn window fixture, whereby the mode of operation of the handle can be altered simply and swiftly, and without modifying the construction of the fixture, even after installation.

The stated object is realized in an assembly of elements as characterized in the appended claims, the two essential features of which are a bottom locating element slidably associated with the fixed surround frame of a window fixture, adjustable for position in relation to the bottom locking element of the moving sash and affording a vertical stop positioned to interact with a corresponding bottom catch, and a top locating element associated with the sash and consisting in two distinct components: the first, a base of which one end affords a pair of vertical stops placed to interact with the catch of a top stay rod, and the remaining end a seating in which the second component is insertable to an exact fit; the second affording a further pair of stops positioned to interact with the same top catch, and insertable in the first in either of two different positions, the one rotated through 180° from the other, in such a manner as to alter the distance between the respective pairs of stops and thus change the pattern of interaction between the locating element and the catch.

The invention will now be described in detail, by way of example, with the aid of the accompanying drawings, in which:

- fig 1 is the schematic frontal elevation of a fixture incorporating the assembly of elements according to the present invention;
- figs 2a-b-c are identical views of the top part of a fixture as in fig 1, illustrating three different operating configurations of a "turn-tilt" system;
- figs 3a-b-c are identical views of the top part of a fixture as in fig 1, illustrating three different operating configurations of a "tilt-turn" system;
- fig 4 is an enlarged detail of the bottom part of a fixture as in fig 1, illustrating one of the open positions of the "tilt-turn" sash;
- fig 5 is the section through V-V in fig 4;
- fig 6 shows one of the elements according to the present invention, in plan from above, positioned for "turn-tilt" operation;
- fig 7 shows the element of fig 6, in plan from above, positioned for "tilt-turn" operation.

With reference to the drawings, an assembly of elements according to the invention is applicable to window fixtures designed for tilt-and-turn type operation, essentially comprising a fixed surround frame 1 and a moving sash 2. The fixture is fitted with at least one first locating element 3 (fig 1), positioned along the upright side 2a of the sash 2 farthest from that connected by way of hinges (not illustrated) to the fixed surround frame 1, and in the case of the sash illustrated by way of example (which would be of notable dimensions), fitted with two such elements denoted 3 and 4. Each element 3 and 4 is embodied as a plate affording a relative projection 3a and 4a such as will provide the stop for a respective catch element 5a and 6a associated with rods 5 and 6 by which the sash 2 is locked and released; the rods 5 and 6 are operated by means of an external handle 7 that can be rotated between a plurality of stable positions (three, in

effect), and associated with flexible transmission elements denoted 40 each consisting in a length of wire rope (one of which is indicated schematically in fig 4) slidably accommodated in a relative guide element 8 and 9 substantially of 'L' shape positioned at the corresponding corner of the sash 2.

The ropes 40 serve to operate respective top and bottom locking and bearing elements 10 and 11, each affording a catch 10a and 11a; in the example of the drawings, the top locking element 10 consists in a stay rod 12 pivotably associated with at least two distinct centres afforded by the fixed surround frame 1 and the sash 2, respectively, in such a way as to limit the travel of the sash when tilted. 13 denotes a bottom locating element associated with the fixed surround frame 1, insertable in a channel 14 afforded by the latter and slidably adjustable for position in relation to the bottom locking and bearing element 11. The element 13 in question consists in a block 22 (see figs 4 and 5) affording a first profile 23 underneath, slidably engaged in the channel 14, and a second profile 24 uppermost, directed toward the locking and bearing element 11, which affords passage to the relative catch 11a when the handle 7 is rotated through the operating positions. The block 22 also comprises a first vertically disposed lateral stop 15 designed to restrain the catch 11a whenever the handle 7 is rotated into a particular operating position (in a preferred embodiment, the stop 15 and the catch 11a will exhibit substantially matching profiles). The block 22 is secured in place by first locking means 16 interacting between the fixed surround frame 1 and the locating element 13, which in the example of the drawings consist in a setscrew 31 (fig 5) passing through a corresponding socket 32 disposed transversely and skew in relation to the element 13 in such a way that the screw interferes with the inside of the channel 14.

17 denotes a top locating element, in this instance associated with the top of the sash 2 (see figs 6 and 7), attached to what is in effect the 'train' of parts set in motion by the flexible transmission means 40; the element 17 in question consists in two distinct component parts 17a and 17b of which the first functions as a base and affords a pair of mutually opposed second vertical stops 19 on the one hand, positioned to engage the catch 10a of the stay rod 12, and on the other, a seating 20 stably and snugly accommodating the second component 17b of the element 17, which in turn affords a pair of mutually opposed third stops 21 serving likewise to engage the catch 10a.

More exactly, the pairs of vertical stops 19 and 21 afforded by the relative components 17a and 17b of the top locating element 17 are disposed one on either side of a central track 25 affording passage to the catch 10a; the seating 20 afforded by the base 17a appears as a plate 26 with longitudinal recesses 26a and 26b, one on each side, serving to accommodate matching projections 27 and 28 issuing from the second component 17b. With the seating 20 and the second component 17b thus embodied, one has the advantage that the second component 17b can be fitted to the first component 17a in two distinct positions (shown respectively in figs 6 and 7), essentially rotated through 180° the one from the other, in such a way as permits of altering the distance that separates the one pair of stops 19 from the other pair 21, and therefore of obtaining a different position of engagement between these and the catch 10a in relation to the two operating positions of the handle 7.

The two components 17a and 17b are secured stably one to the other by second locking means 18 which consist simply in screws 33 and 34 inserted through two holes 30 afforded by the latter 17b and engaged in tapped holes 29 afforded by the former 17a.

Thus, a window fixture incorporating the elements described above can be installed and used either in "turn-tilt" or in "tilt-turn" mode, given that the bottom locating element 11, which when the stop 15 and the bottom catch 11a are aligned functions as a second bottom pivot on which to tilt the sash 2 (discernible from fig 4, which illustrates an open position of the "tilt-turn" type fixture), and the top locating element 17, which serves to restrain or release the catch 10a of the stay rod 12, can both be adjusted for position in relation to the corresponding catches.

Figs 2a, 2b and 2c illustrate the configuration of the top locating element 17 in relation to the three positions of the handle 7, respectively with the sash a) closed and the handle vertical, b) open in turn mode and c) open in tilt mode ("turn-tilt" type system), in which the second component 17b is positioned with the respective pair of stops 21 immediately adjacent to the stops 19 of the first component 17a; the catch 10a is restrained by the stops 19 of the first component 17a in the first position of the handle and by the stops 21 of the second component 17b in the second position, and free to emerge from the fixed surround frame 1 in the third position.

Figs 3a, 3b and 3c illustrate the operation of the selfsame catch 10a in the case of the "tilt-turn" type fixture, likewise in relation to the three positions assumed by the handle 7, respectively a) with the sash closed, b) open in tilt mode and c) open in turn mode. In this instance, the second component 17b of the locating element 17 is rotated to distance the relative pair of stops 21 from the stops 19 of the first component 17a; accordingly, the catch 10a is restrained by the stops 19 of the first component 17a in the first position, free to emerge from the fixed surround frame in the second position, and restrained by the stops 21 of the second component 17b in the third position.

With this type of adjustment available, it becomes possible to switch the operating positions of the handle mechanism, hence of the external handgrip, according to which of the two tilt and turn systems it

is wished to adopt. Moreover, the architecture of the two key elements is such (by virtue of the particular solution disclosed) that the switch can be effected even after the fixture has already been installed: the bottom locating element 13 can be repositioned in relation to the relative catch 11a simply by loosening the setscrew 31 and sliding along the channel of the fixed surround, whilst the top locating element 17 requires no more than to reverse the position of the second component 17b.

Claims

1) An assembly of elements in operating mechanisms for tilt-and-turn window fixtures with a fixed surround frame (1) and a moving sash (2), comprising:

– at least one first locating element (3) positioned on the upright side (2a) of the sash (2) farthest from that associated by way of vertical hinges with the fixed surround frame (1), embodied essentially as a plate affording at least one projection (3a) and functioning as a stop;

– means by which to secure and release the sash (2) in relation to the surround frame (1), comprising rods (5, 6) affording at least one catch element (5a) designed to interact with the projection (3a) of the first locating element (3), operated by an external handle (7) rotatable between a plurality of stable positions and associated with flexible transmission elements (40) accommodated slidably in relative guide elements (8, 9) substantially of 'L' shape situated at the corresponding top and bottom corners of the sash;

– top and bottom locking and bearing elements (10, 11) associated with and operated by the flexible transmission elements (40), each affording a relative catch (10a, 11a), of which the top element consists in a stay rod (12) positioned at the top part of the fixture and pivotably associated with at least two distinct centres, the one afforded by the fixed surround frame (1) and the other by the moving sash (2),

characterized

in that it further comprises:

– a bottom locating element (13) associated with a channel (14) afforded by the fixed surround frame (1), slidably adjustable for position in relation to the bottom locking and bearing element (11) and affording at least one first vertically disposed lateral stop (15) positioned to interact with the bottom catch (11a) in at least one of the stable operating positions of the handle (7) and secured stably in the channel (14) by first locking means (16) interacting between the locating element (13) and the fixed surround frame (1);

– a top locating element (17) associated with the sash (2) and consisting in two distinct components (17a, 17b), the first of which a base affording a pair of mutually opposed second vertical stops (19) at one end, positioned to interact with the catch (10a) of the top stay rod (12), and a seating (20) at the remaining end, the second affording a pair of mutually opposed third vertical stops (21) positioned to interact with the catch (10a) and insertable to an exact fit in the seating (20) of the first component in two different positions, the one rotated substantially 180° from the other, in such a manner as to alter the distance between the respective pairs of stops (19, 21) and thus select a different sequence of interaction between the catch (10a) and the locating element (17) in at least two operating positions of the handle (7).

2) An assembly of elements as in claim 1, wherein the bottom locating element (13) consists essentially in a block (22) affording a downwardly directed profile (23) slidably engaged in the channel (14) and an upwardly directed profile (24) facing toward the bottom locking element (11) and positioned to provide a bearing for the relative catch (11a) when the handle (7) is rotated through the operating positions.

3) An assembly of elements as in claim 1, wherein the seating (20) afforded by the first component (17a) of the top locating element (17) consists in a plate (26) exhibiting longitudinal recesses (26a, 26b) on either side positioned to receive matching projections (27, 28) issuing from the second component (17b), and the second component (17b) is secured to the first by second locking means (18) consisting in a pair of screws (33) insertable through a pair of holes (30) afforded by the second component and engaging in corresponding tapped holes (29) afforded by the first component.

4) An assembly of elements as in claim 1, wherein first locking means (16) consist in a screw (31) insertable through a corresponding socket (32) disposed transversely and skew in relation to the bottom locating element (13) in such a way that the screw can interfere with the inside of the channel (14).

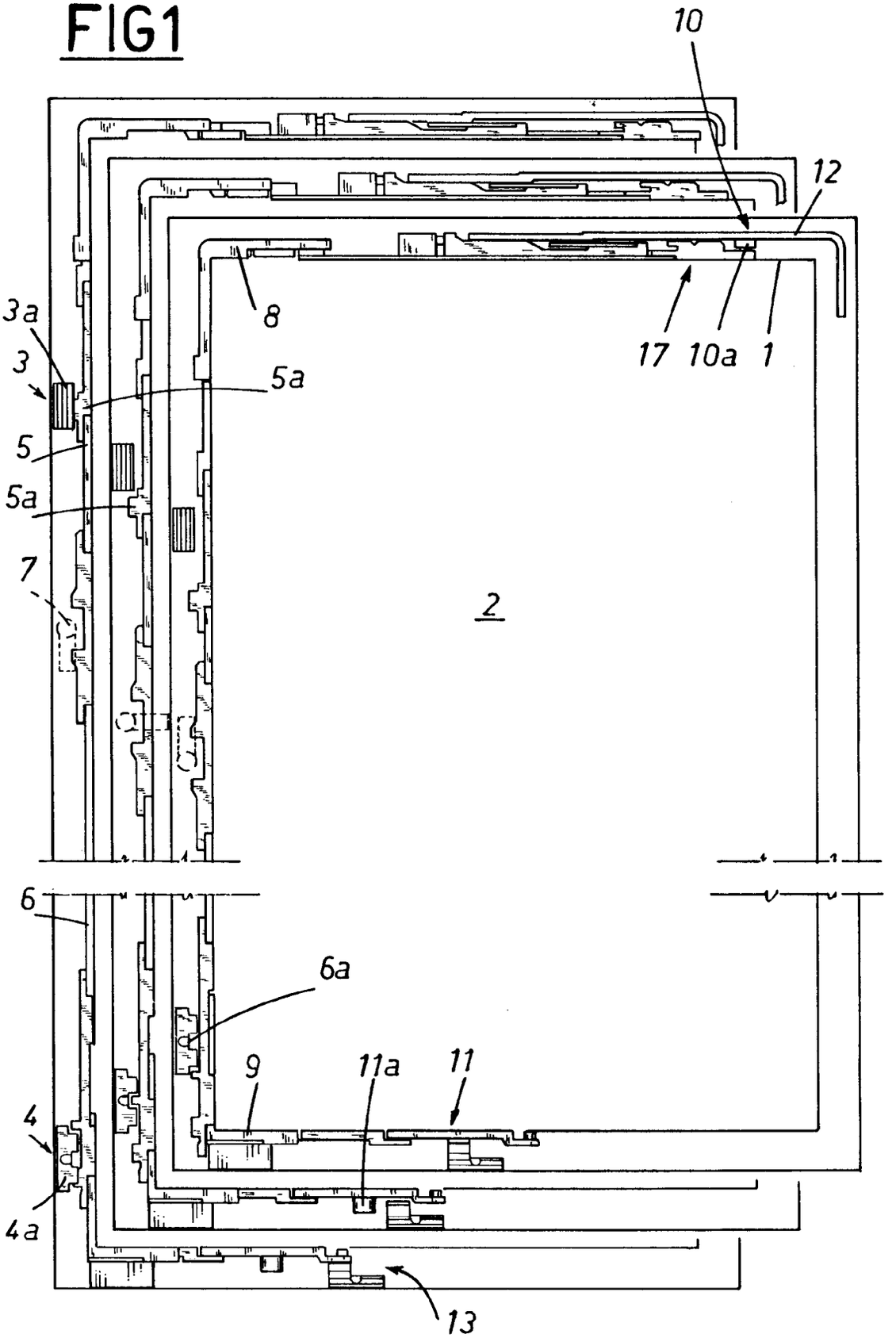
5) An assembly of elements as in claim 1, wherein the two component parts (17a, 17b) of the top locating element (17) are secured one to the other by second locking means (18) consisting in a pair of screws (33) vertically insertable through and into holes (29, 30) afforded by the selfsame components.

6) An assembly of elements as in claim 1, wherein to obtain rotation of the handle (7) from a first vertical position in which the sash is shut and locked, through a second and a third position in which the sash can be opened in turn mode and tilt mode, respectively, the second component (17b) is positioned with the relative pair of stops (21) adjacent to the stops (19) of the first component (17a) such that the top catch (10a) is restrained by at least one stop (19) of the first component in the first position and by the stops (21) of the second component in the second position, and free to

emerge from the fixed surround frame (1) in the third position.

7) An assembly of elements as in claim 1, wherein to obtain rotation of the handle (7) from a first vertical position in which the sash is shut and locked, through a second and a third position in which the sash can be opened in tilt mode and turn mode, respectively, the second component (17b) is positioned with the relative pair of stops (21) distanced from the stops (19) of the first component (17a) such that the top catch (10a) is restrained by at least one stop (19) of the first component in the first position, free to emerge from the fixed surround frame (1) in the second position, and restrained by the stops (21) of the second component in the third position.

FIG1



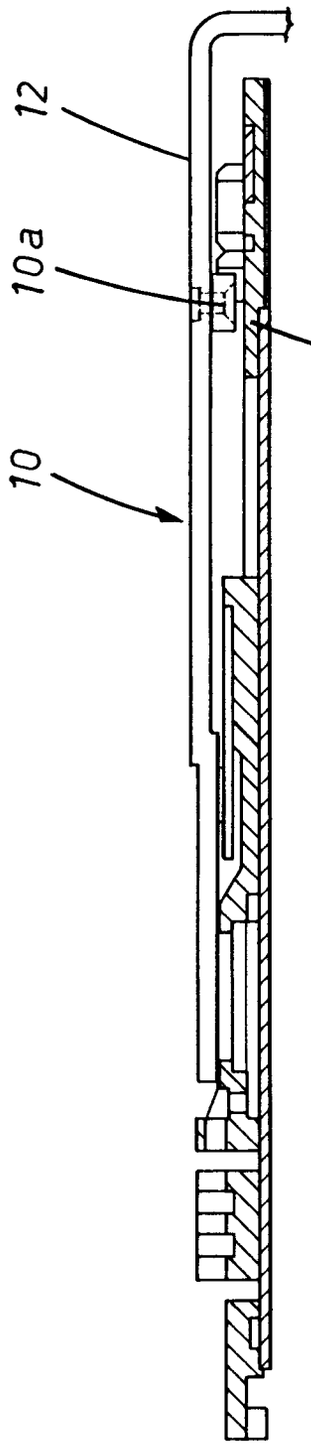


FIG2a

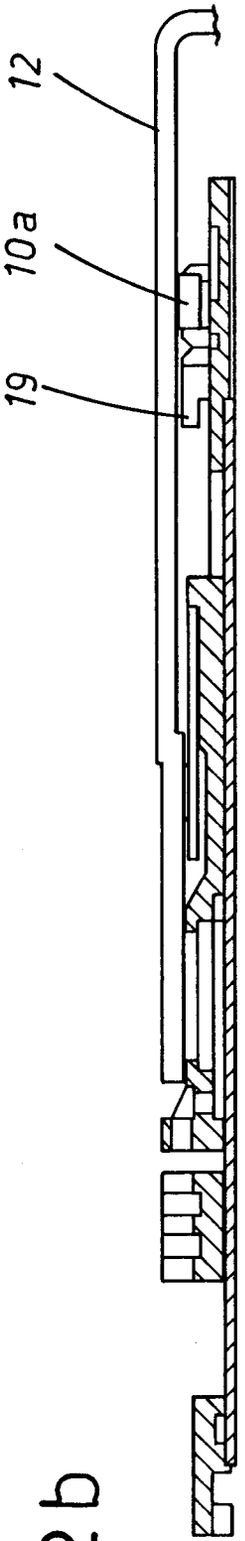


FIG2b

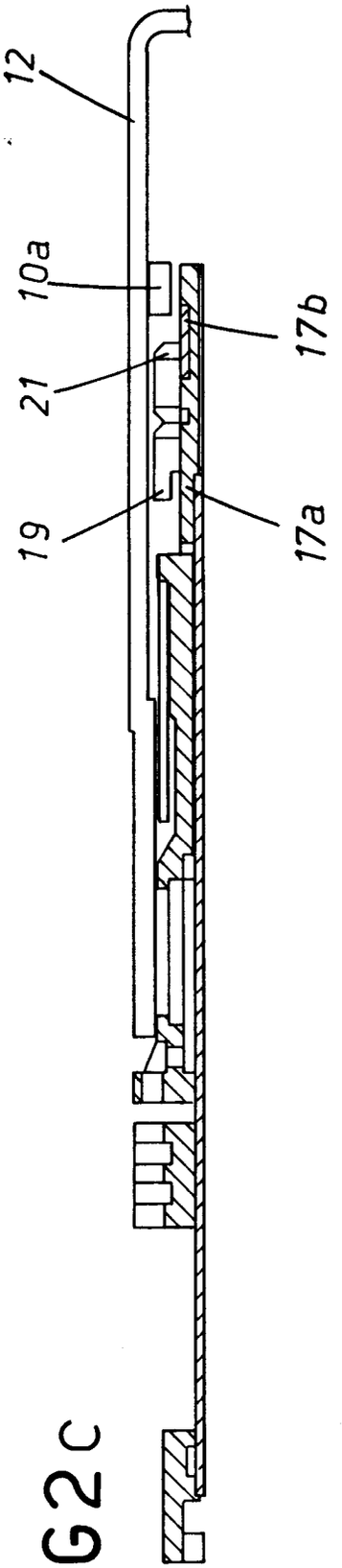
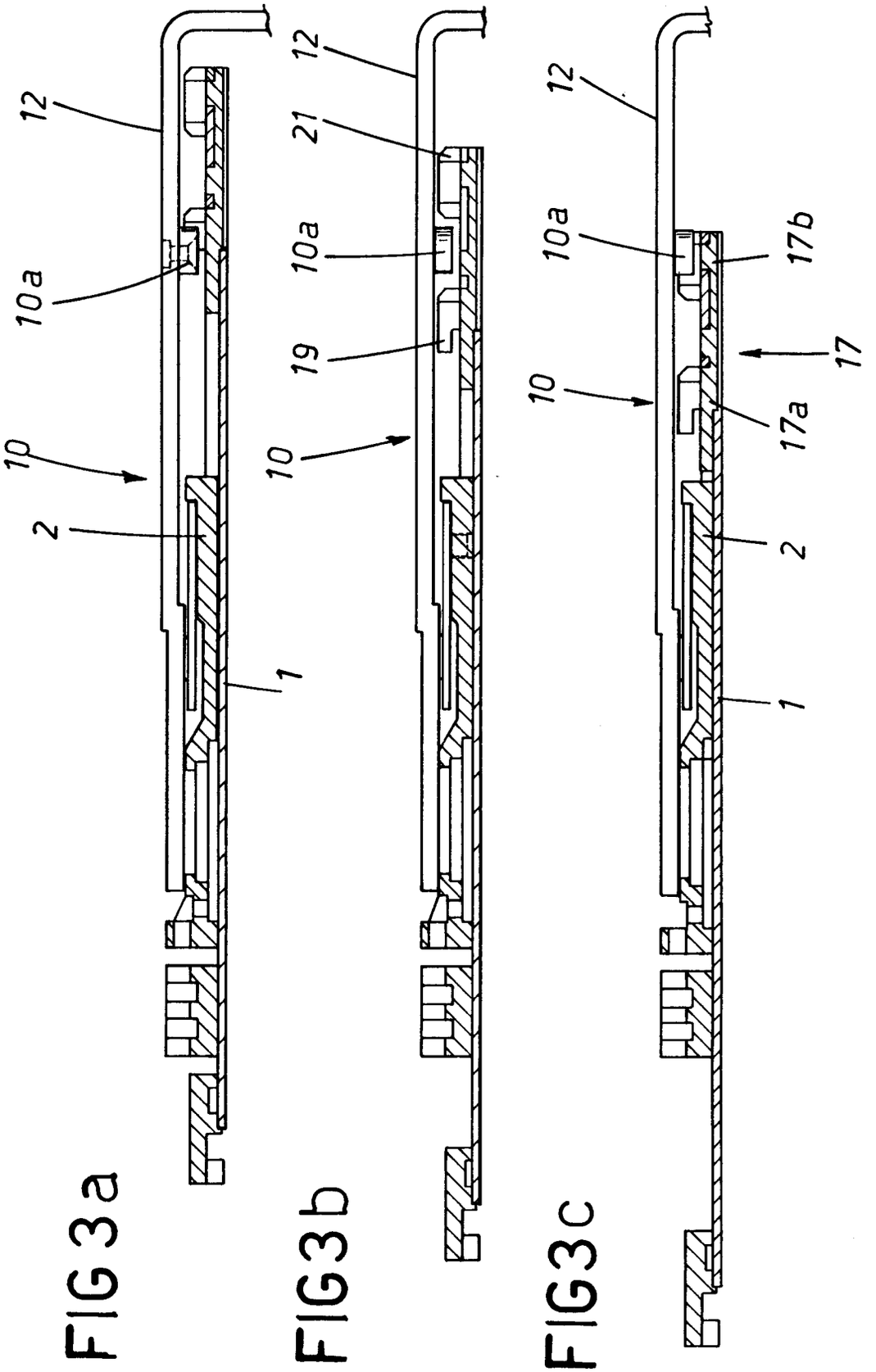


FIG2c


12
10a
10
2
1
FIG3a
12
21
10a
19
10
FIG3b
12
10a
17b
17
10
17a
2
1
FIG3c

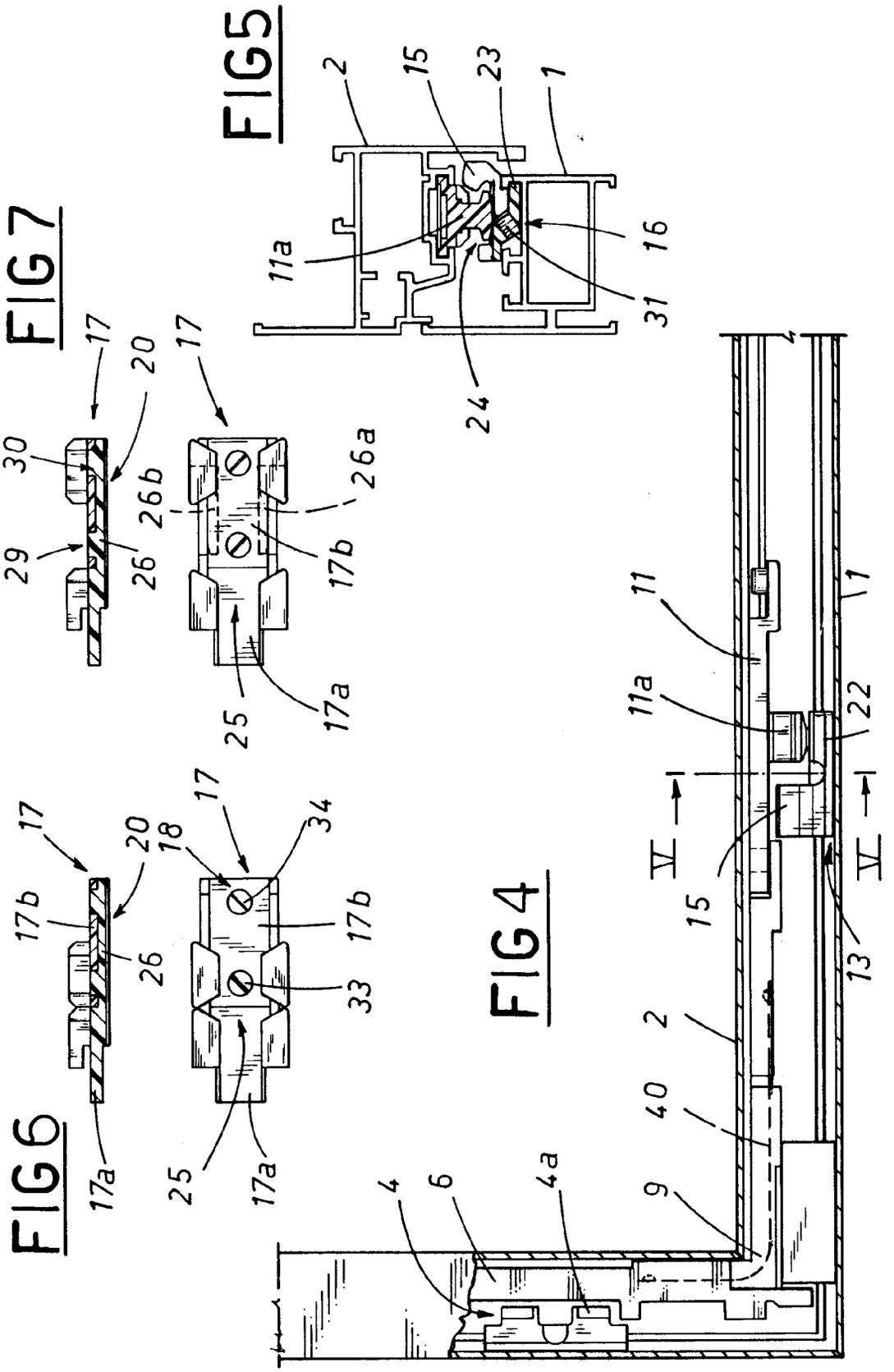


FIG 4
FIG 5
FIG 6
FIG 7
V
V
1
2
4
4a
6
9
11
11a
13
15
16
17
17a
17b
18
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22
23
24
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26a
26b
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