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(54) **A UNIVERSAL MULTIPOINT LOCK ASSEMBLY**

(57) A universal multipoint lock (10) has a gear box (16) drivable by means of a handle to displace a drive rail (14). The gear box may be located at either of at least two thickness positions spaced from the edge of a door leaf into which a standard sized lock fitting groove (11,13) is formed in order to correspond with the predetermined location of the door handle of a prefabricated door leaf (5). The drive rail 14 is comprised of two parallel drive struts (34) spaced by a spacer to form a slot able to accommodate securing screws and the action of bolt features such as a hook bolt member (24). Each rail strut is provided with engaging features comprising regularly spaced recesses (38) which engage with corresponding features such as a tongue (39) of a drive plate of a hook bolt assembly (18). The spacing of the gear box and bolt features (18) (23) can therefore be varied to fit into the preformed recesses of any pre-existing door. A faceplate (12) is formed with weakening grooves which allow it to be separated into portions (12H, 12C, 12G) which allow the gear box, hook bolt and cam bolt to be secured in position according to the location of the recesses. Infill portions (12P) of the faceplate are of various heights enabling the space in the groove (11) to be infilled.

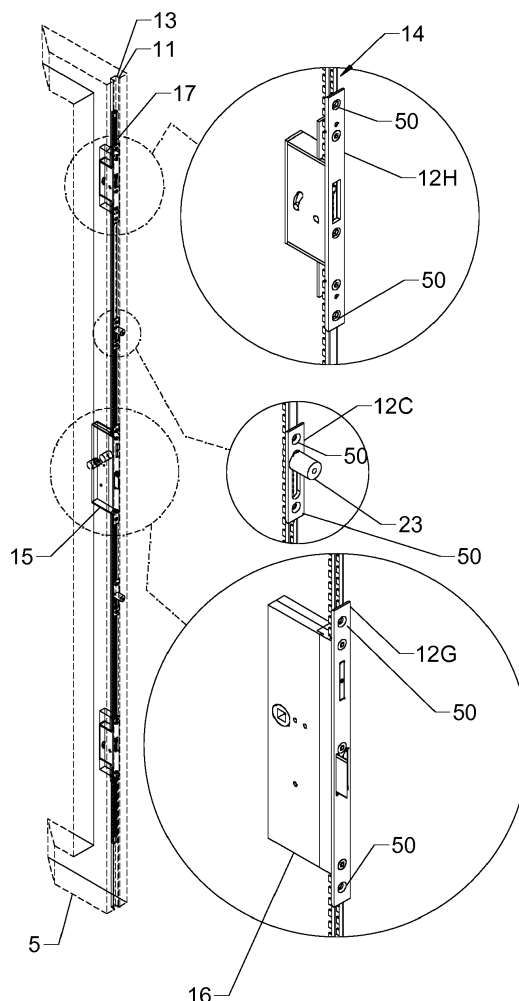


FIG 2F

Description

Technical Field

[0001] Multipoint lock mechanisms of the relevant type are used to secure an openable door leaf or window sash in a closed condition against a frame. In some cases the door leaf or window sash may be secured by the mechanism against an adjacent door leaf or window sash, for example in the case of French doors or sliding patio doors. Apart from size, there is in this case no practical distinction between doors and windows, so for the sake of brevity, terminology relating to doors will be used hereafter and should be interpreted as referring to the corresponding components of a window installation.

[0002] A door will most commonly be fabricated principally from wood or UPVC. The door will be mounted via sliders or hinges into a frame. The hinges will engage between an upright member of the frame known as a hinge jamb and an upright part of the door leaf known as a hinge stile. On the opposite edge the door is provided with a part known as a lock stile which is arranged to bear against either one of; a lock jamb part of a door frame, or a receiver lock stile of an adjacent door leaf. For the purpose of this description the terms lock jamb and receiver lock stile are interchangeable according to the door installation and so the following description will use the term lock jamb which should be interpreted accordingly. It should further be understood that where the mechanism is installed into an awning window the mechanism may be installed into a lower horizontal member known as a weather sash to engage with a horizontal frame member known as the sill. For the purposes of this description the term lock stile may be substituted for the term weather sash and the term lock jamb for sill. The reader should also bear in mind that the weather sash and sill are horizontal and not vertical and should make appropriate accommodation for the orienting terminology used.

PRIOR ART

[0003] Figures 1A to 1E illustrate a conventional multipoint lock and French door installation. For the purposes of the description left and right refer to the view shown from the outside. The installation has a door frame comprising elongate upright members consisting of; a left hinge jamb 1, a right hinge jamb 2, a sill 3 and a head jamb 4 forming a generally rectangular frame. A left hand side door leaf 5 is connected to the left hand side hinge jamb 1 by hinges 6 which are secured to a hinge stile 7 of the left door leaf 5. The door leaf 5 has an upright member providing a lock stile 8 which cooperates with upper and lower rails to frame and support a panel (not shown). The lock stile 8 is formed with a vertical groove 9 (known as a Euro groove) formed in the side edge to receive a multipoint lock mechanism 10.

[0004] As can best be seen in figure 1C the groove has

a first wide portion 11 adjacent the surface of the door 16mm wide and 3mm deep designed to accommodate a faceplate 12 of the lock mechanism 10, to sit flush in the groove. The groove has a narrow portion 13 which is nominally 11 mm wide to accommodate a rail 14 of the lock mechanism. These dimensions are highly standardised. The depth of the groove is usually about 10mm. The groove extends from the top edge of the door to the bottom edge and usually opens into the top and bottom edge. The groove also includes: a gearbox recess 15 to receive a gear box 16, which will typically include a latch bolt and deadbolt and a hook bolt recess 17, to receive a hook bolt 18. The groove is precision formed during manufacture of the door and is not generally susceptible to post manufacture modification. The lock mechanism 10 is typically retained in place by self-tapping screws received into screw holes at vertically spaced intervals along the height of the face plate. The rail 14 normally comes in two separate parts, namely an upper rail 14A and a lower rail 14B, each is formed with a mating portion 19 comprising a right angle bend forming a hook to engage a drive plate 20 of the gear box. The drive plate 20 is coupled to a handle 21 by means of a crank 22. Thus when the handle is turned each rail is urged up or down according to the direction of operation of the handle. Each rail is sufficiently stiff and supported by the walls of the groove to transmit the motion to each of the hook bolts 18 and cam bolts 23. Each hook bolt 18 has a hook shaped bolt 24 mounted to rotate around an axle 25 in a hook bolt casing 26. A hook bolt drive plate 27 engages features (holes) 28 formed in the drive rail 14B and engages the hook bolt via a drive pin and cam track. When the rail 14B is displaced relative to the faceplate and hook bolt casing, by the gear box action the hook shaped bolt 24 is rotated clockwise in the drawing to a projected condition projected from the casing to engage in a recess 29 formed in a striking plate 30. The striking plate 30 will be installed in a groove similar to groove 9 formed into a striking plate lock stile 31 of the right hand side door leaf 32. The lock stile serves as a lock jamb in this instance and will be referred to as such hereafter. The cam bolt 23 will engage in an "L" shaped groove 33 formed into the striking plate. The latch bolt and deadbolt will engage into rectangular apertures in the striking plate. The mechanisms to drive and lock the latch bolt and deadbolt are not shown.

[0005] Figure 1F is a cross section through a typical uPVC extrusion door hinge stile member such as 7. The other members including lock stile 8 will have a similar profile. The Eurogroove 9 is shown to be made of webs of material precluding any significant aftermarket modification to accommodate differently configured multipoint locks.

[0006] It will be appreciated that each: latch, bolt and screw must pass through precisely located corresponding slots in the drive rail in order to allow the drive rail to move vertically and to allow the bolts to move horizontally, or in the case of the cam bolts vertically) without

obstruction. Corresponding apertures must be provided on the striking plate to receive the bolts. There is no standardisation for the vertical positioning of the gear box. However, there are two common standards for the depth positioning (horizontally from the edge of the door leaf) of the handle axis. As a result multipoint door locking mechanisms are supplied by the door manufacturer at the time the door is made. In consequence there are now literally hundreds of different multipoint door locking mechanisms.

[0007] Door locking mechanisms wear over time and may be damaged as a consequence of misuse or deliberate attempts at breaking in. In either case the multipoint locking mechanism may require replacement and this presents a problem for the lock smith in identifying the type of multipoint lock. Even when the lock is identifiable it is increasingly difficult to source a compatible replacement lock as manufacturers have gone out of business, been bought out and/or rationalised their product lines. It is always a problem for the lock smith to stock an adequate range of multipoint locks, particularly as the lock is an expensive item and occupies significant warehouse space. A few lock smiths have developed a reputation for identifying compatible locks or modifying nearly compatible locks to be compatible, but this is rare and time consuming. Increasingly often the end user is forced to replace the door, doors or windows at an additional cost orders of magnitude greater than the typical cost of a lock and which may result in unsatisfactory cosmetic mismatches as well as much greater delay and disruption. There is also the problem of securing premises promptly when a mechanism has failed.

[0008] It is an object of the present invention to provide a universal multipoint locking mechanism capable of being readily adapted to fit a large range of different door types in an effort to alleviate the aforementioned technical problems.

STATEMENT OF INVENTION

[0009] Accordingly the present invention provides a universal multipoint locking assembly having:

a faceplate sized to be received into a door groove;
a gear box:

one or more bolts to be driven by the operation of the gear box to engage a striking plate;
a drive rail adapted to act between the gear box and each of said bolts spaced from the gear box to displace the bolts between a locking condition and an unlocking condition;
a face plate formed with a range of vertically spaced portions; some regions containing apertures to accommodate the operation of each bolt and to receive mounting screws and some regions containing only mounting screws;
wherein the drive rail comprises two similar drive

rail struts and at least one spacer member to arranged to join each drive rail strut in a parallel spaced relation to provide a slot extending over substantially the whole length of the drive rail, each drive rail strut bearing a plurality of equally spaced engaging features distributed over at least a length of the strut where any bolt might be installed, said engaging features being adapted to engage with corresponding drive engaging features provided on the bolt so that the bolt can be located at any one of a range of positions along the height of the rail; the regions of said faceplate being defined by weakened separation portions to facilitate cutting or snapping the faceplate into separated regions whereby the multipoint lock can be assembled into a door groove with each of the gear box and bolts accommodated in the provided door recesses and in operable correspondence with a striking plate.

[0010] The drive rail struts will preferably each be substantially rectangular in cross section. The engaging features will preferably be teeth. The teeth may project into the slot (in the thickness direction) but will preferably be configured to project into the door in the depth direction. Preferably the features will be of rectangular form either to provide recesses into which corresponding formations on the bolt or gearbox engage or to projections to engage into corresponding recesses formed in the bolt or gear box.

[0011] The spacer member may be a simple cuboid spanning the gap between inner facing edges of the rail struts. A spacer member may be provided at the end of the rail remote from gear box. Preferably a spacer member will be provided at the end of the rail proximate the gear box. In the case where the space member is provided proximate the gear box the spacer may also provide an adaptor to engage between the rail and corresponding features of the gear box. Additional spacer members may be fixedly or slidable received between the rail struts to add support and particularly to resist buckling. The spacer members located at the ends of the drive rail may be secured permanently in place during fabrication by welding, adhesives or other techniques; alternatively, the spacer member may be secured into place by screws or pins during installation of multi-point lock. In this case the vertical position of the distal spacer can be adjusted to suit a particular installation.

[0012] In one embodiment of the universal multi-point lock each rail strut is provided with weakened regions to facilitate snapping or cutting the rail strut to a customised length.

[0013] The weakened separation portions may be provided by a groove extending in the thickness direction in the face plate. The groove may extend only partway through the depth direction of the face plate. The groove may have a triangular cross section. The weakening

groove preferably extends to the edges of the faceplate. The face plate is usually configured to have an outside facing surface and an inside facing surface as determined by such features as the countersink of fastening screw holes. Preferably the weakening groove is provided on the inside facing surface.

BRIEF DESCRIPTION OF THE FIGURES

[0014] Embodiments of a universal multipoint lock mechanism will now be described, by way of example only, with reference to the accompanying illustrative figures, in which:

figure 2A is a front elevation of a first embodiment;
figure 2B is a sectional front elevation of the first embodiment including enlarged detail views;
figure 2C is a SW isometric view of the multipoint lock of the first embodiment with enlarged detail views;
figure 2D is a front elevation of a multipoint lock of the first embodiment showing a second configuration;
figure 2E is a front sectional elevation of the configuration in figure 2D;
figure 2F is a SE isometric view of the first embodiment partially installed;
figure 2G is a SE isometric view of the first embodiment installed;
figure 3A is left elevation of a second embodiment of the multipoint lock;
figure 3B is a rear elevation of the second embodiment;
figure 3C is a right elevation of the second embodiment;
figure 3D is an enlarged sectional view of a hook bolt on the line D-D;
figure 3E is an enlarged sectional view of a cam bolt on the line E-E;
figure 3F is an enlarged sectional view of the gear box on the line F-F;
figure 3G is a SW isometric view of the second embodiment with enlarged detail views;

DETAILED DESCRIPTION OF THE FIGURES

[0015] Components corresponding to the components described with regard to the prior art are indicated with similar numerals and only differing components will be described in detail below.

First Embodiment

[0016] With reference to the first embodiment illustrated in figures 2A-2E, the drive rail 14 is fabricated from two similar drive rail struts 34A and 34B each sufficiently long to extend from the gear box 16 to a position: in the case of the top drive rail 14T, above the highest bolt lo-

cation for the lock, and in the case of the bottom drive rail 14B to a position below the lowest bolt location. As shown the total height of the faceplate 12 is 2170mm. The faceplate supplied may have a height corresponding to the height of the tallest standard doors supplied (about 2420mm). The top rail in the example has a height of 920 mm to exceed the height of the uppermost bolt which in this case is a hook bolt 18 located at a height of about 740mm above the hook bolt. The lower rail has a height of 920 mm such that it descends from the gear box location to a position below the location of the lowest bolt which in this example is a bottom hook bolt at a position approximately 670mm below the gear box. The length of the drive rail is selected so that it has room to move when actuated by the gear box. In this case the actuation movement is over approximately 20mm. Door heights vary over a range from about 1980 to 2420mm. The length of the rails may be selected to accommodate the lowest common door height of 1980, which in the embodiment shown is 928mm. Alternatively the lock mechanism may be supplied with two or more drive rail assemblies selectable for a specific door height, for example 920 mm for a 1980mm door and 1140mm for a 2420mm door. In a preferred embodiment the drive rail may be adapted to be cut down or split down from the larger of the aforementioned sizes to one or more smaller sizes by the provision of a groove or weakened zone located at a position 220 mm from the end 35 distal to the gear box.

[0017] Each distal end of each drive rail strut 34 is joined by a spacer member 36. Each end of the drive rail struts proximate the gear box is joined by a gear box spacer 37 so that a slot extends vertically between the ends of each drive rail. The thickness of spacer is selected to form a slot sufficient to allow a hook bolt 24 to pass through the slot and for fastening screws to pass through the slot without fouling the rail struts. The slot is preferably between 5 and 7mm, in the example it is 6mm. Each rail strut is between 4mm and 1.5 mm thick, in the example 2.5mm. To resist buckling under load additional spacer members may be located between each rail strut. These may take the form of a simple floating cuboid block sized to fit between the bolt locations so that free movement of the rail is not obstructed but the spacer resists buckling of the rail strut into the slot. The door groove will resist buckling away from the slot.

[0018] Each rail strut is formed with engaging features comprising regularly longitudinally spaced rectangular recesses 38 provided along its whole length. In a variant of the embodiment the recesses 38 may extend along part of the length spaced from the gear box end or the rail, to enhance the strength of the rail. The height "h" of each recess corresponds to the height of a rail engaging tongue 39 formed on the hook bolt drive plate 27. Thus when the drive rail is displaced in the height direction the hook bolt drive plate is displaced relative to the hook bolt casing to effect rotation of the hook bolt 24.

[0019] The gear box spacer 37 includes means to engage with a notch 40 formed in an upper right facing edge

of the gear box drive plate 20. The gear box is shown assembled with an extension structure 41 which spaces the gear box 16 away (to the left) from the faceplate 12 and drive rail 14 by 10mm. In order to bridge the resulting gap between the gear box spacer 37 and the notch 40 an adaptor 42 is slotted into an aperture 43 formed in the gear box spacer 37. This allows a rectangular section handle socket and hence the handle to be located a first larger distance "D" from the edge of the door leaf.

[0020] As can best be seen from figures 2D-2E the gear box can be installed without the extension structure 41 in which case a projection 44 formed integrally with the gear box spaced 37 engages in the notch 40. This allows the handle socket to be located at a second shorter distance "d" from the edge of the door.

[0021] A cam bolt 23 is formed by a hollow cylinder 45 secured into a threaded hole formed in a back plate 46 by means of a machine screw 47. The cylinder is thus free to rotate around the screw. The back plate 46 comprises a central spine 48 of a thickness to be received between the rail struts 34. Projections 49 extending from the lateral edges of the spine in the thickness direction and at intervals spaced to engage in the recesses 38 of the rail struts. Thus the cam bolt 23 can be located at any height position along the rail.

[0022] In a few cases the universal multipoint lock may fit directly into a door requiring a replacement lock, in which case the replacement process is wholly conventional with the parts of the lock (gear box, hook bolts, cam bolts, drive rail and face plate being preassembled before installation into the groove and securing using screws. However in the common situation where the assembled multipoint lock is a replacement not directly compatible with the door it may be fitted by the following procedure.

[0023] When installing the universal multipoint lock the process is to present the gear box to the gear box recess and to then locate the gear box by inserting the handle drive bar. This will reveal if the extension structure 41 will be required or not for the specific door. If required the extension structure 41 is attached to the gear box casing. The adaptor 42 is then installed into the gear box spacer 37 and the top and/or bottom drive rail is presented to the narrow part of the door groove so that the adaptor locates in the notch 40 of the drive plate.

[0024] Hook bolts 26 are inserted, one each, into the hook bolt recess 17 of the door and the tongue 39 engaged with a recess 37 of the rail 14. If the hook bolts or gear box are not precise fit in the remaining recesses the location may be precisely determined against the striking plate.

[0025] Using the striking plate the required location of each cam bolt 23 may be determined.

[0026] A gear box face plate portion 12G is snapped out of the face plate 12 using adjacent weakened regions and used to secure the gear box in place as shown in the enlarged fragmental view of figure 2E. Similarly cam bolt faceplate portions 12C are snapped out of the faceplate 12 and used to secure the cam bolts 23 in place.

Similarly hook bolt face plate portions 12H are snapped out of the faceplate 12 using the adjacent weakened regions and used to secure the hook bolts in place.

[0027] The face plate portions 12G, 12H and 12C each face plate portion has at least two screw holes to receive

[0028] At this stage the universal multipoint lock is functional in that the bolts should operate and could be tested against the striking plate. However, for aesthetic and functional reasons it is necessary to have a faceplate covering the whole of the groove, rail 14 and the gear box 16. To achieve this, the face plate includes infill panels 12P of various heights selectable to infill the gaps between the face plate portions 12G, 12H and 12C. Each infill plate is provided with at least one and preferably two screw holes 12P by means of which it can be secured into place in the groove to produce a finished installation as illustrated in figure 2G. Thus the universal multipoint lock can be adapted to fit a range of door heights and doors with the gear box and bolts in a range of different positions. The lock can therefore replace damaged and worn multipoint locks. The lock also obviates the need for locksmiths or their suppliers to carry a large range of different locks. The lock can be fitted with minimal skill.

25 Second Embodiment

[0029] The second embodiment of figure 3 differs from the first embodiment mainly in that the drive rail struts 134A 134B are formed with engaging features comprising teeth defining recesses 138. The recesses may be of triangular cross section. The teeth extend in the thickness direction (T) and are formed on the opposing inside surfaces of the drive rails struts defining the slot, leaving the remaining surfaces smooth. The faceplate structure and use is identical to that of the first embodiment.

[0030] The gear box 16 is also identical to the gear box of the first embodiment but the gear box spacer 137 comprises a drive plate engageable part 137A extending at right angles to a rail strut engageable part 137B. The rail strut engageable part as side edges provided with teeth complementary to and engageable with the teeth of the rail struts 134. The gear box spacer 137 is provided in two mutually substitutable versions differing in the thickness of the drive engageable part in order accommodate use, or non-use of the extension structure 41.

[0031] The hook bolt 118 engages with the engaging features by means of a hook bolt plate 150. The hook bolt plate 150 is inserted between the rail struts to engage by means of teeth disposed on the thickness sides of with the teeth formed on the rail struts 134. The hook bolt plate 150 includes an aperture 151 disposed to receive a projection (not shown) formed onto the hook shaped bolt 24. When the drive rail 14 is displaced vertically the vertical motion is communicated to the engaged hook shaped bolt 24 which rotates around the axle 25 to project and engage in the corresponding slot in the striking plate.

[0032] A cam bolt 23 is engaged with the drive rail by means of a cam bolt back plate 146. The cam bolt back

plate 146 is generally similar to the hook bolt plate 150 having a thickness and depth to be received between the opposing tooth formation on the drive rail struts and having corresponding tooth formations 151 to engage with the teeth of the drive rail strut. The cam bolt cylinder 45 is secured to the cam bolt back plate 146 by means of a screw similarly to the first embodiment.

[0033] Installation of the universal multipoint lock is generally similar to installation of the first embodiment.

[0034] The second embodiment also discloses drive rail struts 134 provided with weakening grooves 152 whereby the drive rails strut can be snapped precisely in order to reduce its height. This also requires a spacer which can be located to the new distal end of the drive rail and secured in place. This may be achieved by the provision of holes extending in the thickness direction through each the drive rail strut adjacent the weakening groove and towards the gear box. The holes will correspond to holes formed in the spacer whereby the spacer may be secured by wire pins or threading wire through the rail holes and the spacer.

Claims

1. A universal multipoint locking assembly having:

a faceplate sized to be received into a door groove;

a gear box:

one or more bolts to be driven by the operation of the gear box to engage a striking plate;

a drive rail adapted to act between the gear box and each of said bolts spaced from the gear box to displace the bolts between a locking condition and an unlocking condition;

a face plate formed with a range of vertically spaced portions; some portions containing apertures to accommodate the operation of each bolt and to receive mounting screws and some portions containing only mounting screw holes;

wherein the drive rail comprises two similar drive rail struts and at least one spacer member to arranged to join each drive rail strut in a parallel spaced relation to provide a slot extending over substantially the whole length of the drive rail,

each drive rail strut bearing a plurality of equally spaced engaging features distributed over at least a length of the strut where any bolt can be installed, said engaging features being adapted to engage with corresponding drive engaging features provided on the bolt so that the bolt can be located

at any one of a range of positions along the height of the rail;

the portions of said faceplate being defined by weakened separation portions to facilitate cutting or snapping the faceplate into separated portions whereby the multipoint lock can be assembled into a door groove with each of the gear box and bolts accommodated in the provided door recesses and in operable correspondence with a striking plate.

2. A universal multipoint locking assembly according to claim 1 wherein the engaging features are engaging recesses.

3. A universal multipoint lock assembly according to claim 2 wherein the engaging recesses are formed to extend in a depth direction with regard to the door.

4. A universal multipoint lock according to claim 3 wherein the recesses have a rectangular cross section to engage directly with a tongue of a drive plate of a hook bolt.

5. A universal multipoint lock according to claim 4 wherein the recesses extend in a thickness direction away from the door edge in which the groove is rebated.

6. A universal multipoint lock according to any one of the preceding claims wherein the rail struts are separated and secured to a spacer member located remote from a gear box end of the rail.

7. A universal multipoint lock according to claim 6 wherein a gear box spacer member is provided at the end of the rail intended to engage with the gear box.

8. A universal multipoint lock according to claim 7 wherein the gear box spacer member has a projection extending in the thickness direction to engage with a notch formed in a drive plate of the gear box.

9. A universal multipoint lock according to claim 8 wherein the gear box is adaptable to be installed in a recess in a door leaf at either of at least two positions in the thickness direction and, the gear box spacer is adaptable by means of an adaptor to engage between the drive rail and the drive plate notch.

10. A universal multipoint lock according to claim 9 wherein the gear box thickness position is adaptable by means of an extension structure bridging between the gear box and the face plate.

11. A universal multipoint lock according to claim 10

wherein the gear box spacer adaptor can be fitted into a socket in the gear box spacer.

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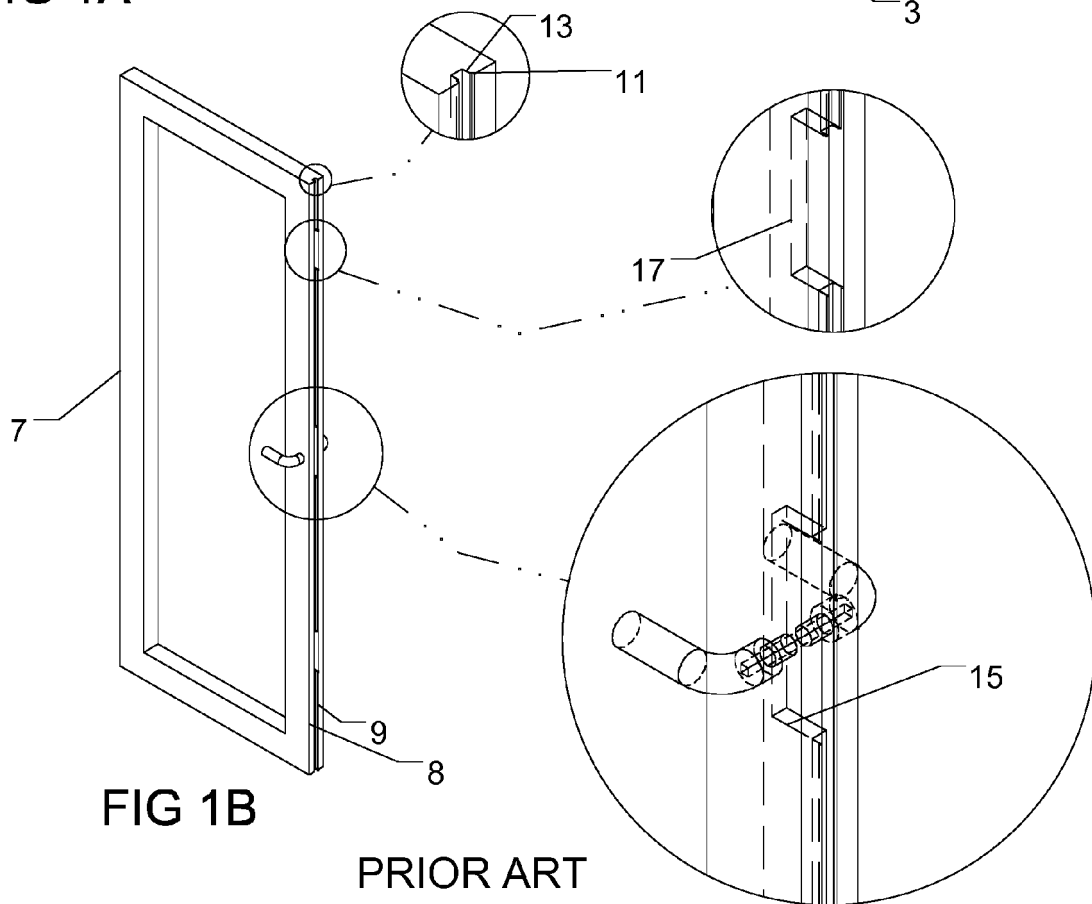
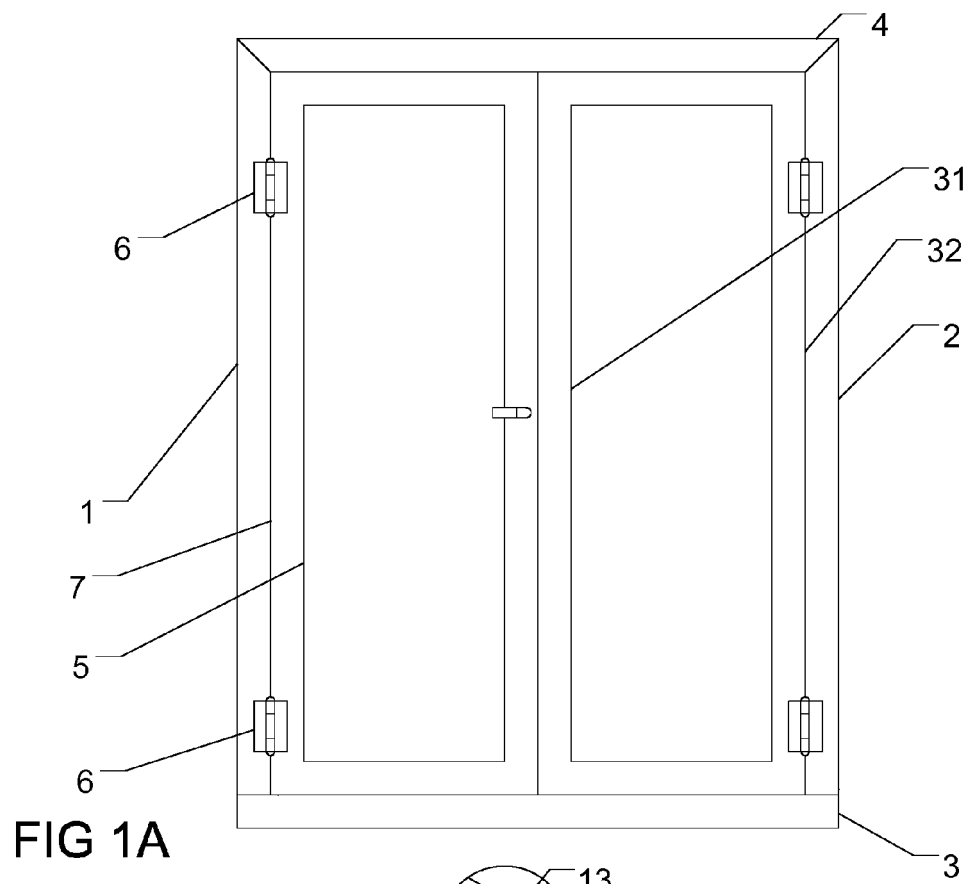
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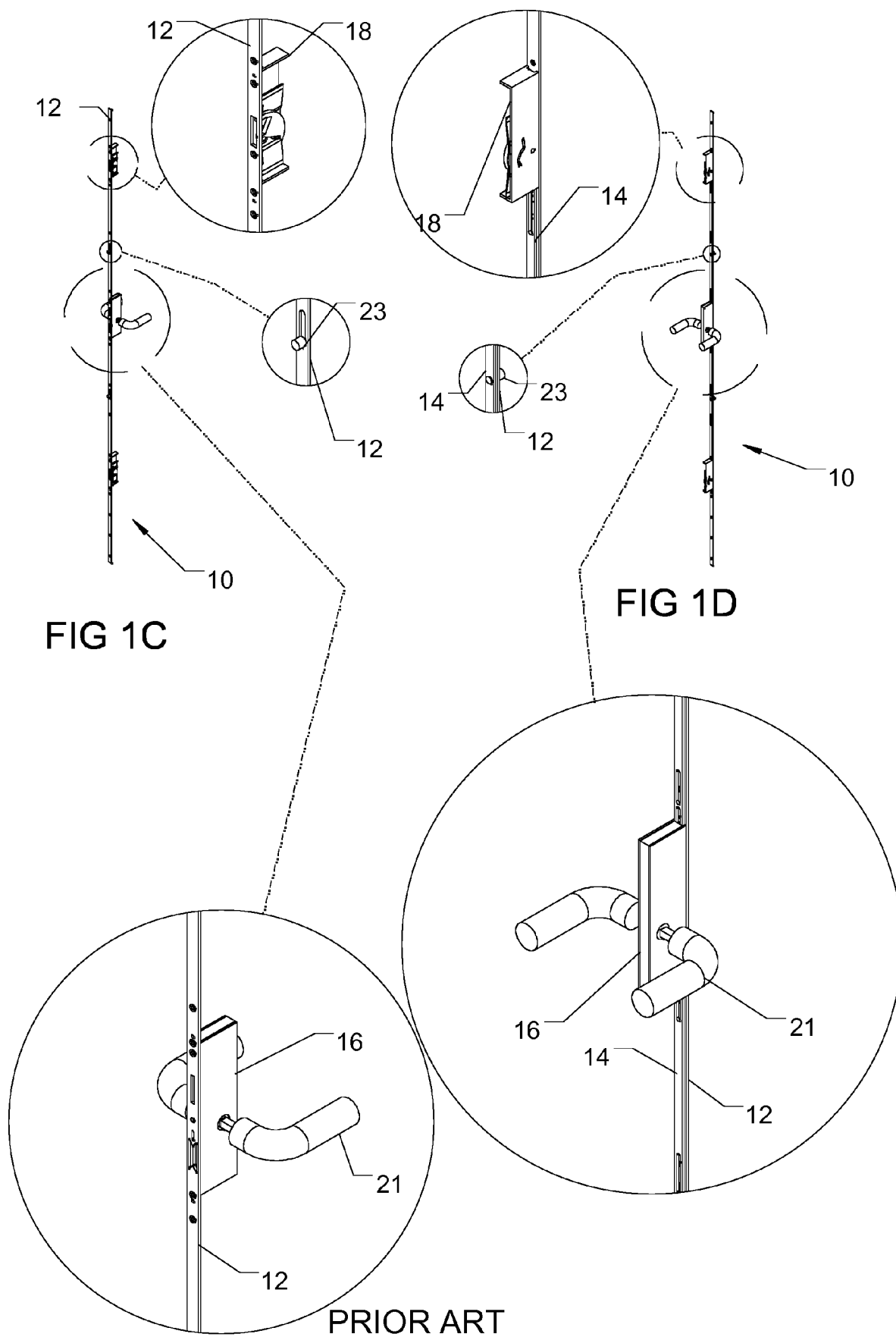
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PRIOR ART



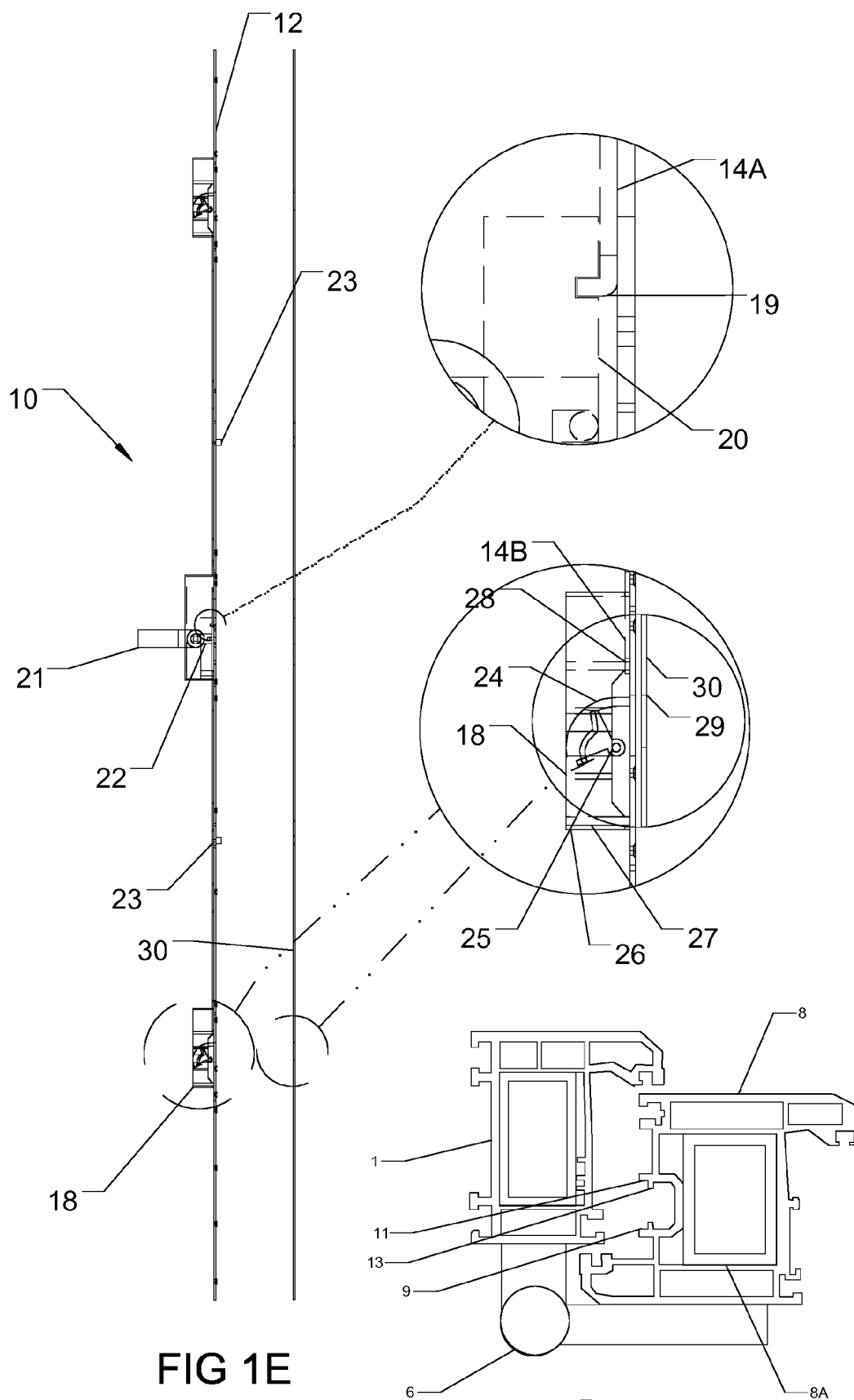
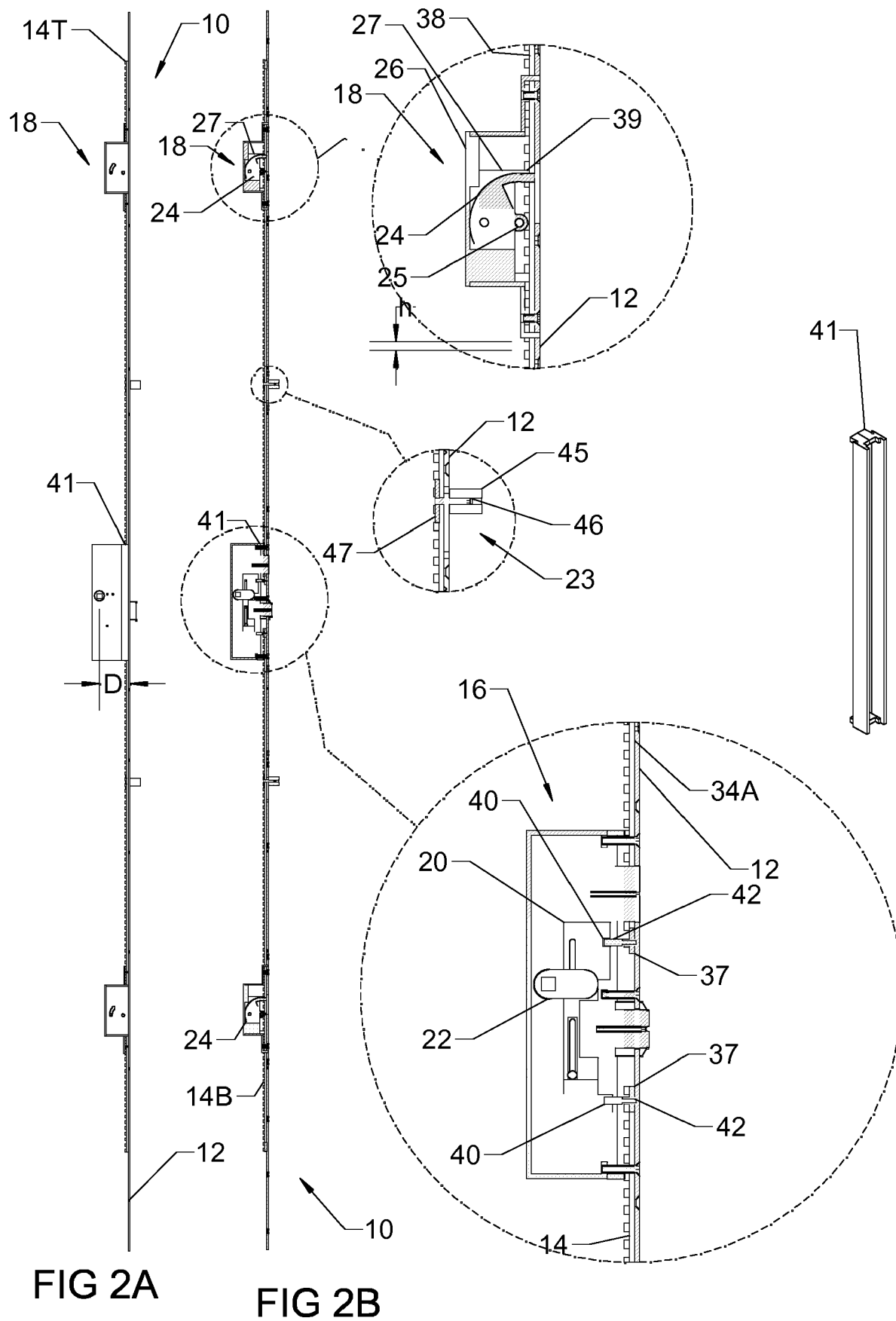
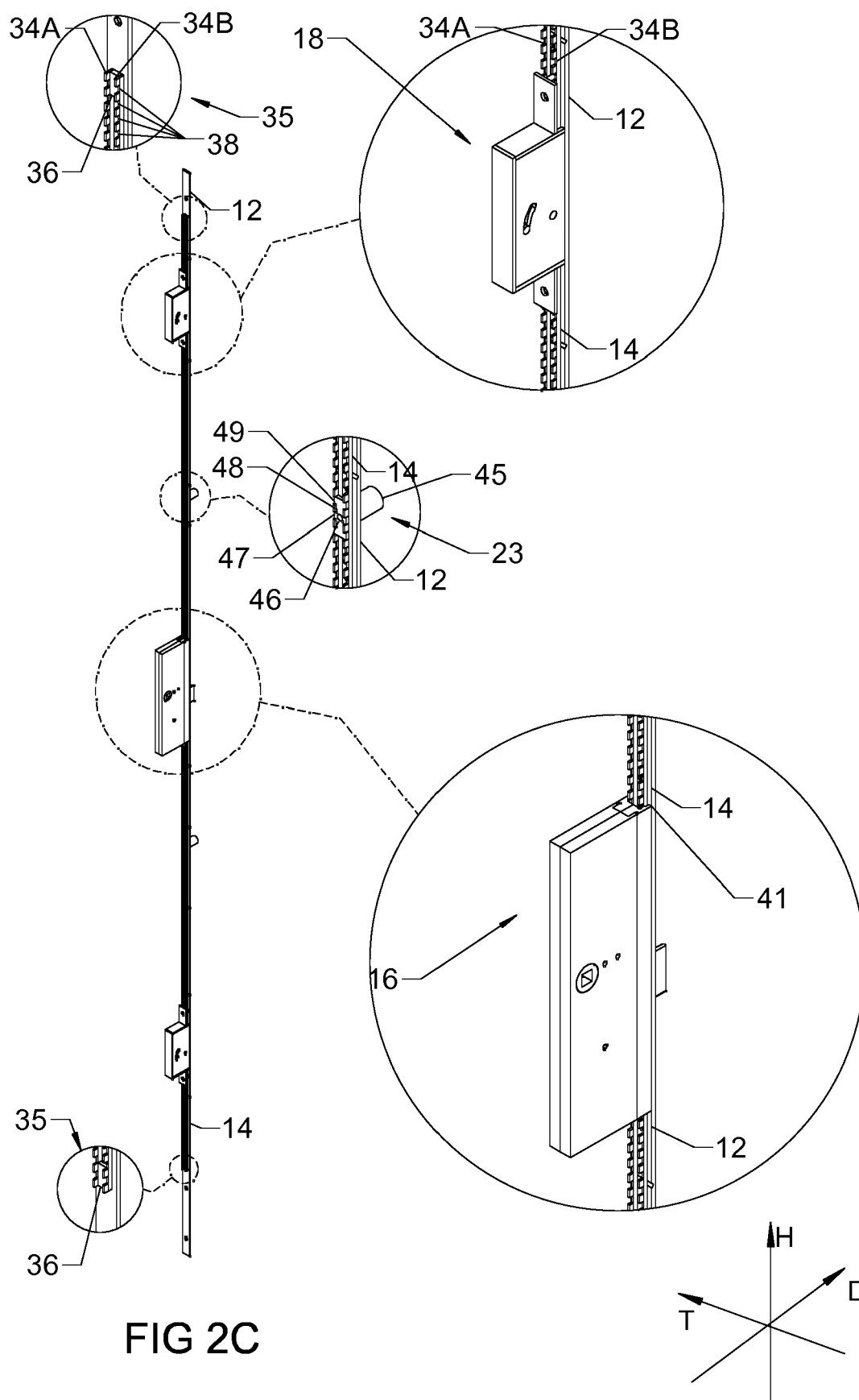
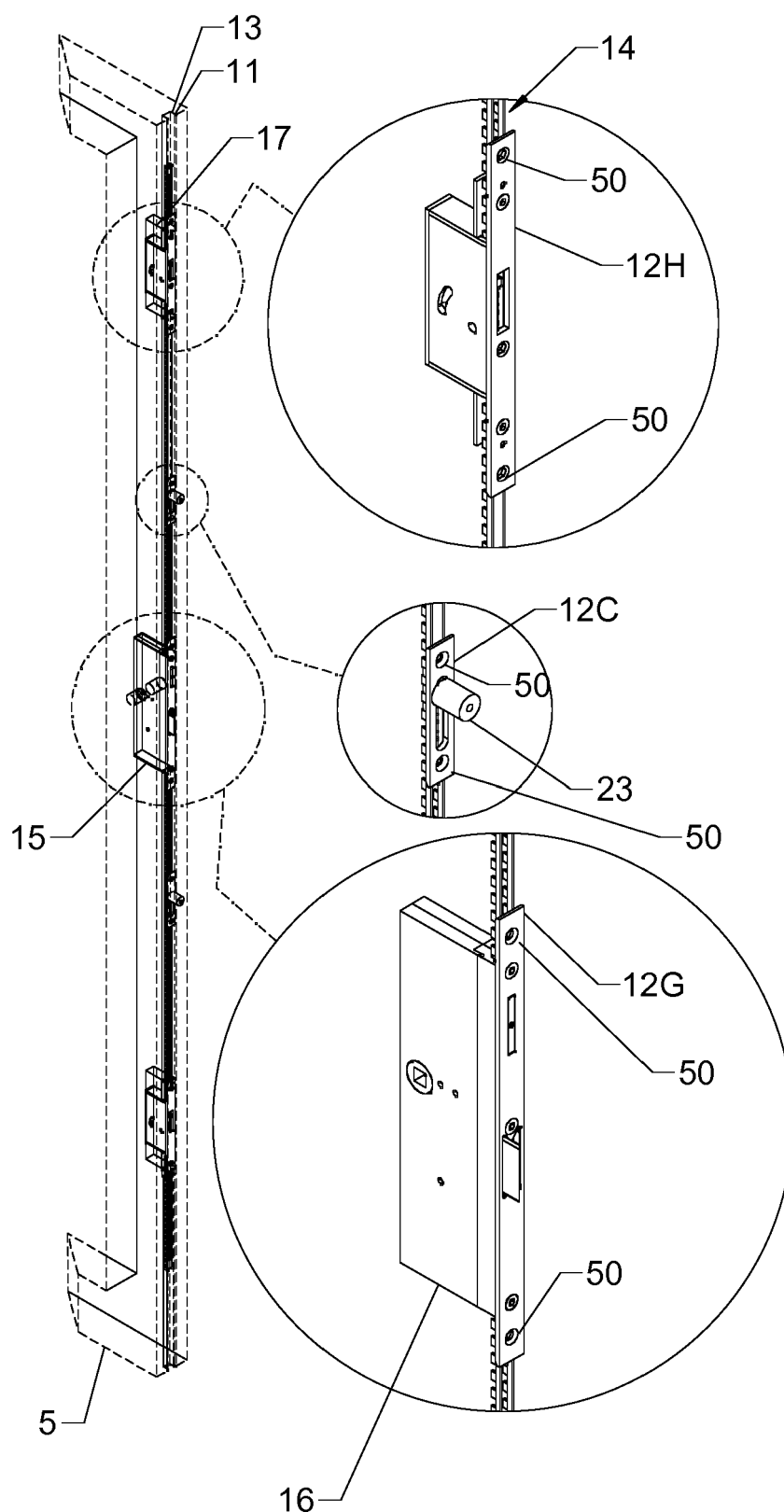


FIG 1E

PRIOR ART FIG 1F







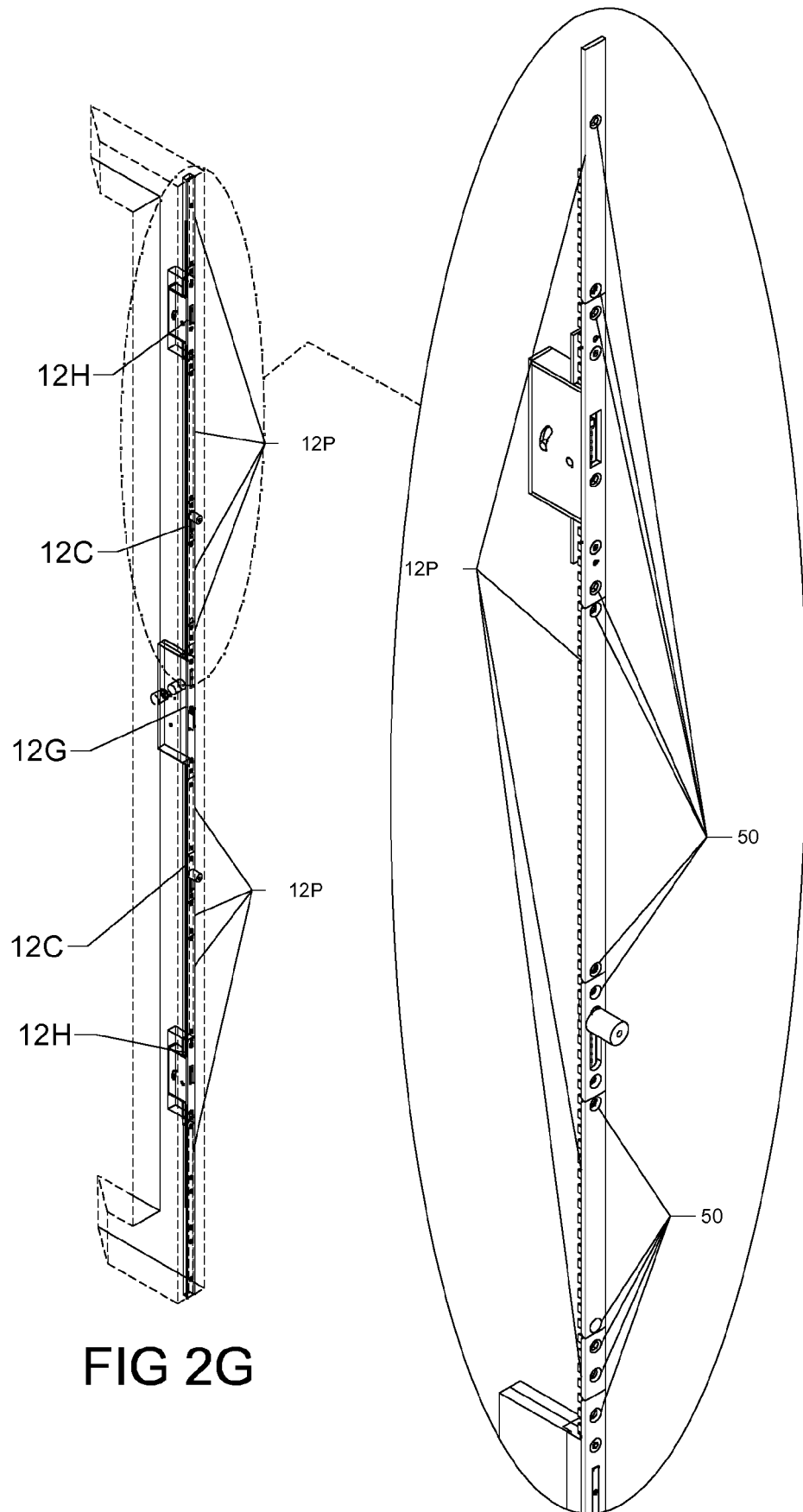


FIG 2G

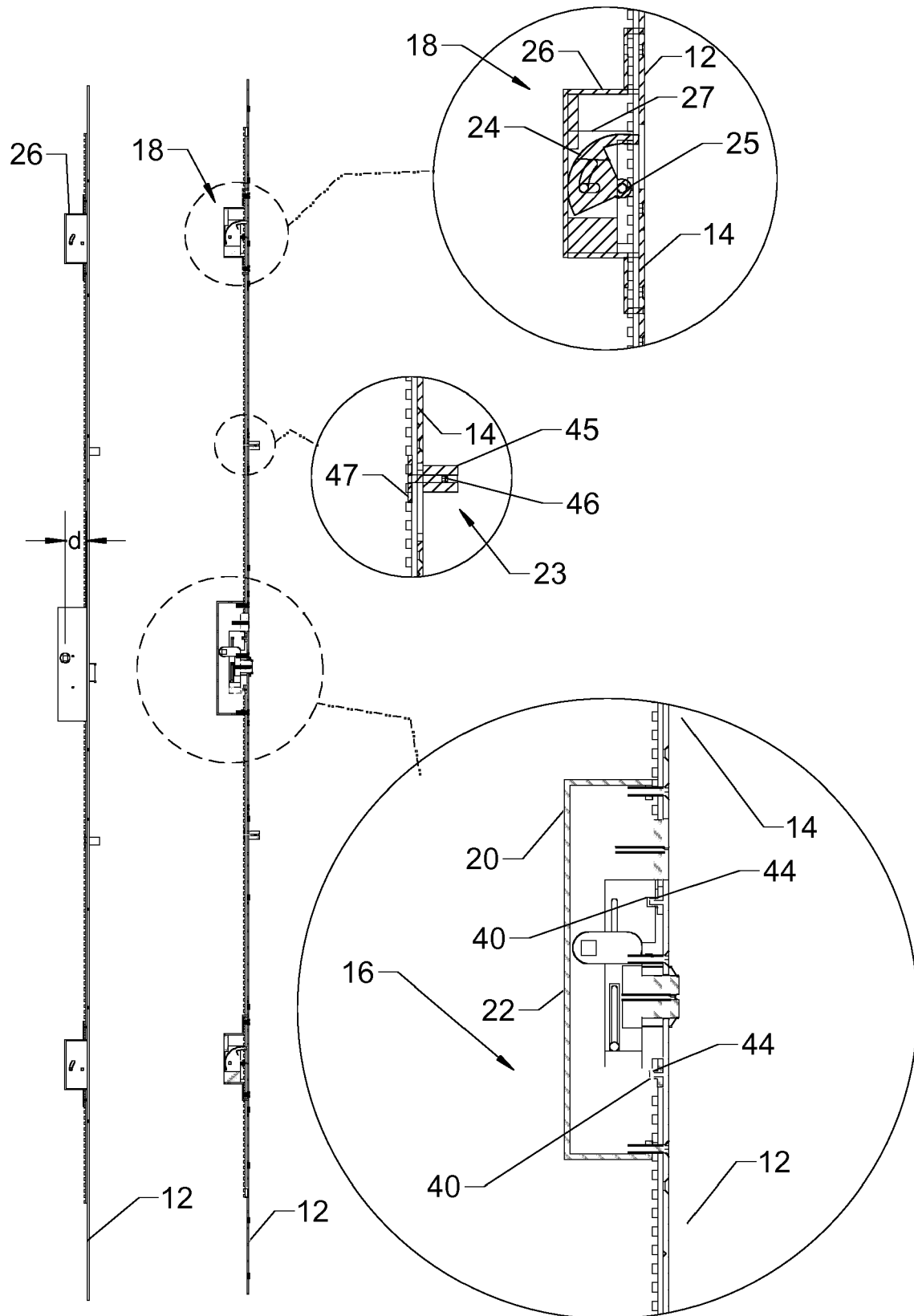


FIG 2D

FIG 2E

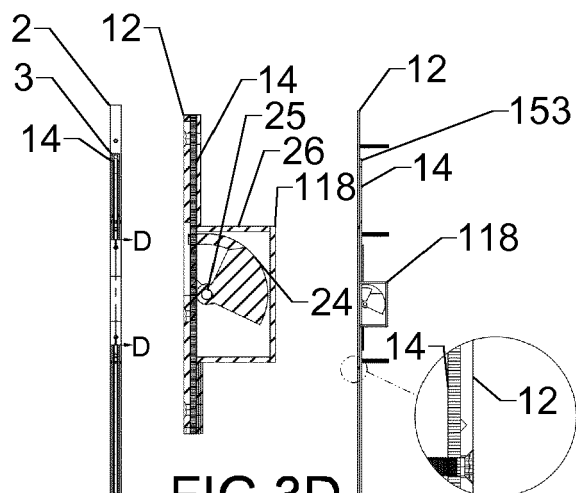


FIG 3D

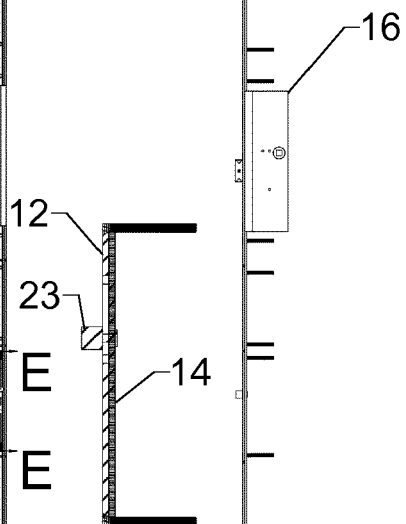


FIG 3E

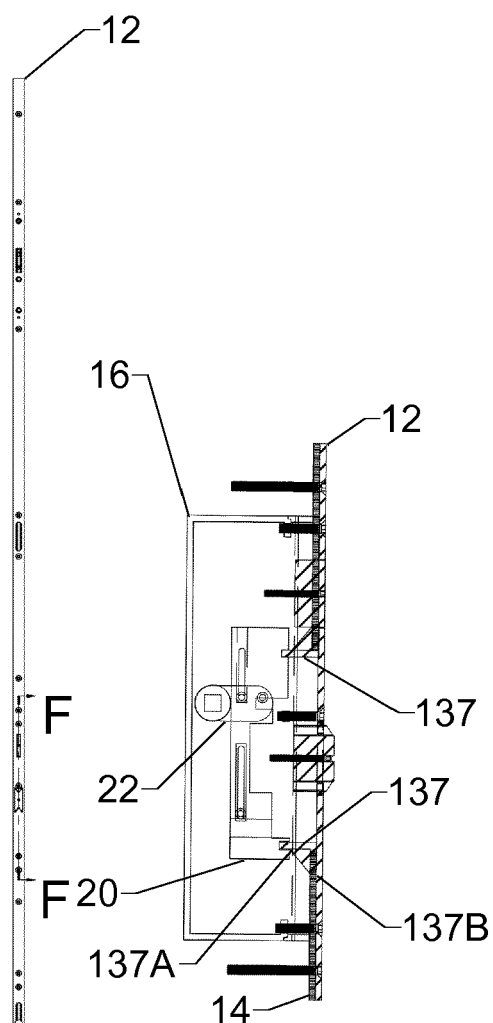
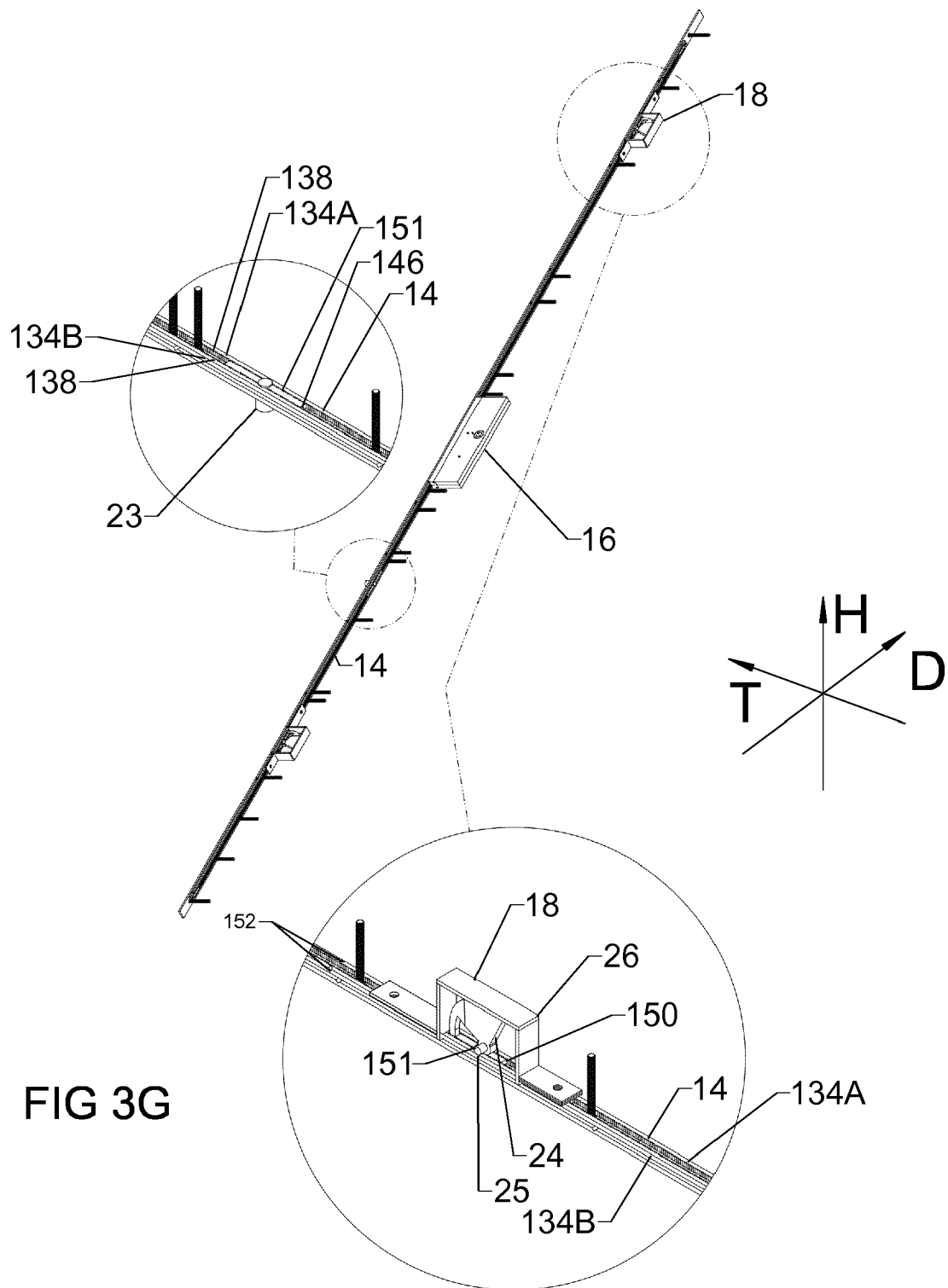


FIG 3F

FIG 3A

FIG 3B

FIG 3C





EUROPEAN SEARCH REPORT

Application Number
EP 17 27 5161

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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	EP 2 754 805 A2 (SCHÜCO INTERNAT KG [DE]) 16 July 2014 (2014-07-16) * the whole document *	1-11	INV. E05B63/00 E05C9/02 E05C9/20
A	US 7 237 811 B1 (LAWRENCE BARRY G [US]) 3 July 2007 (2007-07-03) * the whole document *	1-11	
A	US 2002/180218 A1 (TIMOTHY E ERIK [US]) 5 December 2002 (2002-12-05) * the whole document *	1-11	
A	DE 24 43 619 A1 (KELLER EBERHARD) 1 April 1976 (1976-04-01) * the whole document *	1-11	
A	GB 2 503 967 A (SPIRE HOMEWARES LTD [GB]) 15 January 2014 (2014-01-15) * the whole document *	1-11	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B E05C
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 February 2018	Examiner Robelin, Fabrice
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 17 27 5161

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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13-02-2018

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2754805 A2	16-07-2014	DE 102013100310 A1 EP 2754805 A2	17-07-2014 16-07-2014
US 7237811 B1	03-07-2007	US 7237811 B1 US 2008009444 A1	03-07-2007 10-01-2008
US 2002180218 A1	05-12-2002	CA 2388141 A1 US 2002180218 A1	30-11-2002 05-12-2002
DE 2443619 A1	01-04-1976	NONE	
GB 2503967 A	15-01-2014	NONE	

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EPO FORM P0459

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