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(54) **FOLDING PANEL ASSEMBLY FOR ARCHITECTURAL OPENINGS**

FALTPANEELANORDNUNG FÜR ARCHITEKTONISCHE ÖFFNUNGEN

ENSEMBLE PANNEAU PLIANT POUR OUVERTURES ARCHITECTURALES

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(56) References cited:
WO-A1-2014/120009 DE-A1- 2 143 530
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Description

[0001] The invention relates generally to folding panel assemblies for architectural openings, such as windows, including at least one such panel member. Often these panel members are louvered panels for interior decoration offering light, vision and ventilation control in rooms to which they are applied. Such structures are also popularly referred to as "plantation shutters". While such structures are usually arranged for interior applications, including room dividers, the construction is also adaptable for application on the outside of windows, or as outdoor dividers.

[0002] More recently the functionality of foldable panel shutters - traditionally associated with retrospective and colonial styles - has also come in demand for less traditional forms of home improvement and decoration. Such is the case with a shutter assembly for architectural openings in accordance with the document WO 2014/120009. The foldable panel shutter described in this document includes a first rectangular panel for hinged mounting to a vertical perimeter edge of the architectural opening, and a second rectangular panel hingedly connected to the first panel at a second vertical edge remote from the first vertical edge. Each of the first and second panels comprises spaced substantially parallel first and second vertical frame columns, and spaced substantially parallel top and bottom horizontal frame beams defining a rectangular perimeter frame. First and second plates coextend in a relative sliding arrangement within each perimeter frame to open and close apertures in these plates. In addition the entire panels can be folded to cover and to uncover the architectural opening.

[0003] While this form of foldable panel shutters has been successful in meeting most of the existing demands, there has remained some room for improvements. In particular the mechanical integrity of the individual panel members have sometimes been a cause for unintentional movement and noise production. The need to accommodate plates of various thicknesses, or the addition thereto of an insect screen netting require perimeter frames with slots of sufficient width. Moreover to ensure proper functioning of the sliding movement of the plates some minimal play is also necessary. With metal as a popular material for the shutter panel components noise production can become objectionable. For sealing purposes it has been known from documents DE 21 43 530 A1 and GB 1 364 583 A to incorporate resilient brush strips in a profiled rail, for guiding slidable window panes.

[0004] Furthermore, in particular with heavier folding panels, it is also important to immobilize the panel members when these are unfolded to cover an architectural opening, especially in a window opening that is used for ventilation.

[0005] Accordingly it is an object of the present invention to propose an improved folding panel assembly. In a more general sense it is thus an object of the invention to overcome or reduce at least one of the disadvantages

of the prior art. It is also an object of the present invention to provide alternative solutions which are less cumbersome in assembly and operation and which moreover can be made relatively inexpensively. Alternatively it is an object of the invention to at least provide a useful alternative.

[0006] To this end the invention provides a folding panel assembly for architectural openings as generally defined in the appended claims.

[0007] At least one panel includes a perimeter frame defined by first and second frame posts, and upper and lower frame beams, wherein the perimeter frame of the panel member defines an inwardly opening slot, and coextensive first and second plates, which are held in the respective inwardly opening slot to be relatively slidable with respect to each other. By accommodation of a resilient strip within each of the first and second frame posts of a panel member, which is positioned to extend between an inner wall of the respective first and second frame posts and an outer surface of the respective one of the coextensive first and second plates, as well as longitudinally of each first and second frame posts, rattling noises can successfully be prevented. As an additional benefit the width of the inwardly opening slot of the perimeter frame becomes less critical, and can be made wide enough to alternatively receive a third plate. Optionally the resilient strip can be affixed to an outer surface of the respective one of the coextensive first and second plates. Advantageously the resilient strip is a brush strip, such as one that has extending flexible bristle strands engaging the inner surface of the relevant first and second frame posts. Such a resilient strip exerts only a light biasing pressure and does not cause any significant amount of friction.

[0008] Such panel members can be used for interior applications, such as for windows and as room dividers. The construction, however, is also adaptable for application on the outside of windows, or as outdoor dividers, such as in accordance with NL 2004086. More in particular such panel members can be mounted in a fixed or a movable relationship to a building structure, or window opening. When in a fixed relationship, the panel member can be affixed to a window frame. In a movable relationship, the panel member can be hinged to a perimeter portion of an architectural opening or to a similar panel member, such as in WO 2014/120009, it can be arranged to be slideable along a rail or a channel, or it can be supported on wheels or rollers. It is also conceivable that the panel member forms part of a room divider or separation wall, such as an arrangement in accordance with NL 2003953.

[0009] In a further alternative arrangement the panel member can, further include a third plate coextending with the first and second plates of the panel member and be interposed between confronting ones of the first and second plates. In this case the resilient profiles will ensure that only perimeter frames with one single slot width need to be stocked. As a further option the third plate can be

relatively slidable with respect to the confronting first and second plates. In particular this is useful when the third plate has at least one of a material or configuration, which differs from each of the first and second plates.

[0010] The construction can be further simplified when in the panel member the first plate is fixed and only the coextensive second plate is slidable. Optionally an operating slider can then be connected to the slidable second plate, and extend through a slit in one of the first or second frame posts from an interior to an exterior thereof.

[0011] When in the panel member the first plate is fixed and the coextensive second plate is slidable, with an operating slider connected to the slidable second plate, and extending through a slit in one of the first or second frame posts from an interior to an exterior thereof, then the third plate can be relatively slidable with respect to the confronting first and second plates, and a further operating slider can be connected to the slidable third plate, and extend through a further slit in one of the first or second frame posts from an interior to an exterior thereof. Optionally the operating slider can then extend on one side of the panel member, while the further operating slider can extend from an opposite side of the panel member. Such an arrangement could be very convenient for a user, in that it becomes very easy to distinguish between the different functions of such a product.

[0012] As a further option a folding panel assembly for architectural openings can include at least one such panel member as first and second panel members, a mounting post for mounting to a substantially vertical perimeter portion of an architectural opening, a first hinge connected to the mounting post, the first panel member having its first frame post pivotally mounted by the first hinge, a second hinge connected to the second frame post of the first panel member, and the second panel member having its first frame post pivotally mounted by the second hinge. An abutment profile can be provided for mounting along a substantially horizontal top or bottom portion of an architectural opening. This will help to align the folding panels when these are covering an architectural opening. In this regard it is an advantageous option when the abutment profile will be arranged to extend along a horizontal top portion of the architectural opening. In this way the abutment profile will hardly form an obstruction in a window opening, a door opening, or like architectural opening. In such an arrangement the perimeter frame of at least the second panel member and the abutment profile can be made to magnetically attract one another. Such an arrangement will effectively immobilize the folding panels when covering an architectural opening, especially one used for ventilation. In combination with this option the magnetic attraction can be made to results from only one permanent magnet included in one of the perimeter frame of the second panel member and the abutment profile, when for instance one of these contains a ferromagnetic material. If not the magnetic attraction can additionally results from at least one further permanent magnet having opposite polarity, or a ferromagnetic el-

ement in the other of the perimeter frame and the abutment profile. Accordingly the relevant magnet or ferromagnetic element in the perimeter frame of at least the second panel member can be located in at least one of the first and second frame posts. Likewise a relevant one of the magnet or ferromagnetic element in the perimeter frame of at least the second panel member can also be located in the upper frame beam. This makes for easy assembly of the folding panel assembly in that the relevant continuous cross section profiles can be arranged with a channel for accommodating the magnets or ferromagnetic elements.

[0013] Further advantageous aspects of the invention will become clear from the appended description and in reference to the accompanying drawings, in which:

Figure 1 illustrates an architectural opening fitted with a folding panel assembly according to the invention;

Figure 2 is a partial exploded view of an upper portion of a panel assembly according to the invention;

Figure 3 is a partial view showing the hinges of the panel members and plate operating sliders;

Figure 4 is a frontal elevation of a folding panel assembly as shown in Figure 1;

Figure 5 is a crcss section according to the arrows V-V in Figure 4;

Figure 6 is a cross section according to the arrows VI-VI in Figure 4;

Figure 6A is a cross section similar to Figure 6, but showing an alternative with three coextensive plates;

Figure 7 is a cross section according to the arrows VII-VII in Figure 4;

Figure 8 is a cross section according to the arrow VIII-VIII in Figure 4;

Figure 8A is a cross section similar to Figure 8, but showing an alternative with three coextensive plates; and

Figure 9 is an exploded view of the alternative folding panel assembly with three coextensive plates in each panel member.

[0014] In Figure 1 a folding panel assembly 1 is shown mounted in an architectural opening in the form of a glazed window opening 3 in a building wall 5. The window 3 includes a window sill 7 and a window surround 9, which can be of wood, metal or plastic. Mounted to a vertical portion of the window surround 9 is affixed a vertical mounting post 11. The mounting post 11 received a vertical auxiliary post 13 that is angularly and telescopically adjustable with respect to the mounting post 11. The adjustability of the auxiliary post 13 with respect to the mounting post 11 ensures that slight deviations in the vertically or from the nominal dimensions can be accommodated by the adjustability between the auxiliary post 13 and the mounting post 11. The auxiliary post 13 is associated with a first hinge 15 for pivotally supporting a first panel assembly 17. The first panel assembly 17 is

defined by a substantially rectangular perimeter frame of first and second frame posts 19, 21 and upper and lower beams 23, 25. Held within the contours of this perimeter frame is a plate assembly 27. The plate assembly 27 as will be explained below is composed of at least one pair of coextensive plates, each having openings 29 alternated with closed portions. By relatively moving the coextensive plates the openings 29 can be closed or opened. For adjustment of the coextensive plates of the plate assembly 27, an operating slider 31 is arranged on the second frame post 21. The second frame post 21 is associated with a second hinge 33, which supports a second panel assembly 35. The second panel assembly 35 is very similar to the first panel assembly in also having a substantially rectangular perimeter frame defined by first and second frame posts 37, 39 and upper and lower beams 41, 43. Again a plate assembly 45 is held within contours of this perimeter frame. The plate assembly 45, like plate assembly 27, is an assembly of at least two relatively movable and coextensive plates. An operating slider 47 is provided on the first vertical frame post 37 to open or close the openings 49 of the second panel assembly 35.

[0015] The first and second panel members 17, 35 are shown in a position in which these cover a part of the window opening 3. A right hand part of the window opening 3 in Figure 1 is shown as partly uncovered by a further arrangement of third and fourth panel members 51, 53, which are folded outwardly about their respective hinges of which a third hinge 55 is visible. Thereby it is also revealed that the first, second, third and fourth panels when covering the windows opening abut against an abutment profile 57. The abutment profile 57 is affixed along an upper portion of the window surround 9. The third and fourth panel members 51, 53 are practically mirrored versions of the first and second panel members 17, 35.

[0016] Thus in as far as visible in Figure 1, the fourth panel assembly 53 is again composed of first and second frame posts 57, 61 and upper and lower frame beams 63, 65 defining a rectangular perimeter frame. A further plate assembly 67 is held by this perimeter frame and has openings 69. The openings 69 can be closed by sliding down the operating slider 71. By positioning the operating sliders 31, 47, 71 adjacent to the second and third hinges 33, 55, which are positioned between adjacent panel members the slider knobs can also be used to fold the panel members away from the window opening 3.

[0017] It is further evident from Figure 1 that a window opening 3 that would be less wide than the one illustrated, may alternatively be corrected by only two panel members, rather than four panel members as is the case in Figure 1.

[0018] Referring now to Figure 2 an upper portion of a folding panel assembly 1, similar to that of Figure 1, is shown in a closed and partly exploded arrangement. Similar parts have been identified by reference numerals already identified with respect to Figure 1. Since Figure 2

is also viewed from a different direction as Figure 1 and without a window opening, it is now possible to identify the third panel assembly 51 in more detail. The third panel assembly 51 is hinged to a further vertical auxiliary post 73 by a fourth hinge 75. The further auxiliary post 73 is adjustably affixed to a further vertical mounting post 77. This third panel assembly 51 is further likewise composed of first and second frame posts 79, 81 of a rectangular perimeter frame holding a plate assembly 83 with closable openings 85. Only an upper frame beam 87 is shown as the third panel assembly 51, while on the first panel assembly 17 the upper frame beam has been deleted to show the edge of the plate assembly 27. More clearly shown in Figure 2 is also the abutment profile 57 which extends behind the folding panel members 17, 35, 53, 51. Magnets 89 are associated with the abutment profile 57 for mounting therein to retain, in use, the folding panel assembly in a closed position when it is covering a window opening. When the first to fourth panel members 17, 35, 53, 51 are of a different metal or material than steel contra magnets or steel plates can be incorporated in the relevant upper frame beams 23, 41, 63, 87 to render the magnets 89 effective. The magnets 89 will thereby prevent rattling, or unintended opening of the folding panel assembly 1.

[0019] In the fragmentary view of Figure 3, it is shown that the plate members 27, 45 of the first and second panel members 17, 35 each include a first aperture plate 27A, 45A and a coextensive second aperture plate 27B, 45B. The first and second aperture plates 27A, 27B, 45A, 45B are relatively slidable to minimize or maximize the overlap of the openings 29, 49 in each of the aperture plates. In the example presently described the first aperture plates 27A, 45A are stationary fixed to their respective perimeter frames, of which only the vertically extending frame posts 19, 21, 37 are visible in Figure 3. The second aperture plates 27B, 45B in this example are slidable in a vertical direction with respect to the perimeter frames of panel members 17, 35. Minimizing the overlap of the relevant apertures 29, 49 and thereby closing the respective panel members 17, 35 is accomplished by moving the operating sliders 31, 47 in one direction. Maximizing the overlap of the relevant apertures 29, 49, and thereby opening the respective panel members 17, 35 is accomplished by moving the operating slides 31, 47 in an opposite direction. In Figure 3 the panel members 17, 35 are shown in an intermediate position with the opening 29, 49 reduced to a half of their maximum. Figure 4 is a frontal view of a folding panel assembly 1 similar to Figure 1, but with all panels in a position to extend over a window opening. As visible in this view the third panel assembly 51 has a lower frame beam 9 and an operating slider 93.

[0020] In figure 4 it is further indicated that Figure 5 is a partial cross section according to the line V-V. Figure 6 is a partial cross section according to the line VI-VI in Figure 4. Figure 7 is a cross section according to the lines VII-VII in Figure 4. Figure 8 is a partial cross section according to the line VIII-VIII in Figure 4.

[0021] As shown in the cross-section V-V in Figure 5 the abutment profile 57 can be generally L-shaped, and have a leg that extends above the panel assembly 35. A further magnet 95 is incorporated in the upper frame beam 41, or alternatively in an upper end of the vertical frame beam 37, to attract the magnet 89 in the abutment profile 57. As will be understood one of the magnets 89, 95 may be replaced by an iron plate if the magnetic attraction is sufficient.

[0022] Figure 6 is the cross section according to line VI-VI in Figure 4 and additionally shows an adjustment arrangement 97 for telescopic and angular adjustment of the auxiliary post 13 with respect to the mounting post 11. The first hinge 15 is pivotally joined to a hook formation 13A of the auxiliary post 13 and a hook formation 19A integrally formed with the first frame post 19. The first frame post 19 also has an elongate slot 19B therein for accommodating and guiding therein of the coextensive first and second aperture plates 27A, 27B. For the same purpose the lower frame beam 25 also has an elongate slot 25A. Because the thickness and/or number of the coextensive plates 27A, 27B of the plate assembly 27 may vary, the slots 19B and 25A are sufficiently wide to allow for such variations. As can be seen in Figure 6 a brush strip 99 is provided on the left hand edge of the coextensive plates 27A, 27B to exert a light resilient pressure that urges the plates 27A, 27B to one side edge of the slots 19B, 25A. This ensures that a thinner packet of coextensive plates does not rattle in its surrounding frame, when subjected to a gust of wind, or the like.

[0023] Figure 6A is a variation, which has a third plate 27C interposed between the first and second aperture plates 27A, 27B. This third plate 27C is here also in the form of an adjustable plate, which can be operated by an additional operating slider 101 positioned on a rear side of the first frame post 19.

[0024] Figure 7 is a cross section that is representative for the line VII-VII indicated in Figure 4 across both the second hinge 33, as well as the third hinge 55. Accordingly the relevant reference numerals for both identical cross sections are given, separated by commas. Further brush strips 99 are also provided on the right hand edge of each of the plate assemblies 27, 67, as well as on the left hand edge of each plate assembly 45, 83 for the same purpose as described above.

[0025] In Figure 8 the cross section according to the line VIII-VIII in Figure 4 is shown. It is seen here that the second vertical frame post 39 of the second panel assembly 35 has a flanged portion 39A extending therefrom, while a similar flange portion 61A extends from the second frame post of the fourth panel assembly 53. Meeting sides of the flanged portions 39A, 61A are each provided with an undercut groove in which one of a magnetic strip 103 is accommodated. The magnetic strips 103 mutually attract one another and ensure that the second frame posts 39, 61 of the second and fourth panel members 35, 53 are disconnectably held together when the foldable panel assembly 1 is covering an architectural

opening. This will also prevent any unintended movement or unwanted noises. Brush strips 99 are again provided to resiliently bias the relevant edges of the plate assemblies 45A, 45B, 67A, 67B toward one side of the slots 39B, 43A, 61B, 65A of the perimeter frames.

[0026] Figure 8A is again a variation as is Figure 6A, with further intermediate plates 45C, 67C interposed between the first and second aperture plates 45A, 45B, 67A, 67B. Optionally when the intermediate plates 45C, 67C are adjustable, further operating sliders 105 may be provided to extend from a rear side of the second frame posts 39, 61.

[0027] Figure 9 is an exploded view of the variation referred to in Figures 6A and 8A, which has further intermediate plates 27C, 45C interposed between the respective first and second aperture plates 27A, 27B, 45A, 45B. The further intermediate plates 27C, 45C can be a translucent, buty for example tinted material. When the intermediate plates 27C, 45C are also provided with apertures 29C, 49C that correspond to the other apertures of the outer aperture plates 27A, 27B, 45A, 45B then an additional option of filtered light admission through tinted plate sections can be selected by actuation of the additional and further operating sliders 103, 105. It is also conceivable that the third plate has a series of openings or apertures that is configured differently from the first and second plates, so as to thereby offer a selection of different apertures, which may be closed and opened by relative movement of the first and second plates. Other options for the intermediate plates 27C, 45C are also conceivable and within the capacity of a skilled person.

[0028] It is further illustrated in Figure 9 that the frame posts 19, 21, 37, 39 are connected the relevant upper and lower frame beams 23, 25, 41, 45 by means of corner connectors 107.

[0029] Thus a folding panel assembly (1) for architectural openings (3) is described, that includes a mounting post 11 (77) for mounting to a substantially vertical perimeter portion of an architectural opening. A first (fourth) hinge 15 (75) is connected to the mounting post (11 (77)), a first (third) panel member 17 (51) has a first frame post 19 (79) that is pivotally mounted by the first hinge, a second (third) hinge 33 (55) connected to a second frame post 21 (81) of the first panel member. A second (fourth) panel member 35 (53) having a first frame post 37 (59) pivotally mounted by the second (third) hinge 33 (55). Each of the first (third) and second (fourth) panel members 17, 35 (51, 53) comprises a perimeter frame defined by first and second frame posts 19, 21, 37, 39 (79, 81, 59, 61), and upper and lower frame beams 23, 25, 41, 43 (87, 91, 63, 65). Each perimeter frame of the first (third) and second (fourth) panel members 17, 35 (51, 53) defines an inwardly opening slot 19B, 25A, 39B, 43A (61B, 65A), and is provided with coextensive first and second plates 27A, 27B, 45A, 45B (83A, 83B, 67A, 67B), which are held in the respective inwardly opening slot to be relatively slidable with respect to each other. A resilient strip (99) is accommodated within each of the first and

second frame posts 19, 21, 37, 39 (79, 81, 59, 61), and positioned to extend between an inner wall of the respective first and second frame posts and an outer surface of the respective one of the coextensive first and second plates 27A, 27B, 45A, 45B (83A, 83B, 67A, 67B), as well as longitudinally of each first and second frame posts.

[0030] It is thus believed that the operation and construction of the present invention will be apparent from the foregoing description and drawings appended thereto. For the purpose of clarity and a concise description features are described herein as part of the same or separate embodiments, however, it will be appreciated that the scope of the invention may include embodiments having combinations of all or some of the features described. It will be clear to the skilled person that the invention is not limited to any embodiment herein described and that modifications are possible which may be considered within the scope of the appended claims. Also kinematic inversions are considered inherently disclosed and can be within the scope of the invention. In the claims, any reference signs shall not be construed as limiting the claim. The terms 'comprising' and 'including' when used in this description or the appended claims should not be construed in an exclusive or exhaustive sense but rather in an inclusive sense. Thus expression as 'including' or 'comprising' as used herein does not exclude the presence of other elements, additional structure or additional acts or steps in addition to those listed. Furthermore, the words 'a' and 'an' shall not be construed as limited to 'only one', but instead are used to mean 'at least one', and do not exclude a plurality. Features that are not specifically or explicitly described or claimed may additionally be included in the structure of the invention without departing from its scope. Expressions such as: "means for ..." should be read as: "component configured for ..." or "member constructed to ..." and should be construed to include equivalents for the structures disclosed. The use of expressions like: "critical", "preferred", "especially preferred" etc. is not intended to limit the invention. To the extent that structure, material, or acts are considered to be essential they are inexpressively indicated as such. Additions, deletions, and modifications within the purview of the skilled person may generally be made without departing from the scope of the invention, as determined by the claims.

Claims

1. Folding panel assembly (1) for architectural openings (3), including:

first and second panel members (17; 35; 51; 53) amounting post (11, 77) for mounting to a substantially vertical perimeter portion of an architectural opening;
a first hinge (15; 75) connected to the mounting post (11, 77);

the first panel member (17; 51) having its first frame post (19; 79) pivotally mounted by the first hinge (15; 75);

a second hinge (33; 55) connected to the second frame post (21, 81) of the first panel member (17; 51); and

the second panel member (35; 53) having its first frame post (37; 59) pivotally mounted by the second hinge (33; 55), wherein at least one panel member (17; 35; 51; 53) forming part of the first and second panel members, includes a perimeter frame defined by first and second frame posts (19, 21, 37, 39; 79, 81, 59, 61) and upper and lower frame beams (23, 25, 41, 43; 87, 91, 63, 65) wherein the perimeter frame of the panel member defines an inwardly opening slot (19B, 25A, 39B, 43A; 61B, 65A) and coextensive first and second plates (27A, 27B, 45A, 45B; 83A, 83B, 67A, 67B) which are held in the respective inwardly opening slot to be relatively slidable with respect to each other, **characterized in that** a resilient strip (99) is accommodated within each of the first and second frame posts (19, 21, 37, 39; 79, 81, 59, 61) and positioned to extend between an inner wall of the respective first and second frame posts and an outer surface of the respective one of the coextensive first and second plates (27A, 27B, 45A, 45B; 83A, 83B, 67A, 67B), as well as longitudinally of each first and second frame posts.

2. Folding panel assembly according to claim 1, further comprising an abutment profile (57) for mounting along a substantially horizontal top or bottom portion of an architectural opening.
3. Folding panel assembly according to claim 2, wherein the abutment profile (57) is arranged to extend along a horizontal top portion of the architectural opening.
4. Folding panel assembly according to claim 3, wherein the perimeter frame of at least the second panel member and the abutment profile are magnetically attracted to each other.
5. Folding panel assembly according to claim 4, wherein the magnetic attraction results from at least one permanent magnet (89; 95) included in one of the perimeter frame of the second panel member and the abutment profile.
6. Folding panel according to claim 5, wherein the magnetic attraction further results from at least one of a further permanent magnet (95; 89) having opposite polarity, or a ferromagnetic element in the other of the perimeter frame and the abutment profile.

7. Folding panel assembly according to claim 6, wherein the relevant magnet or ferromagnetic element in the perimeter frame of at least the second panel member is located in at least one of the first and second frame posts. 5
8. Folding panel assembly according to claim 6 or 7, wherein a relevant one of the magnet or ferromagnetic element in the perimeter frame of at least the second panel member is located in the upper frame beam. 10
9. Folding panel assembly according to one of claims 1 to 8, wherein the resilient strip (99) of the at least one panel member is affixed to the outer surface of the respective one of the coextensive first and second plates. 15
10. Folding panel assembly according to one of claims 1 to 9, wherein the resilient strip (99) of the at least one panel member is a brush strip. 20
11. Folding panel assembly according to claim 10, wherein the brush strip has extending flexible bristle strands engaging the inner surface of the relevant first and second frame posts 25
12. Folding panel assembly according to one of claims 1 to 11, wherein the at least one panel further includes a third plate (27C) coextending with the first and second plates (27A, 27B) of the panel member and interposed between confronting ones of the first and second plates. 30
13. Folding panel assembly according to claim 12, wherein the third plate is relatively slidable with respect to the confronting first and second plates. 35
14. Folding panel assembly according to claim 12 or 13, wherein the third plate has at least one of a material or configuration, which differs from each of the first and second plates. 40
15. Folding panel assembly according to one of claims 1 to 14, wherein in the at least one panel member the first plate is fixed and the coextensive second plate is slidable. 45
16. Folding panel assembly according to claim 15, wherein an operating slider is connected to the slidable second plate, and extends through a slit in one of the first or second frame posts from an interior to an exterior thereof. 50
17. Folding panel assembly according to claim 12, wherein in the at least one panel member the first plate is fixed and the coextensive second plate is slidable, wherein an operating slider is connected to 55

the slidable second plate, and extends through a slit in one of the first or second frame posts from an interior to an exterior thereof, wherein the third plate is relatively slidable with respect to the confronting first and second plates, and wherein a further operating slider is connected to the slidable third plate, and extends through a further slit in one of the first or second frame posts from an interior to an exterior thereof.

18. Folding panel assembly according to claim 17, wherein the operating slider extends on one side of the panel member, and the further operating slider extends from an opposite side of the panel member.

Patentansprüche

1. Faltpaneeelanordnung (1) für architektonische Öffnungen (3), umfassend:

erste und zweite Paneelelemente (17; 35; 51; 53);

einen Montagepfosten (11, 77) zum Montieren eines im Wesentlichen vertikalen Perimeterabschnitts einer architektonischen Öffnung;

ein erstes Scharnier (15; 75), das mit dem Montagepfosten (11, 77) verbunden ist;

wobei ein erster Rahmenpfosten (19; 79) des ersten Paneelelements (17; 51), drehbar durch das erste Scharnier (15; 75) montiert ist;

ein zweites Scharnier (33; 55), das mit dem zweiten Rahmenpfosten (21, 81) des ersten Paneelelements (17; 51) verbunden ist, und wobei ein erster Rahmenpfosten (37; 59) des zweiten Paneelelementes (35; 53) drehbar durch das zweite Scharnier (33; 55) montiert ist,

wobei mindestens ein Paneelelement (17; 35; 51; 53), das einen Teil des ersten und zweiten Paneelelements bildet, einen Perimeterrahmen umfasst, der durch den ersten und zweiten Rahmenpfosten (19, 21, 37, 39; 79, 81, 59, 61) und obere und untere Rahmenbalken (23, 25, 41, 43; 87, 91, 63, 65) definiert ist;

wobei der Perimeterrahmen des Paneelelements einen nach innen gerichteten Öffnungsschlitz (19B, 25A, 39B, 43A; 61B, 65A) und flächengleiche erste und zweite Platten (27A, 27B, 45A, 45B; 83A, 83B, 67A, 67B) definiert, die in dem entsprechenden nach innen gerichteten Öffnungsschlitz gehalten werden, um gegeneinander relativ verschiebbar zu sein, dadurch charakterisiert, dass eine elastische Leiste (99) jeweils innerhalb der ersten und zweiten Rahmenpfosten (19, 21, 37, 39; 79, 81, 59, 61) untergebracht ist und so positioniert ist, dass sie sich zwischen einer Innenwand der entsprechenden ersten und zweiten Rahmenpfosten und einer

- Außenfläche einer der entsprechenden flächengleichen ersten und zweiten Platten (27A, 27B, 45A, 45B; 83A, 83B, 67A, 67B) sowie in Längsrichtung jeweils des ersten und zweiten Rahmenpfostens erstreckt.
2. Faltpaneelordnung nach Anspruch 1, des Weiteren umfassend ein Widerlagerprofil (57) zum Montieren entlang eines im Wesentlichen horizontalen oberen oder unteren Abschnitts einer architektonischen Öffnung.
 3. Faltpaneelordnung nach Anspruch 2, wobei das Widerlagerprofil (57) so angeordnet ist, dass es sich entlang eines horizontalen oberen Abschnitts der architektonischen Öffnung erstreckt.
 4. Faltpaneelordnung nach Anspruch 3, wobei der Perimeterrahmen von mindestens dem zweiten Paneelelement und das Widerlagerprofil einander magnetisch anziehen.
 5. Faltpaneelordnung nach Anspruch 4, wobei die magnetische Anziehung von mindestens einem Dauermagnet (89; 95) resultiert, der entweder im Perimeterrahmen des zweiten Paneelelements oder im Widerlagerprofil enthalten ist.
 6. Faltpaneelordnung nach Anspruch 5, wobei die magnetische Anziehung des Weiteren von mindestens einem weiteren Dauermagnet (95; 89) mit einer entgegengesetzten Polarität oder einem ferromagnetischen Element in dem anderen Perimeterrahmen und Widerlagerprofil resultiert.
 7. Faltpaneelordnung nach Anspruch 6, wobei sich der entsprechende Magnet oder das ferromagnetische Element im Perimeterrahmen mindestens des zweiten Paneelelements in mindestens einem der ersten und zweiten Rahmenpfosten befinden.
 8. Faltpaneelordnung nach Anspruch 6 oder 7, wobei sich der entsprechende Magnet oder das ferromagnetische Element im Perimeterrahmen mindestens des zweiten Paneelelements im oberen Rahmenbalken befinden.
 9. Faltpaneelordnung nach einem der Ansprüche 1 bis 8, wobei die elastische Leiste (99) von mindestens einem Paneelelement an der Außenfläche entsprechend einer der flächengleichen ersten und zweiten Platte angebracht ist.
 10. Faltpaneelordnung nach einem der Ansprüche 1 bis 9, wobei die elastische Leiste (99) von mindestens einem Paneelelement eine Bürstenleiste ist.
 11. Faltpaneelordnung nach Anspruch 10, wobei die Bürstenleiste sich ausstreckende, flexible Borstenstränge aufweist, die mit der Innenfläche der entsprechenden ersten und zweiten Rahmenpfosten in Eingriff stehen.
 12. Faltpaneelordnung nach einem der Ansprüche 1 bis 11, wobei mindestens ein Paneel eine dritte Platte (27C) umfasst, die sich gemeinsam mit der ersten und zweiten Platte (27A, 27B) des Paneelelements erstreckt und zwischen der gegenüberliegenden ersten und zweiten Platte eingefügt ist.
 13. Faltpaneelordnung nach Anspruch 12, wobei die dritte Platte in Bezug auf die gegenüberliegende erste und zweite Platte relativ verschiebbar ist.
 14. Faltpaneelordnung nach Anspruch 12 oder 13, wobei die dritte Platte mindestens ein Material oder eine Struktur aufweist, dies sich jeweils von der ersten und zweiten Platte unterscheiden.
 15. Faltpaneelordnung nach einem der Ansprüche 1 bis 14, wobei in mindestens einem Paneelelement die erste Platte feststehend und die flächengleiche zweite Platte verschiebbar ist.
 16. Faltpaneelordnung nach Anspruch 15, wobei ein wirkender Schieber mit der verschiebbaren zweiten Platte verbunden ist und sich durch einen Schlitz entweder im ersten oder zweiten Rahmenpfosten vom Inneren zum Äußeren desselben erstreckt.
 17. Faltpaneelordnung nach Anspruch 12, wobei in mindestens einem Paneelelement die erste Platte feststehend und flächengleiche zweite Platte verschiebbar ist, wobei ein wirkender Schieber mit der verschiebbaren zweiten Platte verbunden ist und sich durch einen Schlitz entweder im ersten oder zweiten Rahmenpfosten vom Inneren zum Äußeren desselben erstreckt, wobei die dritte Platte in Bezug auf die gegenüberliegenden erste und zweite Platte relativ verschiebbar ist und wobei ein weiterer wirkender Schieber mit der verschiebbaren dritten Platte verbunden ist und sich durch einen weiteren Schlitz entweder im ersten oder zweiten Rahmenpfosten vom Inneren zum Äußeren desselben erstreckt.
 18. Faltpaneelordnung nach Anspruch 17, wobei sich der wirkende Schieber auf einer Seite des Paneelelements erstreckt und sich der weitere wirkende Schieber von der gegenüberliegenden Seite des Paneelelements aus erstreckt.

Revendications

1. Ensemble de panneau rabattable (1) destiné à des

ouvertures architecturales (3), comprenant :

des premier et second éléments de panneau (17 ; 35 ; 51 ; 53),

un support de montage (11, 77) destiné à être monté sur une partie de périmètre sensiblement verticale d'une ouverture architecturale ;

une première charnière (15 ; 75) reliée au support de montage (11, 77) ;

le premier élément de panneau (17 ; 51) ayant son premier support de châssis (19 ; 79) monté de manière pivotante par la première charnière (15 ; 75) ;

une seconde charnière (33 ; 55) reliée au second support de châssis (21, 81) du premier élément de panneau (17 ; 51) ; et

le second élément de panneau (35 ; 53) ayant son premier support de châssis (37 ; 59) monté de manière pivotante par la seconde charnière (33 ; 55), dans lequel au moins un élément de panneau (17 ; 35 ; 51 ; 53) qui fait partie des premier et second éléments de panneau comprend un châssis de périmètre défini par les premier et second supports de châssis (19, 21, 37, 39 ; 79, 81, 59, 61) et des structures de châssis supérieure et inférieure (23, 25, 41, 43 ; 87, 91, 63, 65),

dans lequel le châssis de périmètre de l'élément de panneau définit une fente qui s'ouvre vers l'intérieur (19B, 25A, 39B, 43A ; 61B, 65A) et des première et seconde plaques coextensives (27A, 27B, 45A, 45B ; 83A, 83B, 67A, 67B) qui sont maintenues dans la fente respective qui s'ouvre vers l'intérieur afin de pouvoir coulisser l'une par rapport à l'autre, **caractérisé en ce que**

une bande souple (99) est placée dans chacun des premier et second supports de châssis (19, 21, 37, 39 ; 79, 81, 59, 61) et est positionnée afin de s'étendre entre une paroi intérieure des premier et second supports de châssis respectifs et une surface extérieure de l'une parmi la première et la seconde plaques coextensives (27A, 27B, 45A, 45B ; 83A, 83B, 67A, 67B), et longitudinalement par rapport à chaque premier et second supports de châssis.

2. Ensemble de panneau rabattable selon la revendication 1, comprenant en outre un profilé de butée (57) destiné à être monté le long d'une partie supérieure ou inférieure sensiblement horizontale d'une ouverture architecturale.

3. Ensemble de panneau rabattable selon la revendication 2, dans lequel le profilé de butée (57) est prévu pour s'étendre le long d'une partie supérieure horizontale de l'ouverture architecturale.

4. Ensemble de panneau rabattable selon la revendication 3, dans lequel le châssis de périmètre d'au moins le second élément de panneau et le profilé de butée sont magnétiquement attirés l'un vers l'autre.

5. Ensemble de panneau rabattable selon la revendication 4, dans lequel l'attraction magnétique est provoquée par au moins un aimant permanent (89 ; 95) inclus dans l'un parmi le châssis de périmètre du second élément de panneau et le profilé de butée.

6. Ensemble de panneau rabattable selon la revendication 5, dans lequel l'attraction magnétique est en outre provoquée par au moins l'un parmi un autre aimant permanent (95 ; 89) ayant une polarité opposée, ou un élément ferromagnétique dans l'autre parmi le châssis de périmètre et le profilé de butée.

7. Ensemble de panneau rabattable selon la revendication 6, dans lequel l'aimant ou l'élément ferromagnétique dans le châssis de périmètre d'au moins le second élément de panneau est situé dans au moins l'un parmi les premier et second supports de châssis.

8. Ensemble de panneau rabattable selon la revendication 6 ou 7, dans lequel l'un parmi l'aimant ou l'élément ferromagnétique dans le châssis de périmètre d'au moins le second élément de panneau est situé dans la structure de châssis supérieure.

9. Ensemble de panneau rabattable selon l'une des revendications 1 à 8, dans lequel la bande souple (99) du au moins un élément de panneau est fixée sur la surface extérieure de l'une des première et seconde plaques coextensives.

10. Ensemble de panneau rabattable selon l'une des revendications 1 à 9, dans lequel la bande souple (99) du au moins un élément de panneau est un joint brosse.

11. Ensemble de panneau rabattable selon la revendication 10, dans lequel le joint brosse possède des poils flexibles qui s'étendent et qui engagent la surface intérieure respective des premier et second supports de châssis.

12. Ensemble de panneau rabattable selon l'une des revendications 1 à 11, dans lequel l'au moins un panneau comprend en outre une troisième plaque (27C) en co-extension avec les première et seconde plaques (27A, 27B) de l'élément de panneau et interposée entre les première et seconde plaques qui se confrontent.

13. Ensemble de panneau rabattable selon la revendication 12, dans lequel la troisième plaque peut coulisser par rapport aux première et seconde plaques

qui se confrontent.

- 14.** Ensemble de panneau rabattable selon la revendication 12 ou 13, dans lequel la troisième plaque possède au moins l'un parmi un matériau ou une configuration qui diffère de chacune des première et seconde plaques. 5
- 15.** Ensemble de panneau rabattable selon l'une des revendications 1 à 14, dans lequel, dans l'au moins un élément de panneau, la première plaque est fixée et la seconde plaque coextensive peut coulisser. 10
- 16.** Ensemble de panneau rabattable selon la revendication 15, dans lequel un coulisseau est relié à la seconde plaque coulissante, et s'étend à travers une fente dans l'un parmi le premier ou le second support de châssis entre un intérieur et un extérieur de celui-ci. 15
20
- 17.** Ensemble de panneau rabattable selon la revendication 12, dans lequel, dans l'au moins un élément de panneau, la première plaque est fixe et la seconde plaque coextensive peut coulisser, dans lequel un coulisseau est relié à la seconde plaque coulissante, et s'étend à travers une fente dans l'un parmi le premier ou le second support de châssis entre un intérieur et un extérieur de celui-ci, dans lequel la troisième plaque peut coulisser par rapport aux première et seconde plaques qui se confrontent, et dans lequel un autre coulisseau est relié à la troisième plaque coulissante, et s'étend à travers une autre fente dans l'un parmi le premier ou le second support de châssis entre un intérieur et un extérieur de celui-ci. 25
30
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- 18.** Ensemble de panneau rabattable selon la revendication 17, dans lequel le coulisseau s'étend sur un côté de l'élément de panneau, et l'autre coulisseau s'étend depuis un côté opposé de l'élément de panneau. 40

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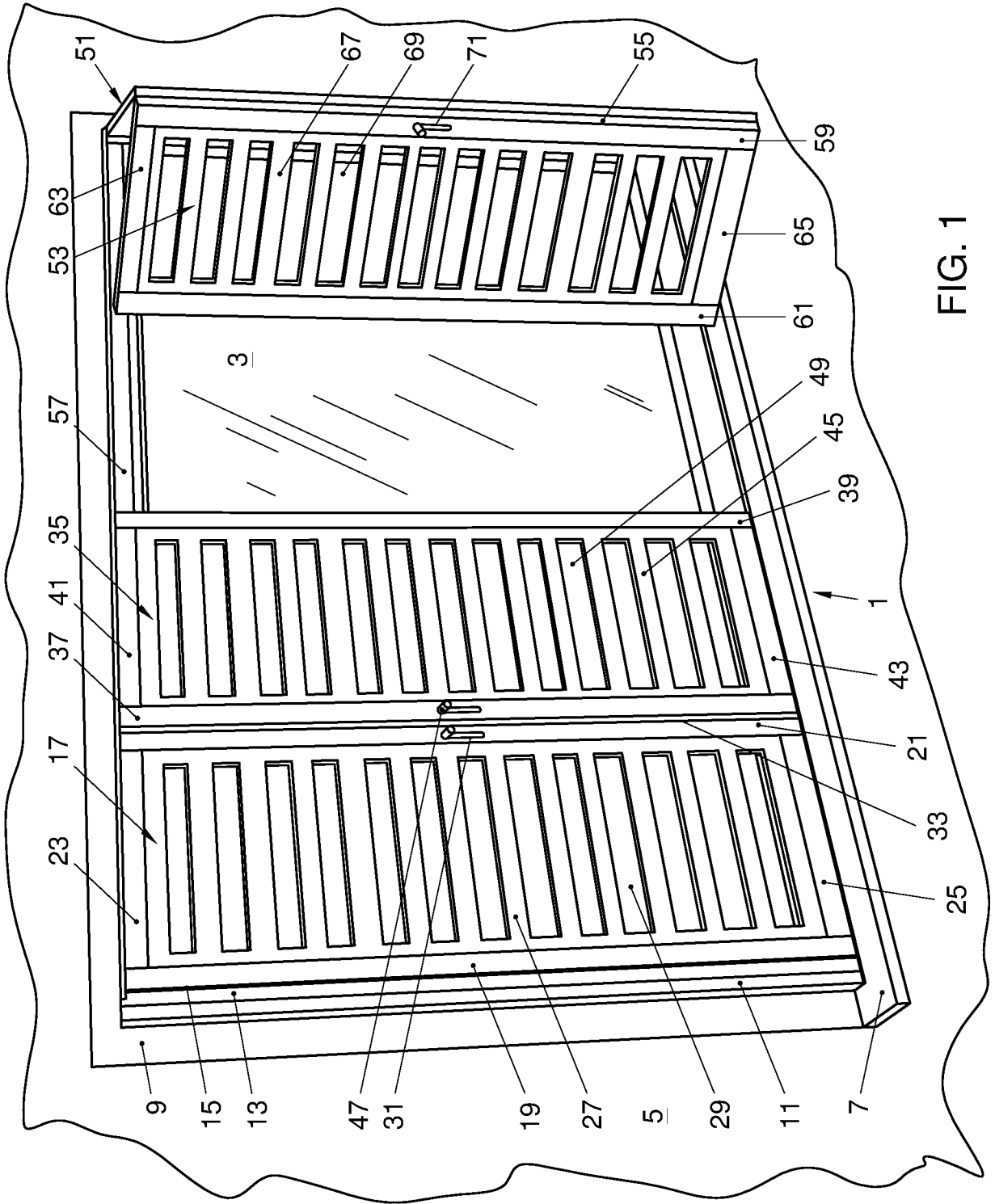


FIG. 1

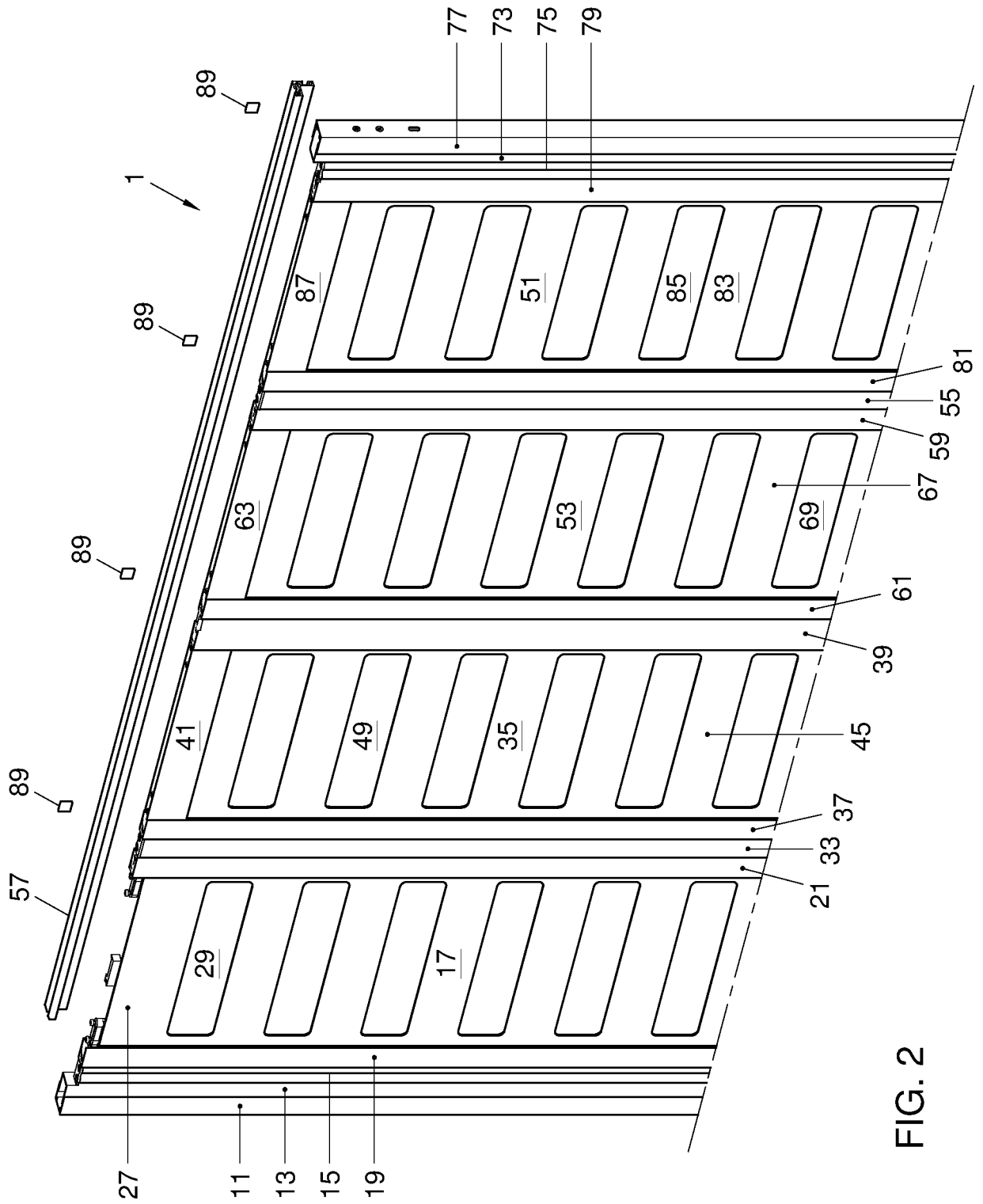


FIG. 2

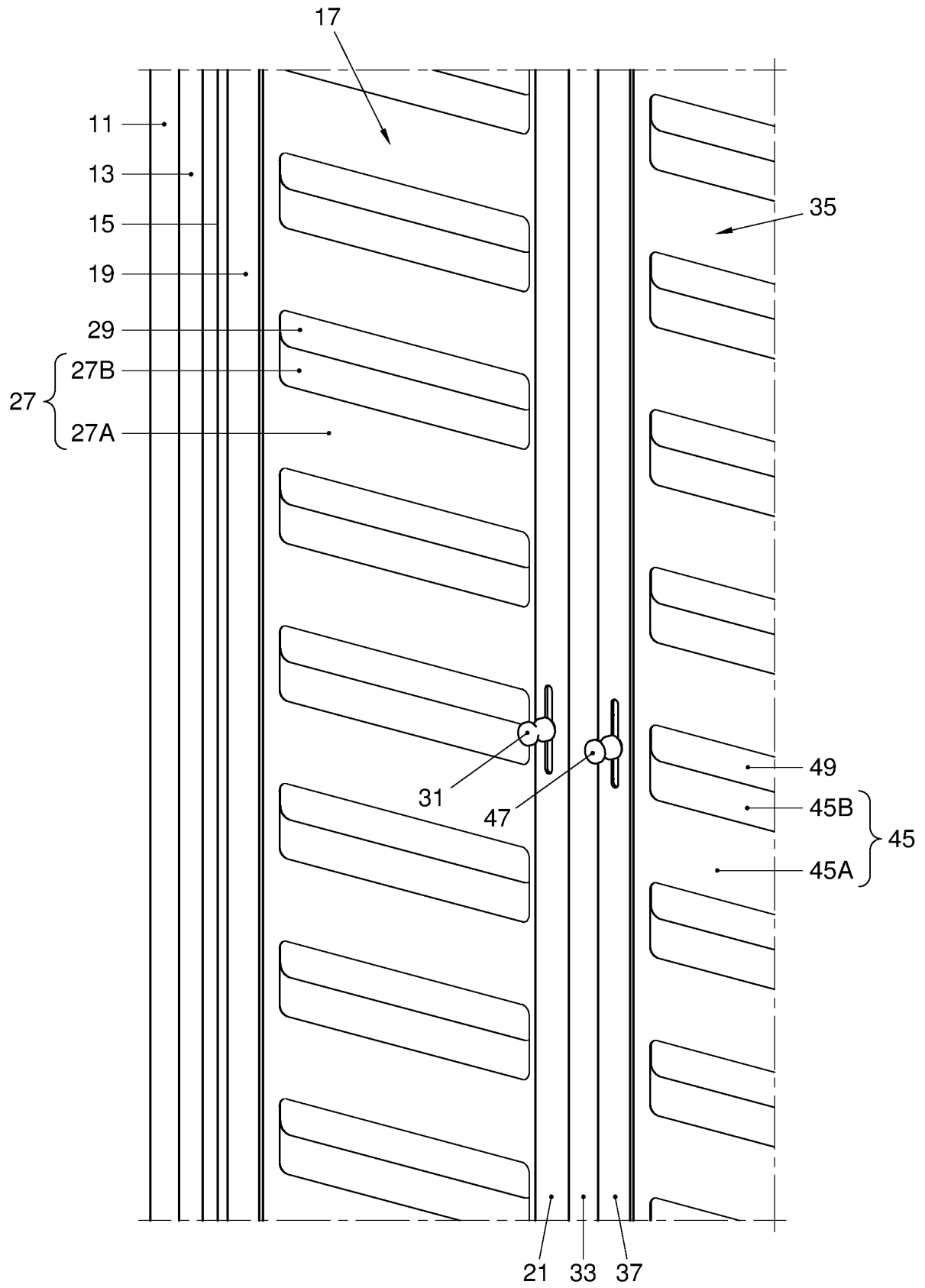


FIG. 3

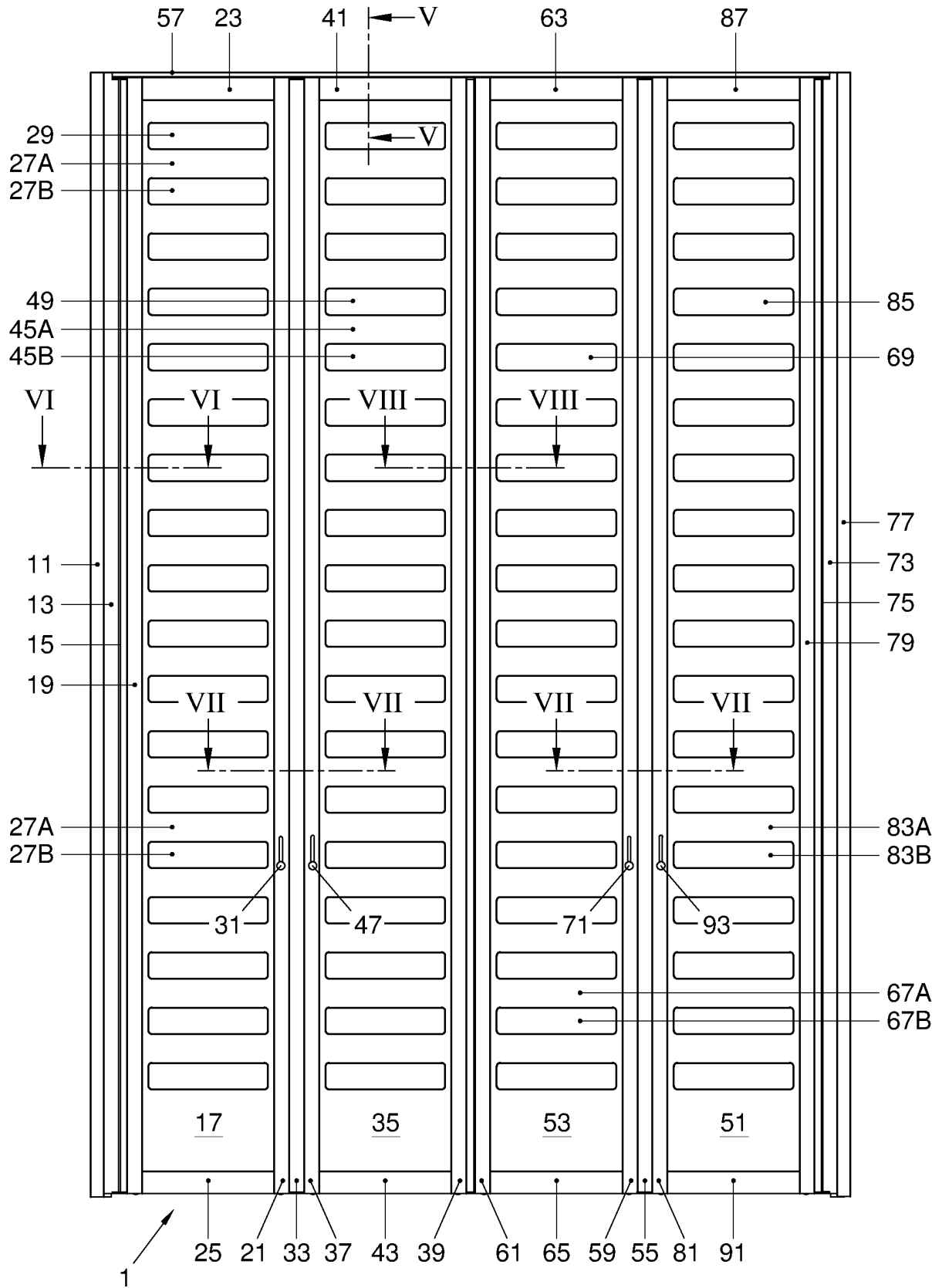


FIG. 4

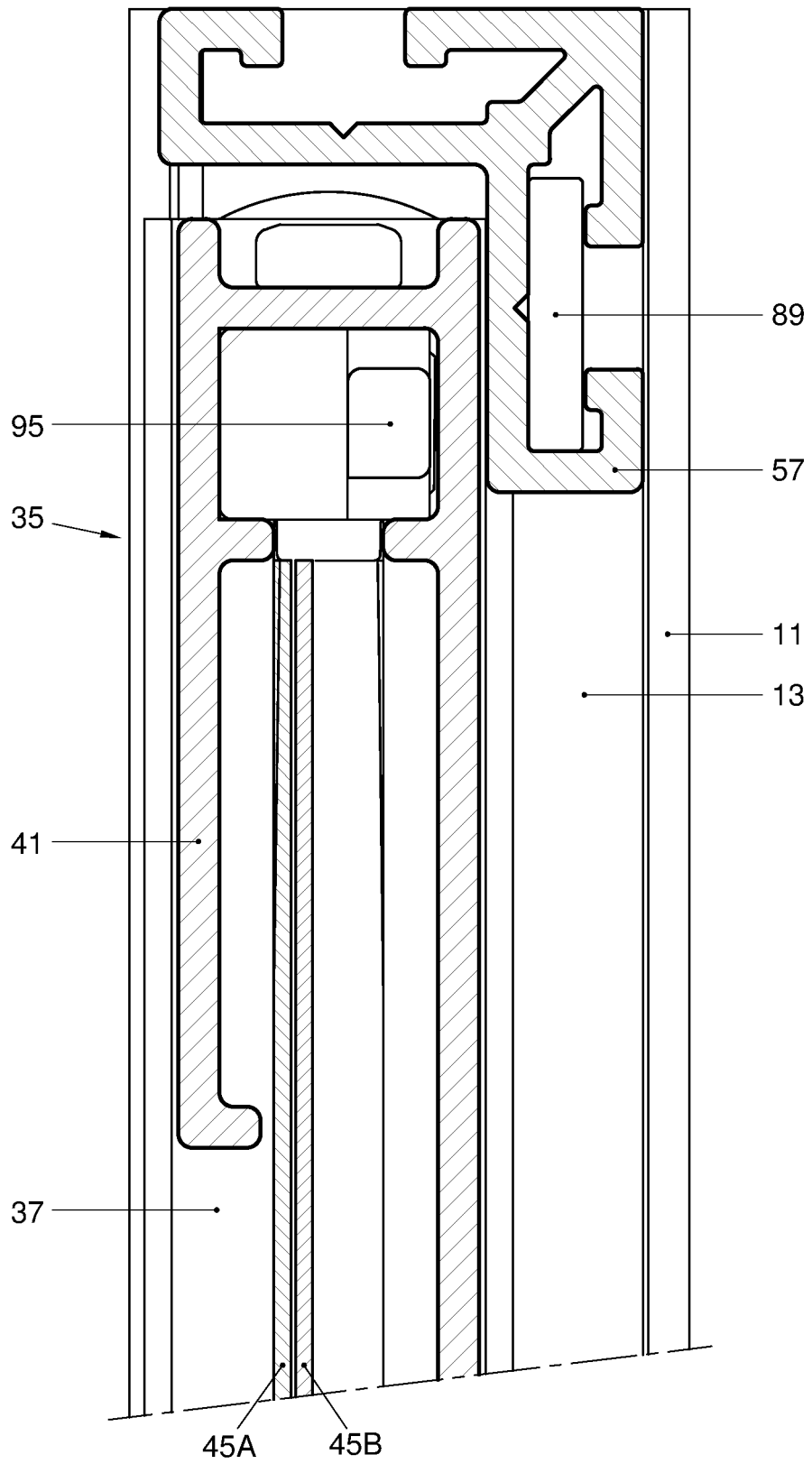


FIG. 5

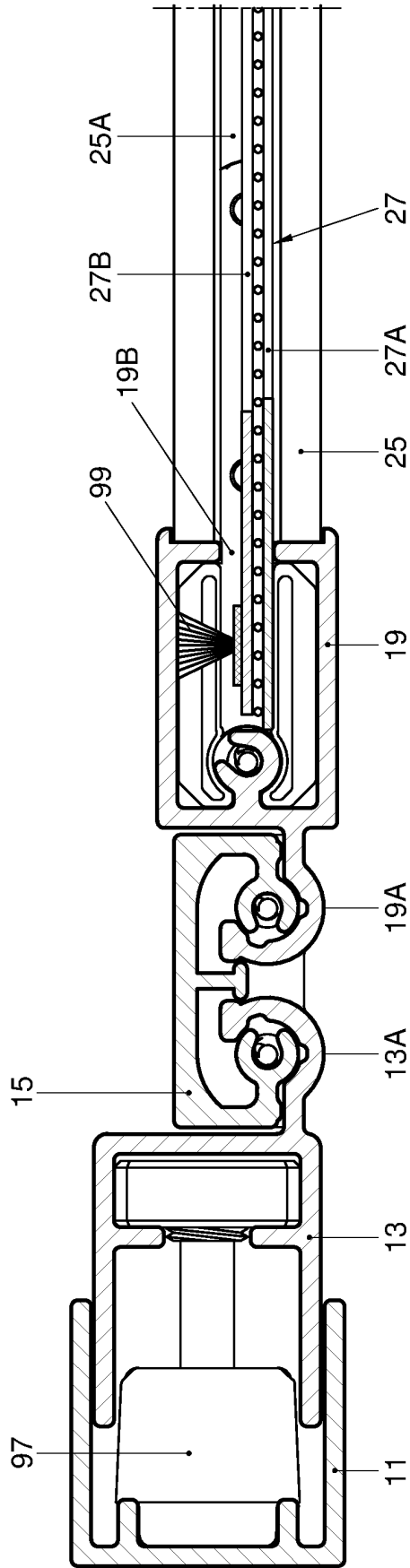


FIG. 6

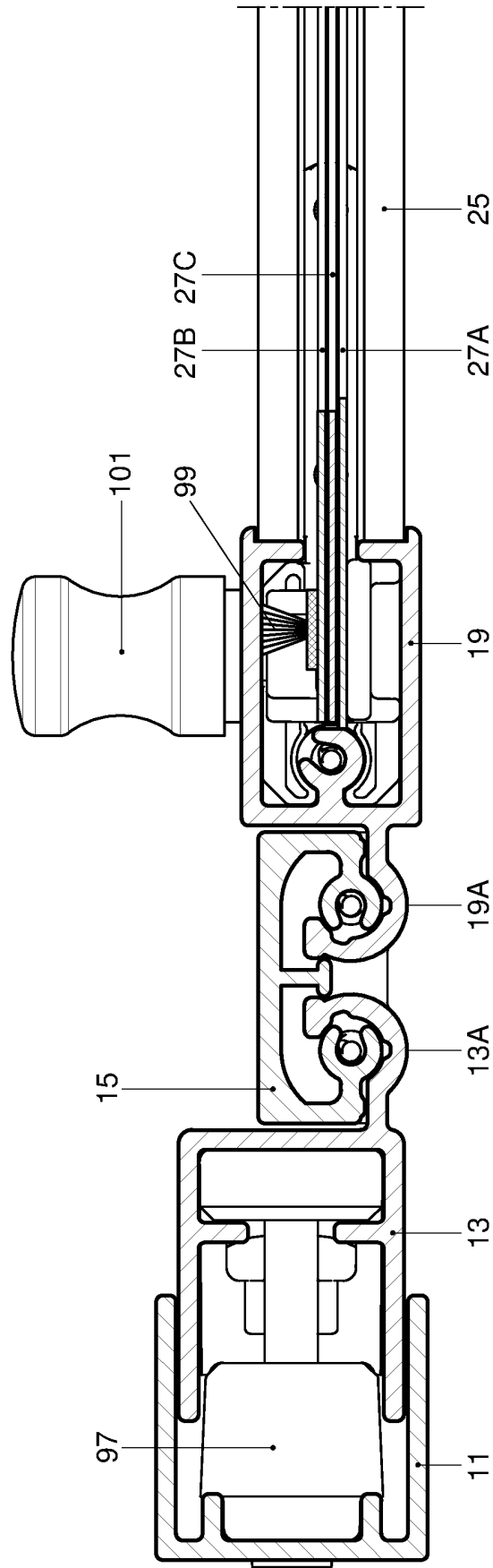


FIG. 6A

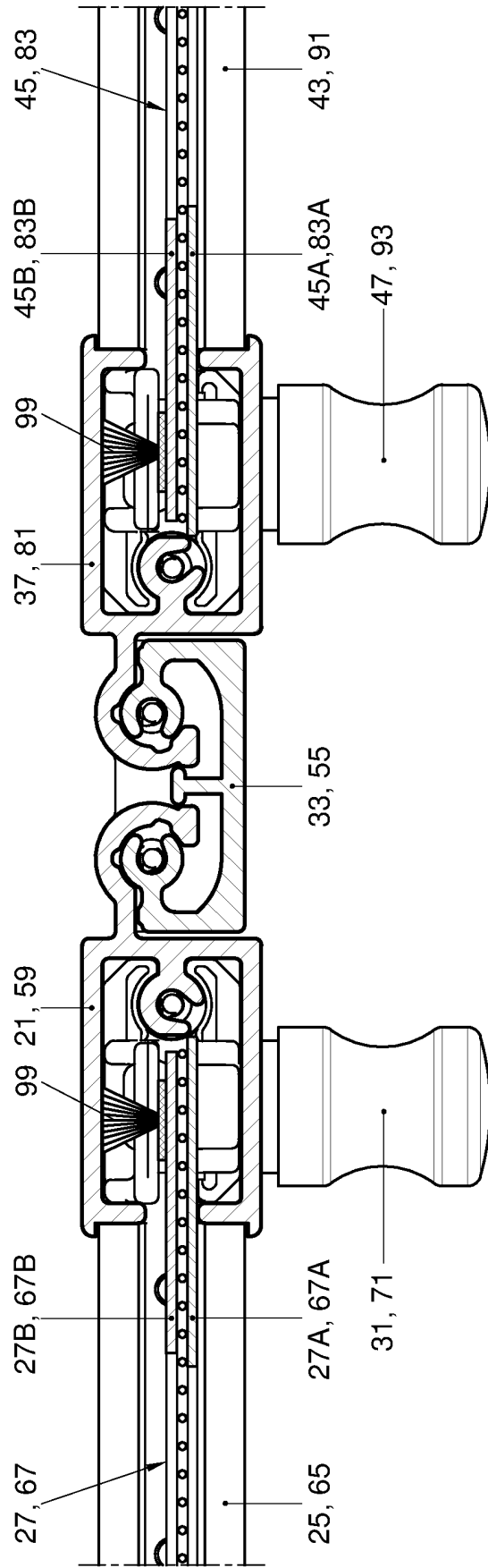


FIG. 7

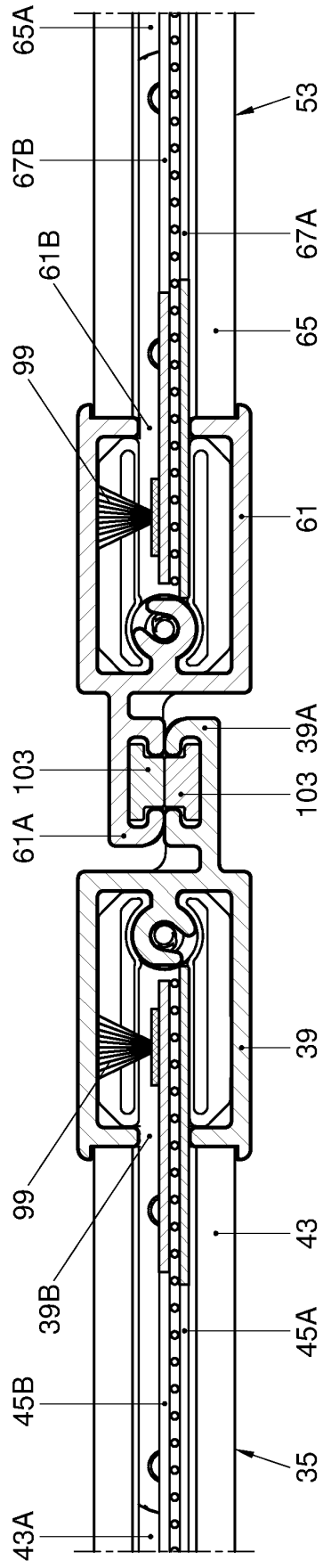


FIG. 8

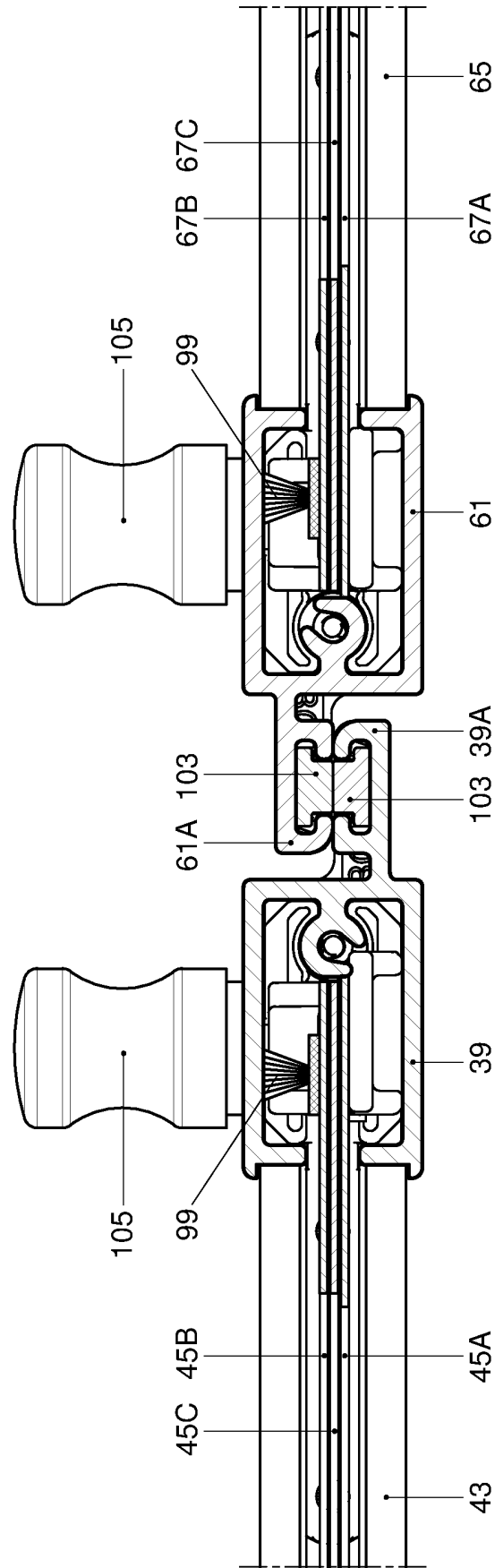


FIG. 8A

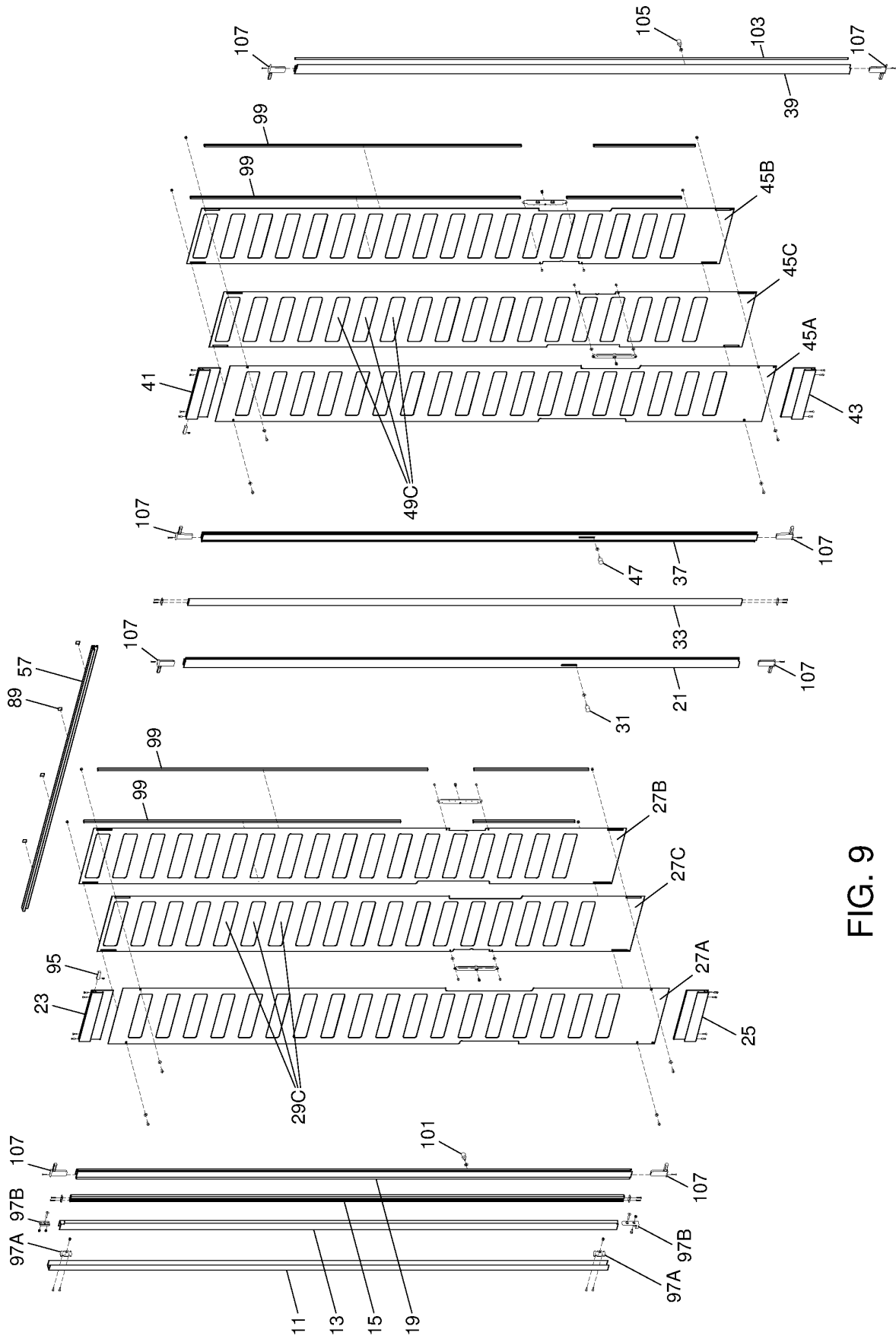


FIG. 9

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- WO 2014120009 A [0002] [0008]
- DE 2143530 A1 [0003]
- GB 1364583 A [0003]
- NL 2004086 [0008]
- NL 2003953 [0008]