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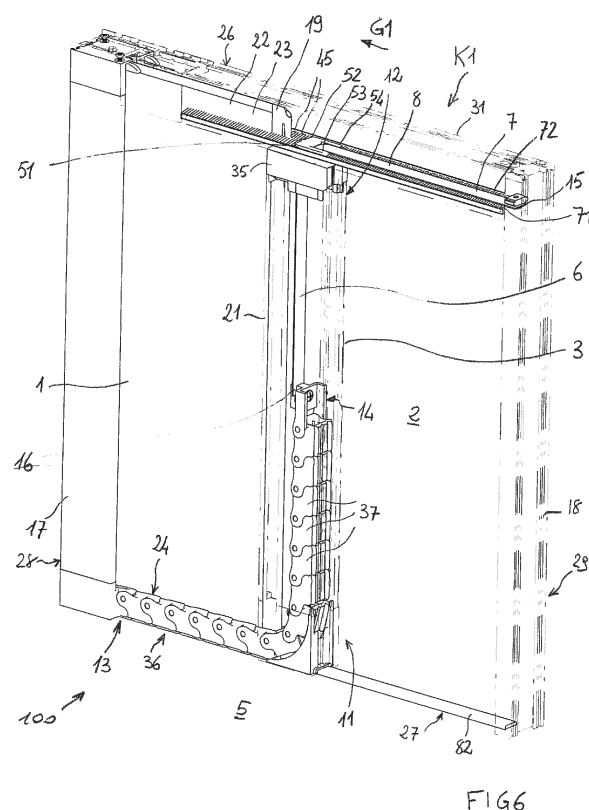
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(54) **A SCREENING APPARATUS FOR SCREENING AN OPENING MADE IN A WALL**

(57) A screening apparatus (100) for screening an opening (2) made in a wall (5). The opening can be a window or a door. The screening apparatus (100) comprises: a sheet (1) for screening the opening (2) made in the wall (5), which can be a mosquito screen, a curtain or pleated blind; a movable bar (3), also known as a bar handle; a chain (36), or in any case a flexible guide with hinged elements, which is insertable internally of the movable bar (3); a flexible belt (6), for example made of metal or plastic, which is insertable internally of the movable bar (3); a housing (31), upper profiled element, which is provided with a first through-opening (41) for passage of the portion of flexible belt (7) and of the upper edge portion (23) of the sheet (1); a plurality of flexible teeth (45), for example brushes, which are borne by the housing (31), and which are designed to enable the flexible belt (6) to pass beyond them so as to insert in the movable bar (3). The screening apparatus (100) is configured in such a way that the flexible belt (6) and the chain (36) tend to maintain the movable bar (3) orientated vertically, further comprising a guide (81) for guiding the portion of flexible belt (7) internally of the housing (31). The first guide (81) in turn comprises: one or more guide walls (50); and the plurality of flexible teeth (45). The one or more guide walls (50) and the first plurality of flexible teeth (45) are near to one another so as to prevent the portion of flexible belt (7) from bending until passing beyond the first plurality of flexible teeth (45), with the consequence of increasing the resistance to axial compression of the portion of flexible belt (7) which is housed in the housing (31) and limiting the problem of instability at peak load.



Description

DESCRIPTION OF THE INVENTION

[0001] The present invention relates to the technical sector concerning a screen of an opening made in a wall: the screen can be for example a mosquito screen. Figures 1-4 illustrate a screening apparatus of known type, see also WO 2013/064308, for screening an opening made in a wall (5), comprising: a frame (17, 18, 31) fixed to an opening (2) made in a wall (5); a sheet (1) for screening the opening (2) made in the wall (5); a movable bar (3) which has a first end (11) and a second end (12) opposite one another, which is tubular and manually activatable, which is fixed to a first lateral edge of the sheet (1) and which is movable from a screening position of the opening (not illustrated), at which the sheet (1) screens the opening (2) when the screening apparatus is in use, and a removed position from the opening (not illustrated); a chain (36) which has a third end (13) and a fourth end (14) opposite one another, which is fixable to the frame (17, 18, 31) by means of the third end (13), and which is insertable internally of the movable bar (3) via the fourth end (14), from the first end (11) of the movable bar (3), for sliding internally of the movable bar (3); a flexible belt (6) which has a fifth end (15) and a sixth end (16) opposite one another, which is fixable to the frame (17, 18, 31) by means of the fifth end (15), and which is insertable internally of the movable bar (3) via the sixth end (16), from the second end (12) of the movable bar (3), for sliding internally of the movable bar (3); a housing (31) which is part of the frame (17, 18, 31), which is fixable to an upper flank of the opening (2) made in the wall (5), which is dimensioned to internally house at least a portion of flexible belt (7) and at least a portion of an upper edge (23) of the sheet (1), and which is provided with a first through-opening (2) for passage of the portion of flexible belt (6) and of the upper edge portion (22) of the sheet (1); a first plurality of flexible teeth (45) (figure 2) which are borne by the housing (31), which are arranged internally of the housing (31) for retaining the upper edge (22) of the sheet (1), preventing an undesired exit of the sheet (1) from the housing (31) and which are designed to enable the flexible belt (6) to pass beyond them so as to insert in the movable bar (3). The screening apparatus is configured in such a way that the flexible belt (6) and the chain (36) tend to maintain the movable bar (3) orientated vertically, both when stationary and when manually activated: if this were not the case, the sheet (1) would be subjected to local stresses, possibly very strong, which might damage it. For the movable bar (3) to maintain a vertical orientation during the activation, it is appropriate to apply thereto a force (F1 in figure 1) at the central portion thereof: by way of example, figure 1 represents a force F1 applied to the central portion of the movable bar (3) so as to move the movable bar towards the removed position of the opening. If on the other hand a force F2 is applied for example at an upper portion

of the central bar, then the portion of flexible belt (7) arranged internally of the housing (31) (figure 3) can bend and pass beyond the first plurality of flexible teeth (45), projecting to outside the housing (31), with a consequent anti-clockwise rotation of the movable bar (3) which thus assumes an undesired oblique orientation. Therefore, the portion of flexible belt (7) collapses and this occurs when an axial compression load applied on the portion of flexible belt (7) exceeds a critical value (a phenomenon known as "critical load instability"). Returning the flexible belt (6) internally of the housing (31) is not complicated, but repeated bending of the flexible belt (6) (as in figure 3) can lead over time to the breaking of the flexible belt (6), which then needs replacing.

[0002] To limit this drawback a flexible belt can be used that is curved about the longitudinal axis, see figure 2, i.e. which in transversal section has a concavity facing upwards.

[0003] Further, the thickness of the flexible belt can be increased, while bearing in mind the fact that the force the user must impress on the movable bar correspondingly increases in order to displace it during normal use of the screening apparatus. The aim of the present invention therefore consists in finding other and more effective solutions to the above drawback.

[0004] The above-described objective was attained by means of a screening apparatus for screening an opening made in a wall, according to claim 1.

[0005] The reciprocal nearness between the guide wall and the first plurality of flexible teeth advantageously tends to prevent the portion of flexible belt from bending beyond a certain limit, i.e. bending up to passing beyond the first plurality of flexible teeth, due to the fact that the guide wall and plurality of cogs function as an abutment for the portion of flexible belt. This leads to an increase in the resistance to axial compression (and therefore an increase of the above-mentioned critical value) of the portion of flexible belt which is located in the housing. Particularly advantageous is the fact that in order to obtain this result, flexible teeth have been used as part of the guide, which have the double function of: guiding, and therefore abutting, the portion of flexible belt; and being able in any case to be passed over by the same portion of flexible belt in order to insert into the movable bar.

[0006] On the other hand, in the screening apparatus of the prior art, the flexible teeth have no guide function for the flexible belt, as they are too distanced therefrom.

[0007] Specific embodiments of the invention will be described in the following part of the present description, according to what is set down in the claims and with the aid of the appended tables of drawings, in which:

- figure 1 is a schematic lateral view, with some parts removed for illustrative purposes, of a screening apparatus for screening an opening made in a wall, of known type;
- figure 2 is a view of section A-A of figure 1;
- figure 3 is a view of the screening apparatus of figure

- 1 in a case of faulty operation;
- figure 4 is a view of section B-B of figure 3;
- figures 5A, 5B, 5C illustrate three schematic perspective views of a screening apparatus for screening an opening made in a wall, according to the present invention, respectively when the relative movable bar is in a screening position of the opening, in a removed position of the opening and in an intermediate position between the above-mentioned positions;
- figures 6, 7 are each the same view as in figure 5C with some parts removed for illustrative purposes and according to a first embodiment of the invention;
- figure 6A is a view along section K1 of figure 6;
- figure 6B differs from figure 6A in that it is a lateral view;
- figures 6C, 6D differ respectively from figures 6A, 6B in that the flexible belt assumes a serpentine progression following the application of a compression load;
- figures 6E, 6F are respectively views of sections A-A, B-B of figure 6D;
- figure 6G is a larger-scale view of detail K2 of figure 6C, with some parts sectioned;
- figure 6H is a larger-scale view of detail K3 of figure 6D;
- figure 8 differs from figure 6 in that it is taken from another perspective;
- figures 9, 10, 11, 12 are respectively views A-A, B-B, C-C, D-D of figure 6B;
- figures 13A, 13B, 13C are three perspective views of a component of the screening apparatus according to the first embodiment, while figure 13D is a perspective view of a section of the same component;
- figure 14 is a schematic lateral view, with some parts removed for illustrative purposes, of a screening apparatus for screening an opening made in a wall, according to a second embodiment;
- figures 14A, 14B are views respectively of sections A-A, B-B of figure 14;
- figure 14C is the same view as in figure 6A but with reference to the second embodiment;
- figure 15 is a schematic lateral view, with some parts removed for illustrative purposes, of a screening apparatus for screening an opening made in a wall, according to a third embodiment;
- figures 15A, 15B are views respectively of sections A-A, B-B of figure 15;
- figure 16 is a schematic lateral view, with some parts removed for illustrative purposes, of a screening apparatus for screening an opening made in a wall according to a fourth embodiment;
- figures 16A, 16B are views respectively of sections A-A, B-B of figure 16;
- figure 17 is a schematic lateral view, with some parts removed for illustrative purposes, of a screening apparatus for screening an opening made in a wall,

- according to a fifth embodiment;
- figures 17A, 17B are views respectively of sections A-A, B-B of figure 17;
- figure 17C is the same view as in figure 6G, but in reference to a fourth embodiment;
- figure 17D is the same view as in figure 6H, but in reference to a fourth embodiment;
- figures 18A, 18B, 18C are three perspective views of a component of the screening apparatus according to a second, third and fourth embodiment, while figure 18D is a perspective view of a section of the same component.

[0008] With reference to figures from 5 onwards, reference numeral (100) denotes a screening apparatus for screening an opening (2) made in a wall (5), object of the present invention, comprising: a frame (17, 18, 31) fixable to an opening (2) made in a wall (5); a sheet (1) for screening the opening (2) made in the wall (5); a movable bar (3) which has a first end (11) and a second end (12) opposite one another, which is tubular, which is manually activatable, which is fixable to a first lateral edge (21) of the sheet (1) and which is movable from a screening position of the opening (PS) (figure 5A), at which the sheet (1) screens the opening (2) when the screening apparatus is in use, and a removed position from the opening (PD) (figure 5B); a chain (36) which can be arranged at a lower flank (26) of the opening (2) made in the wall (5), which has a third end (13) and a fourth end (14) opposite one another, which is fixable to the frame (17, 18, 31) by means of the third end (13), and which is insertable internally of the movable bar (3) via the fourth end (14), from the first end (11) of the movable bar (3), for sliding internally of the movable bar (3) (see for example figures 6, 8); a flexible belt (6) which has a fifth end (15) and a sixth end (16) opposite one another, which is fixable to the frame (17, 18, 31) by means of the fifth end (15), and which is insertable internally of the movable bar (3) via the sixth end (16), from the second end (12) of the movable bar (3), for sliding internally of the movable bar (3) (see for example figures 6, 8); a housing (31) which is part of the frame (17, 18, 31), which is fixable to an upper flank (27) of the opening (2) made in the wall (5), which is dimensioned to internally house at least a portion of flexible belt (7) and at least a portion of an upper edge (23) of the sheet (1), and which is provided with a first through-opening (41) for passage of the portion of flexible belt (7) and of the upper edge portion (23) of the sheet (1); a first plurality of flexible teeth (45), which are borne by the housing (31), which are arranged internally of the housing (31) and which are designed to enable the flexible belt (6) to pass beyond them (see for example figures 8, 9) so as to insert in the movable bar (3).

[0009] The housing (31) can be a profiled member.

[0010] The screening apparatus (100) is configured in such a way that the flexible belt (6) and the chain (36) tend to maintain the movable bar (3) orientated vertically.

[0011] The screening apparatus (100) further compris-

es a first guide (81) for guiding the portion of flexible belt (7) internally of the housing (31), the first guide (81) in turn comprising: one or more guide walls (50) that are a part of the housing (31) and which are arranged to abut a first face (8) of the flexible belt (6); and the first plurality of flexible teeth (45) which are arranged to abut a second face (9), opposite the first face (8), of the flexible belt (6), the one or more guide walls (50) and the first plurality of flexible teeth (45) being near to one another so as to prevent the portion of flexible belt (7) from bending until passing beyond the first plurality of flexible teeth (45), with the consequence of increasing the resistance to axial compression of the portion of flexible belt (7) which is housed in the housing (31).

[0012] The sheet (1) can be a mosquito screen, a curtain or pleated blind (figures 17-17D).

[0013] The movable bar (3) is also known as a bar handle.

[0014] The first lateral edge (21) of the sheet (1) can be vertically orientated.

[0015] The chain (36) can comprise a plurality of chain elements (37) which are hinged to one another. The chain elements (37) of the plurality of chain elements (37) can comprise housings (not visible in the figures) for housing a lower edge (24) of the sheet (1), functioning as a guide. The chain elements (37) of the plurality of chain elements (37) can each be provided with an abutment (not visible in the figures) which limits the rotation of the adjacent chain element (37), so that the chain elements (37) cannot rise (therefore assuming an upwards-facing concavity) at the portion of chain (36) comprised between the third end (13) and the movable bar (3), i.e. the portion of chain (36) which is horizontal, as is visible for example in figures 5A, 5C, 6.

[0016] The screening apparatus (100) can comprise a second guide (82) for the chain (36), fixed on the lower flank (26) of the opening (2) made in the wall (5).

[0017] The flexible belt (6) can be made of a plastic material, for example PVC.

[0018] The length of the portion of flexible belt (7) and the length of the upper edge portion (23) of the sheet (1) can vary as a function of the position assumed by the movable bar (3).

[0019] The housing (31) can be designed in such a way that the first through-opening (41) is arranged downwards when the housing (31) is fixed to the upper flank (27) of the opening (2) made in the wall (5).

[0020] The flexible teeth (45) of the first plurality of flexible teeth (45) are preferably brushes (illustrated in the drawings).

[0021] The screening apparatus (100) preferably comprises a head (35) (figures 13A-13D, 18A-18D) that is borne by the movable bar (3), which is arranged at the second end (12) of the movable bar (3), which engages with the housing (31), and which comprises: a guide through-hole (4) which is crossable by the flexible belt (6) and which opens between the one or more guide walls (50), on one side, and the first plurality of flexible teeth

(45), on the other side; one or more switchers (51, 52) which are arranged between the one or more guide walls (50), on one side, and the first plurality of flexible teeth (45), on the other side, and which are conformed in such a way as to distance the flexible teeth (45) of the first plurality of flexible teeth (45) from the one or more guide walls (50) during the displacement of the movable bar (3) in the direction (G1) (see for example figures 6, 6A, and compare with figure 16) which tends to increase the length of the portion of flexible belt (7) which is arranged in the housing (31), so that the portion of flexible belt (7) which is located in the housing (31) is maintained interposed between the one or more guide walls (50) and the first plurality of flexible teeth (45). In all embodiments, with the exception of the fourth embodiment (illustrated in figure 16), the displacement of the movable bar (3) towards the screening position of the opening (PS) determines the increase in length of the portion of flexible belt (7). As specified in the foregoing, the one or more guide walls (50) and the first plurality of flexible teeth (45) are neared to one another, so that the action exerted by the one or more switchers (51, 52) is advantageous as it guarantees the correct repositioning of the flexible teeth (45) of the first plurality of flexible teeth (45) during the movement of the movable bar (3).

[0022] The head (35) preferably comprises a turret (34) which in turn: bears the one or more switchers (51, 52); comprises a first front wall (32), which engages in the first guide (81) so as to distance the flexible teeth (45) of the first plurality of flexible teeth (45) from the longitudinal axis of the first guide (81) during the displacement of the movable bar (3) in the direction (G1) which tends to increase the length of the portion of flexible belt (7) arranged in the housing (31); comprises a second front wall (33), opposite the first front wall (32), which engages in the first guide (81) so as to distance the flexible teeth (45) of the first plurality of flexible teeth (45) from the longitudinal axis of the first guide (81) during the displacement of the movable bar (3) in the direction (opposite direction (G1), not indicated) which tends to reduce the length of the portion of flexible belt (7) arranged in the housing (31).

[0023] The screening apparatus (100) preferably comprises one or more endrun stops (61, 62) which are arranged to abut the flexible teeth (45) of the first plurality of flexible teeth (45) when the portion of flexible belt (7) presses against the flexible teeth (45) of the first plurality of flexible teeth (45), tending to distance the first plurality of flexible teeth (45) from the one or more guide walls (50), so as to maintain the portion of flexible belt (7) guided and consequently to further increase the resistance to axial compression of the portion of flexible belt (7) which is housed in the housing (31).

[0024] The flexible teeth (45) of the first plurality of flexible teeth (45) are preferably interposed between the one or more guide walls (50) and the one or more endrun stops (61, 62).

[0025] The one or more guide walls (50) and the one or more endrun stops (61, 62) are preferably orientated

horizontally when the housing (31) is fixed to the upper flank (27) of the opening (2) made in the wall (5).

[0026] The first plurality of flexible teeth (45) preferably comprises a first assembly of flexible teeth (71) and a second assembly of flexible teeth (72); the flexible teeth (45) of the first assembly of flexible teeth (71) are opposite the flexible teeth (45) of the second assembly of flexible teeth (72); the one or more switchers (51, 52) comprise a first switcher (51) and a second switcher (52) (see for example figures 6G, 6H); the first switcher (51) is arranged and conformed to distance the flexible teeth (45) of the first assembly of flexible teeth (71); the second switcher (52) is arranged and conformed to distance the flexible teeth (45) of the second assembly of flexible teeth (72); the one or more endrun stops (61, 62) comprise a first endrun stop (61) and a second endrun stop (62); the first endrun stop (61) is arranged to abut the flexible teeth (45) of the first assembly of flexible teeth (71); the second endrun stop (62) is arranged to abut the flexible teeth (45) of the first assembly of flexible teeth (71).

[0027] The screening apparatus (100) can also comprise further one or more switchers (53, 54) which are arranged between the one or more guide walls (50), on one side, and the first plurality of flexible teeth (45), on the other side, and which are conformed in such a way as to distance the flexible teeth (45) of the first plurality of flexible teeth (45) from the one or more guide walls (50) during the displacement of the movable bar (3) in the direction (opposite to (G1)) which tends to reduce the length of the portion of flexible belt (7) which is arranged in the housing (31), so that the portion of flexible belt (7) which is located in the housing (31) is maintained interposed between the one or more guide walls (50) and the first plurality of flexible teeth (45). In particular, the one or more switchers (53, 54) comprise a third switcher (53) and a fourth switcher (54); the third switcher (53) is arranged and conformed to distance the flexible teeth (45) of the first assembly of flexible teeth (71); the fourth switcher (54) is arranged and conformed to distance the flexible teeth (45) of the second assembly of flexible teeth (72).

[0028] The screening apparatus (100) can further comprise a first upright (17) which is part of the frame (17, 18, 31) and which is fixable to a first lateral flank (28) of the opening (2) made in the wall (5).

[0029] The screening apparatus (100) can further comprise a second upright (18) which is part of the frame (17, 18, 31) and which is fixable to a second lateral flank (29), opposite the first lateral flank (28), of the opening (2) made in the wall (5).

[0030] The head (35) can comprise a fin member (19) to which the first lateral edge (21) of the sheet (1) is fixable.

[0031] According to a first and second embodiment, see figures from 5 to 14, the sheet (1) extends between the first upright (17) and the movable bar (3); the portion of flexible belt (7) extends between the movable bar (3) and a second lateral flank (29); the one or more guide

walls (50) comprise a first guide wall (47) and a second guide wall (48) which are spaced from one another to define a second through-opening (42) crossable by the upper edge portion (23) of the sheet (1) at the housing part (31) interposed between the first upright (17) and the movable bar (3).

[0032] The first guide (81) can be arranged in proximity or at the first through-opening (41).

[0033] The upper edge portion (23) of the sheet (1) can advantageously pass beyond the first guide (81) without interfering either with the first guide (81) or the portion of flexible belt (7) (figures 10, 14A).

[0034] Specifically according to the second embodiment, figures 14-14C, the screening apparatus (100) comprises a plurality of button elements (10). The button elements (10) of the plurality of button elements (10) are borne by the sheet (1) and are arranged at least along the upper edge (22) of the sheet (1); the upper edge portion (23) of the sheet (1) crosses the first guide (81) and the second through-opening (42) in such a way that the button elements (10) of the plurality of button elements (10) are arranged after the second through-opening (42); the button elements (10) of the plurality of button elements (10) and the second through-opening (42) are mutually dimensioned so that the button elements (10) do not pass beyond the second through-opening (42), with the consequence that the upper edge portion (23) of the sheet (1) cannot exit the housing (31).

[0035] With the present screening apparatus (100) it is advantageously possible to use a sheet (1) which bears button elements (10).

[0036] The button elements (10) of the plurality of button elements (10) can also be arranged along the lower edge (24) of the sheet (1), so as to engage with the chain (36).

[0037] According to a third (figures 15-15B), fourth (figures 16-16B) and fifth embodiment (figures 17-17D), the first guide (81) is distanced (see in particular figures 15A, 16A, 17A) from the first through-opening (41) in such a way that the upper edge portion (23) of the sheet (1) is distanced from the first guide (81). In this case it is not necessary to have a first guide wall (47) and a second guide wall (48) to form the second through-opening (42), as the upper edge portion (23) of the sheet (1) is distanced from the first guide (81), but it is sufficient to have a single guide wall. The following is a more detailed description of the first embodiment, figures from 5 to 13.

[0038] The first upright (17) is a box. The screening apparatus (100) can comprise a roller cylinder (20) (visible only in figure 7) which is housed in the box. The sheet (1) is fixed to the roller cylinder (20) by means of a second lateral edge (25) (visible only in figure 5A). In this case the sheet (1) can be a curtain or a mosquito screen.

[0039] Figure 5A illustrates the screening apparatus (100) when the movable bar (3) is in the screening position of the opening (PS), while figure 5B illustrates the screening apparatus (100) when the movable bar (3) is in the removed position of the opening (PD). The remain-

ing figures 5C, 6, 6A, 6B, 6C, 6D, 7, 8 illustrate the screening apparatus (100) when the movable bar (3) is in an intermediate position comprised between the positions mentioned above.

[0040] Figures 6C, 6D illustrate the serpentine progression that the portion of flexible belt (7) assumes when subjected to a compression load of a certain entity: as can be observed, the portion of flexible belt (7) in any case remains internal of the first guide (81), abutting in several areas both the flexible teeth (45) of the first plurality of flexible teeth (45) and the one or more guide walls (50).

[0041] The one or more guide walls (50) comprise the first guide wall (47) and the second guide wall (48): with the present screening apparatus (100) it is advantageously possible to use a uniform sheet (1), figures 5-13, or a sheet (1) with button elements (10), as illustrated in figures 14-14C.

[0042] The fifth end (15) of the flexible belt (6) can be fixed at the second upright (18), the sixth end (16) of the flexible belt (6) can be fixed to the fourth end (14) of the chain (36), while the third end (13) of the chain (36) can be fixed to the first upright (17). As a consequence the assembly comprising the chain (36) and the flexible belt (6) assume a zig-zag progression, see figures 6, 8, 14.

[0043] The second embodiment, figures 14-14C, differs from the first embodiment due to the fact that the sheet (1) bears the plurality of button elements (10), which has been discussed in the foregoing.

[0044] According to the third (figures 15-15B) and fourth embodiment (figures 16-16B), the screening apparatus (100) can comprise a second plurality of flexible teeth (46) which are arranged at or in proximity of the first through-opening (41) in order to engage with the upper edge portion (23) of the sheet (1).

[0045] The fourth embodiment (figures 16-16B) differs from the others in that the fifth end (15) of the flexible belt (6) is fixed to the first upright (17), the sixth end (16) of the flexible belt (6) is free to slide internally of the movable bar (3), the fourth end (14) of the chain (36) is free to slide internally of the movable bar (3). In other words the sixth end (16) and the fourth end (14) are not constrained to one another. As a consequence the assembly comprising the chain (36) and the flexible belt (6) assumes an overturned C-shape, see figure 16.

[0046] Also to be noted is that the turret (34) is higher than the third, fourth and fifth embodiments with respect to the second embodiment, compare figures 18A-18D with figures 13A-13D.

[0047] It is understood that the above has been described by way of non-limiting example, so that any constructional variants are understood to fall within the protective scope of the present technical solution, as claimed in the following.

Claims

1. A screening apparatus (100) for screening an opening (2) made in a wall (5), comprising:

a frame (17, 18, 31) fixable to an opening (2) made in a wall (5);

a sheet (1) for screening the opening (2) made in the wall (5);

a movable bar (3) which has a first end (11) and a second end (12) opposite one another, which is tubular, which is manually activatable, which is fixable to a first lateral edge (21) of the sheet (1) and which is movable from a screening position of the opening (PS), at which the sheet (1) screens the opening (2) when the screening apparatus (100) is in use, and a removed position from the opening (PD);

a chain (36) which can be arranged at a lower flank (26) of the opening (2) made in the wall (5), which has a third end (13) and a fourth end (14) opposite one another, which is fixable to the frame (17, 18, 31) by means of the third end (13), and which is insertable internally of the movable bar (3) via the fourth end (14), from the first end (11) of the movable bar (3), for sliding internally of the movable bar (3);

a flexible belt (6) which has a fifth end (15) and a sixth end (16) opposite one another, which is fixable to the frame (17, 18, 31) by means of the fifth end (15), and which is insertable internally of the movable bar (3) via the sixth end (16), from the second end (12) of the movable bar (3), for sliding internally of the movable bar (3);

a housing (31) which is part of the frame (17, 18, 31), which is fixable to an upper flank (27) of the opening (2) made in the wall (5), which is dimensioned to internally house at least a portion of flexible belt (7) and at least a portion of an upper edge (22) of the sheet (1), and which is provided with a first through-opening (41) for passage of the portion of flexible belt (7) and of the upper edge portion (23) of the sheet (1);

a first plurality of flexible teeth (45), which are borne by the housing (31), which are arranged internally of the housing (31) and which are designed to enable the flexible belt (6) to pass beyond them so as to insert in the movable bar (3); the screening apparatus (100) being configured in such a way that the flexible belt (6) and the chain (36) tend to maintain the movable bar (3) orientated vertically;

characterised in that it comprises a first guide (81) for guiding the portion of flexible belt (7) internally of the housing (31), the first guide (81) in turn comprising: one or more guide walls (50) that are a part of the housing (31) and which are arranged to abut a first face (8) of the flexible

- belt (6); and the first plurality of flexible teeth (45) which are arranged to abut a second face (9), opposite the first face (8), of the flexible belt (6), the one or more guide walls (50) and the first plurality of flexible teeth (45) being near to one another so as to prevent the portion of flexible belt (7) from bending until passing beyond the first plurality of flexible teeth (45), with the consequence of increasing the resistance to axial compression of the portion of flexible belt (7) which is housed in the housing (31).
2. The screening apparatus (100) of the preceding claim, wherein it comprises a head (35) that is borne by the movable bar (3), which is arranged at the second end (12) of the movable bar (3), which engages with the housing (31), and which comprises: a guide through-hole (4) which is crossable by the flexible belt (6) and which opens between the one or more guide walls (50), on one side, and the first plurality of flexible teeth (45), on the other side; one or more switchers (51, 52) which are arranged between the one or more guide walls (50), on one side, and the first plurality of flexible teeth (45), on the other side, and which are conformed in such a way as to distance the flexible teeth (45) of the first plurality of flexible teeth (45) from the one or more guide walls (50) during the displacement of the movable bar (3) in the direction (G1) which tends to increase the length of the portion of flexible belt (7) which is arranged in the housing (31), so that the portion of flexible belt (7) which is located in the housing (31) is maintained interposed between the one or more guide walls (50) and the first plurality of flexible teeth (45).
 3. The screening apparatus (100) of any one of the preceding claims, wherein the head (35) comprises a turret (34) which in turn: bears the one or more switchers (51, 52); comprises a first front wall (32) which engages in the guide so as to distance the flexible teeth (45) of the first plurality of flexible teeth (45) from the longitudinal axis of the guide during the displacement of the movable bar (3) in the direction (G1) which tends to increase the length of the portion of flexible belt (7) arranged in the housing (31); comprises a second front wall (33), opposite the first front wall (32), which engages in the guide so as to distance the flexible teeth (45) of the first plurality of flexible teeth (45) from the longitudinal axis of the guide during the displacement of the movable bar (3) in the direction which tends to reduce the length of the portion of flexible belt (7) arranged in the housing (31).
 4. The screening apparatus (100) of any one of the preceding claims, wherein it comprises one or more endrun stops (61, 62) which are arranged to abut the flexible teeth (45) of the first plurality of flexible teeth (45) when the portion of flexible belt (7) presses against the flexible teeth (45) of the first plurality of flexible teeth (45), tending to distance the first plurality of flexible teeth (45) from the one or more guide walls (50), so as to maintain the portion of flexible belt (7) guided and consequently to further increase the resistance to axial compression of the portion of flexible belt (7) which is housed in the housing (31).
 5. The screening apparatus (100) of any one of the preceding claims, wherein: the frame (17, 18, 31) comprises a first upright (17) which is fixable to a first lateral flank (28) of the opening (2) made in the wall (5); the sheet (1) extends between the first upright (17) and the movable bar (3); the portion of flexible belt (7) extends between the movable bar (3) and a second lateral flank (29), opposite the first lateral flank (28), of the opening (2) made in the wall (5); the one or more guide walls (50) comprise a first guide wall (47) and a second guide wall (48) which are spaced from one another to define a second through-opening (42) crossable by the upper edge portion (23) of the sheet (1) at the housing part (31) interposed between the first upright (17) and the movable bar (3).
 6. The screening apparatus (100) of the preceding claim, wherein: it comprises a plurality of button elements (10); the button elements (10) of the plurality of button elements (10) are borne by the sheet (1) and are arranged at least along the upper edge (22) of the sheet (1); the portion of the upper edge portion (23) of the sheet (1) crosses the guide and the second through-opening (42) in such a way that the button elements (10) of the plurality of button elements (10) are arranged after the second through-opening (42); the button elements (10) of the plurality of button elements (10) and the second through-opening (42) are mutually dimensioned so that the button elements (10) do not pass beyond the second through-opening (42), with the consequence that the upper edge portion (23) of the sheet (1) cannot exit the housing (31).
 7. The screening apparatus (100) of any one of claims from 1 to 4, wherein the first guide (81) is distanced from the first through-opening (41) in such a way that the upper edge portion (23) of the sheet (1) is distanced from the first guide (81).
 8. The screening apparatus (100) of any one of the preceding claims, wherein the flexible belt (6) is made of a plastic material.
 9. The screening apparatus (100) of any one of the preceding claims, wherein the flexible teeth (45) of the first plurality of flexible teeth (45) are brushes.

10. The screening apparatus (100) of claims 1, 2 and 4, wherein: the first plurality of flexible teeth (45) comprises a first assembly of flexible teeth (71) and a second assembly of flexible teeth (72); the flexible teeth (45) of the first assembly of flexible teeth (71) are opposite the flexible teeth (45) of the second assembly of flexible teeth (72); the one or more switchers (51, 52) comprise a first switcher (51) and a second switcher (52); the first switcher (51) is arranged and conformed to distance the flexible teeth (45) of the first assembly of flexible teeth (71); the second switcher (52) is arranged and conformed to distance the flexible teeth (45) of the second assembly of flexible teeth (72); the one or more endrun stops (61, 62) comprise a first endrun stop (61) and a second endrun stop (62); the first endrun stop (61) is arranged to abut the flexible teeth (45) of the first assembly of flexible teeth (71); the second endrun stop (62) is arranged to abut the flexible teeth (45) of the first assembly of flexible teeth (71).

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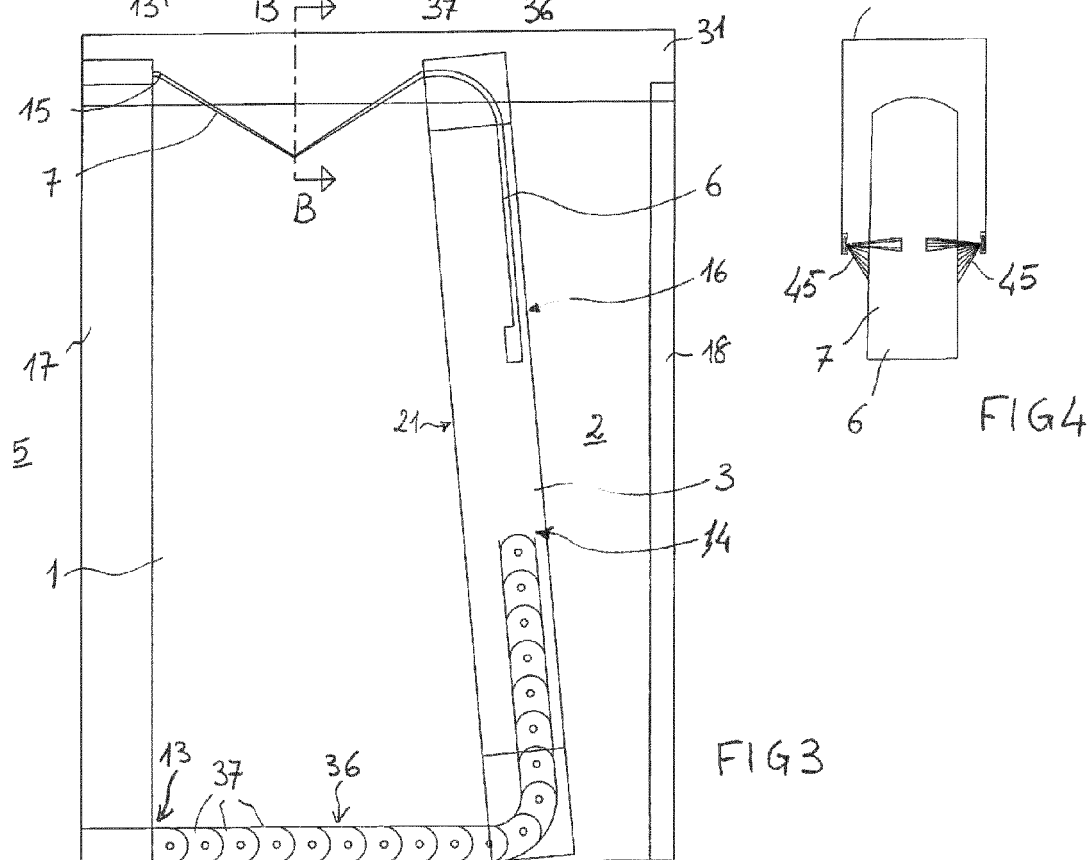
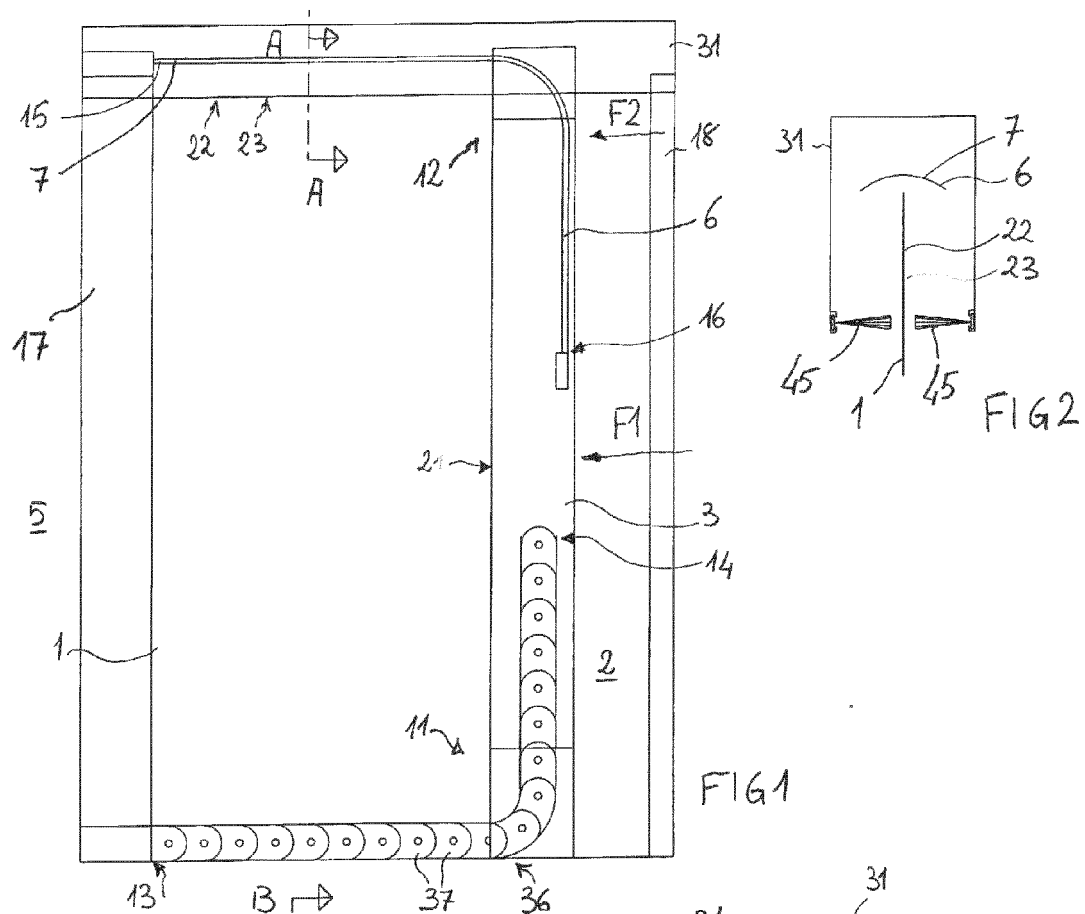
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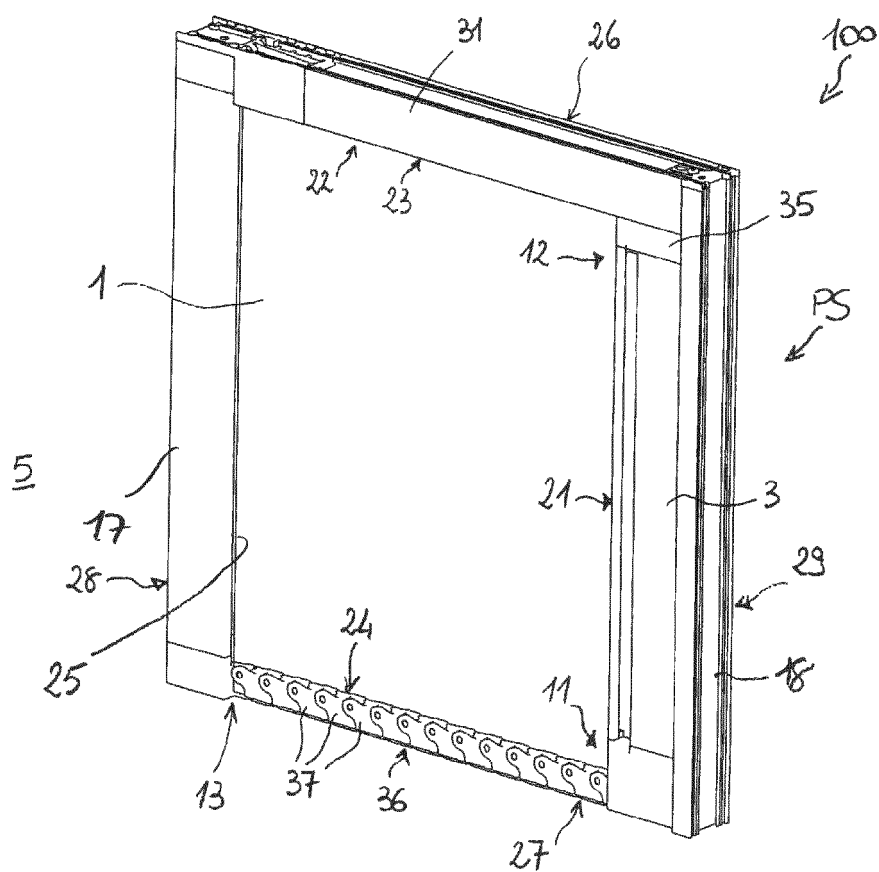


FIG 5A

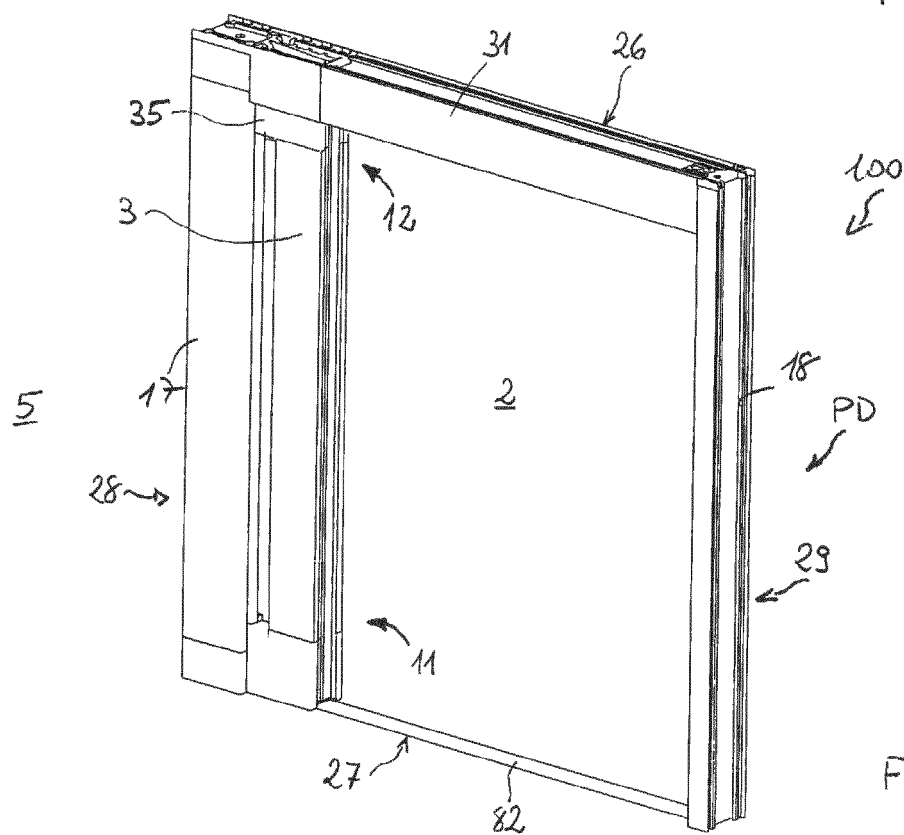
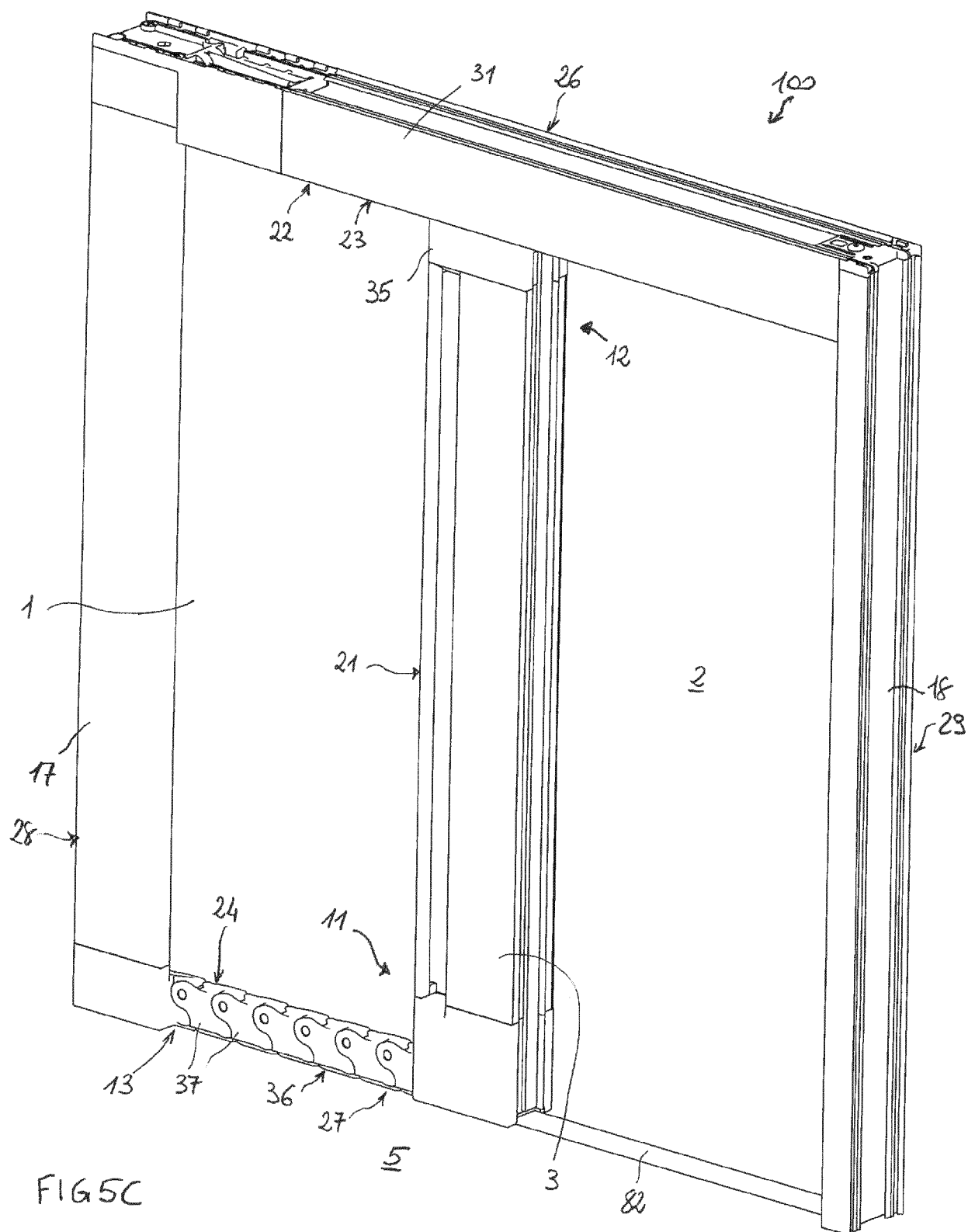


FIG 5B



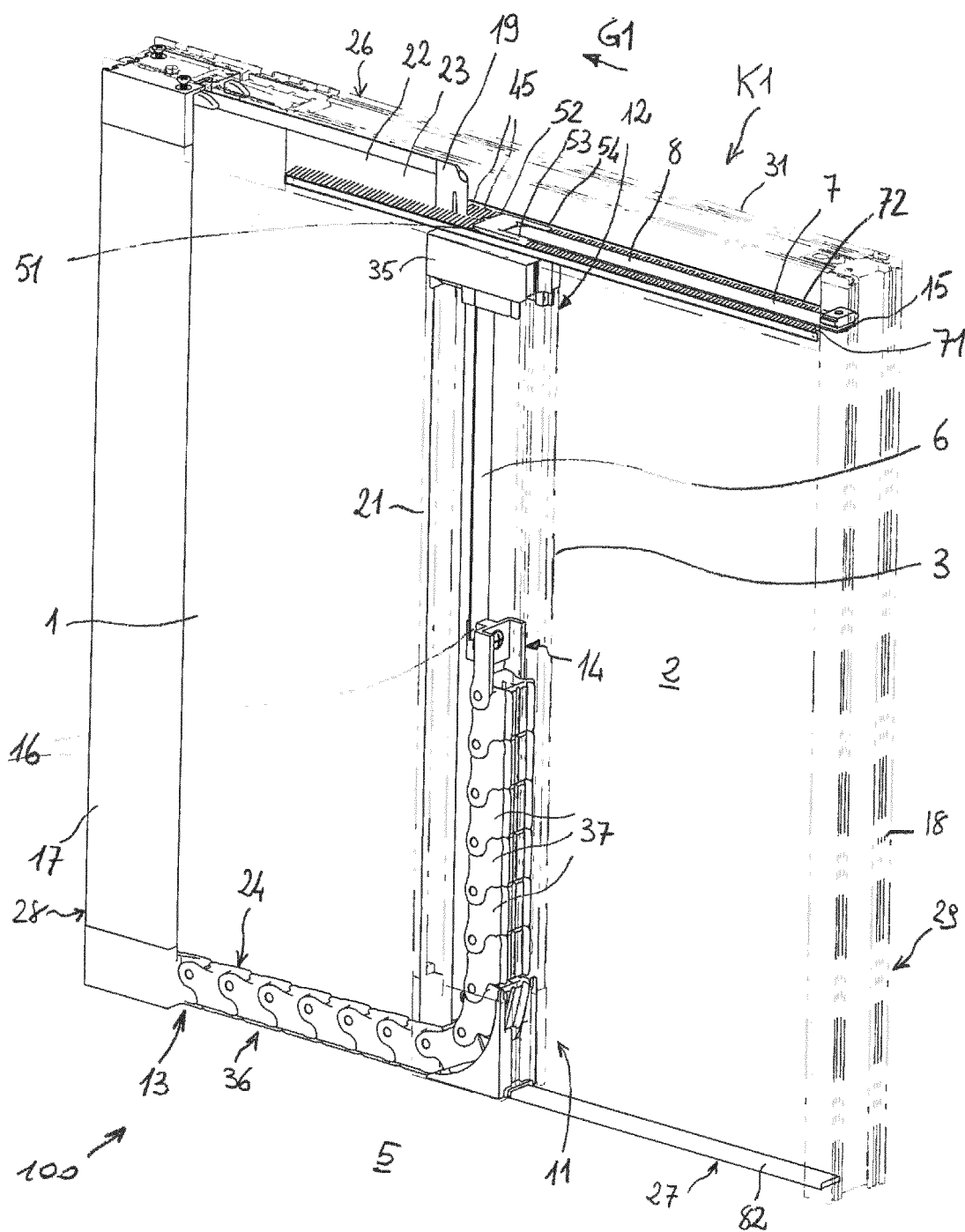
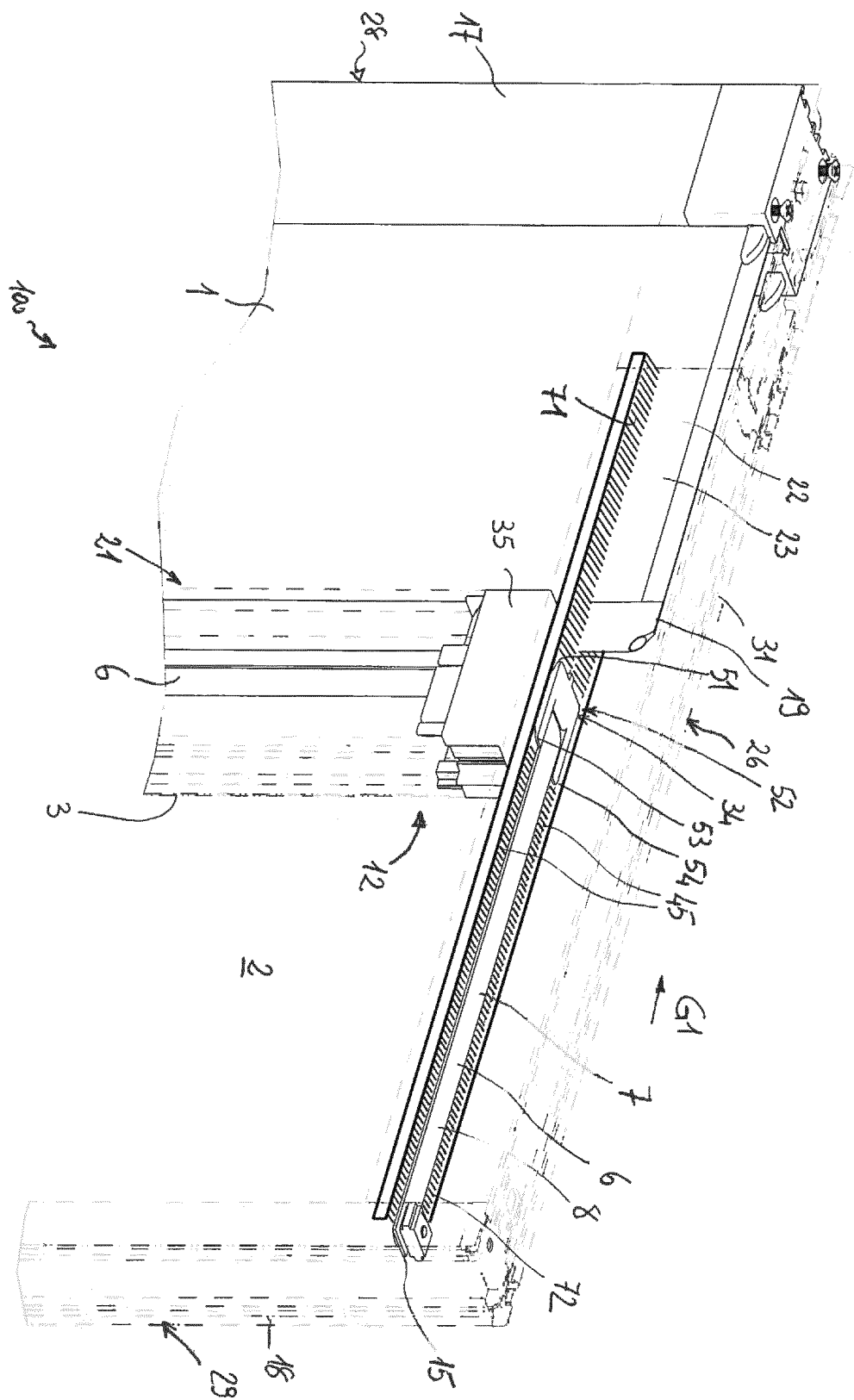
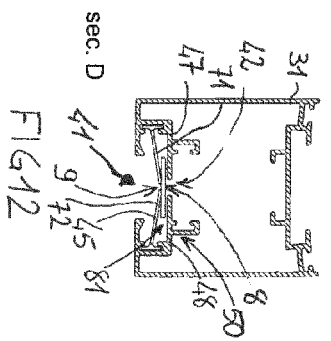
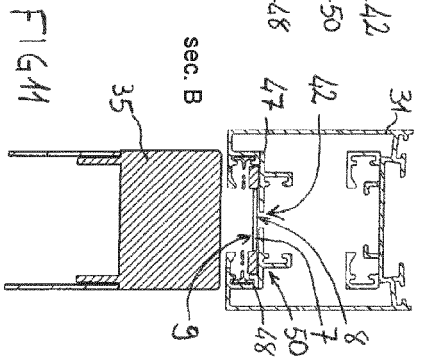
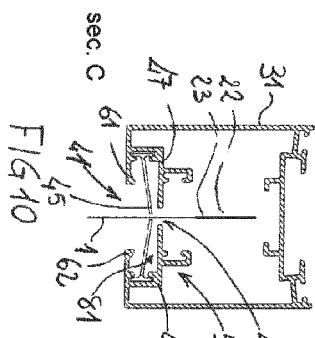
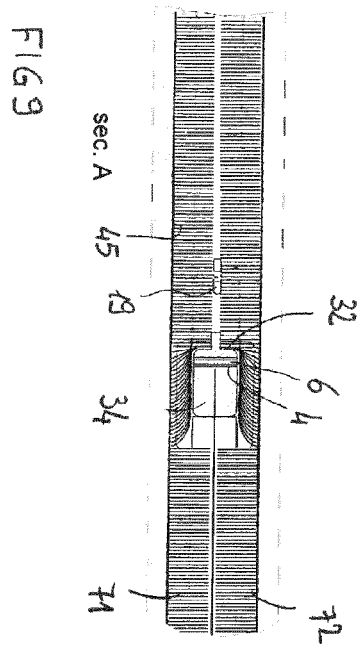
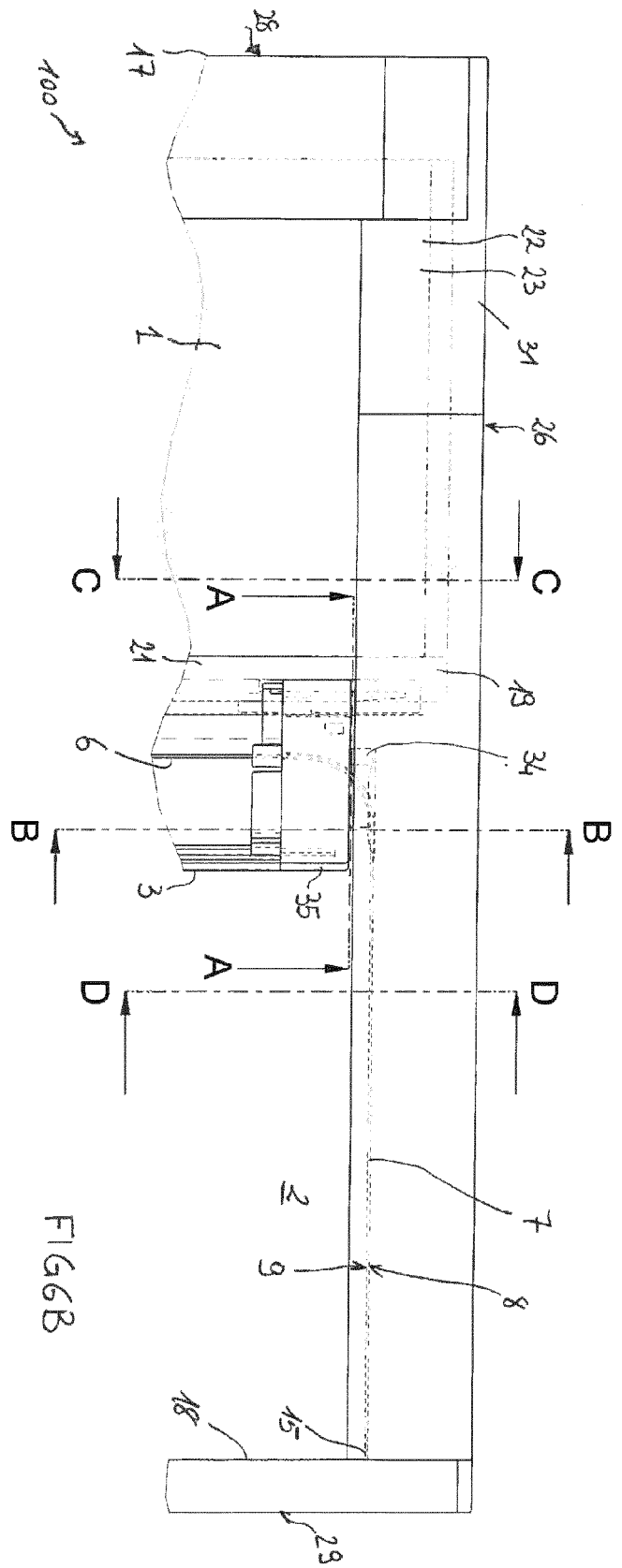
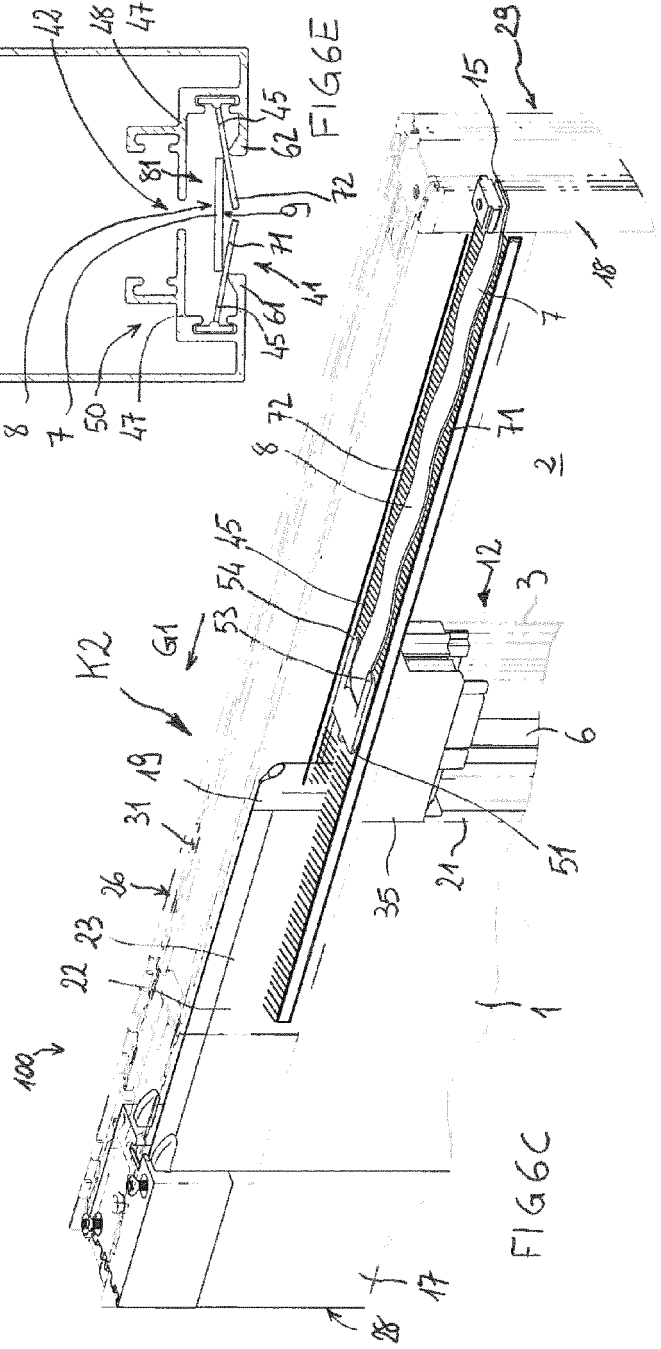
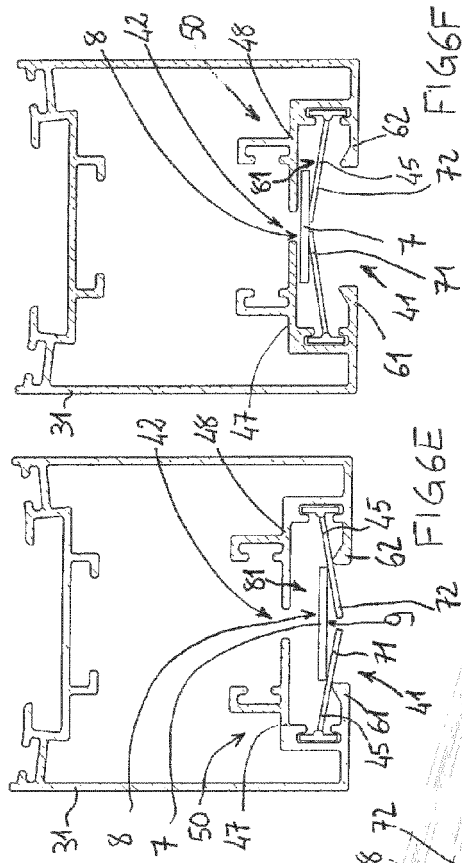
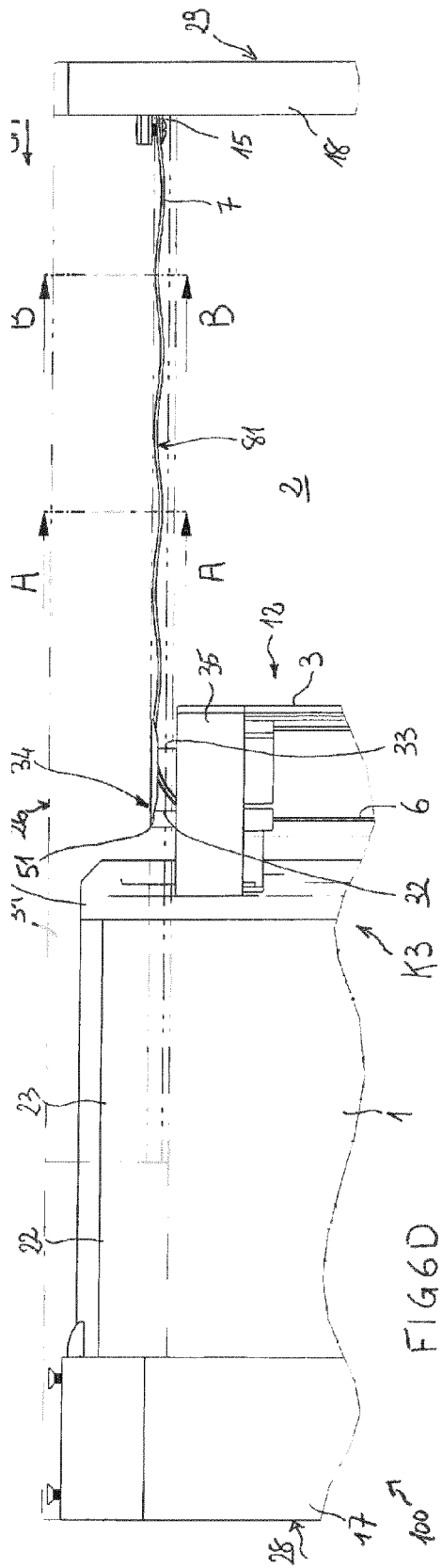


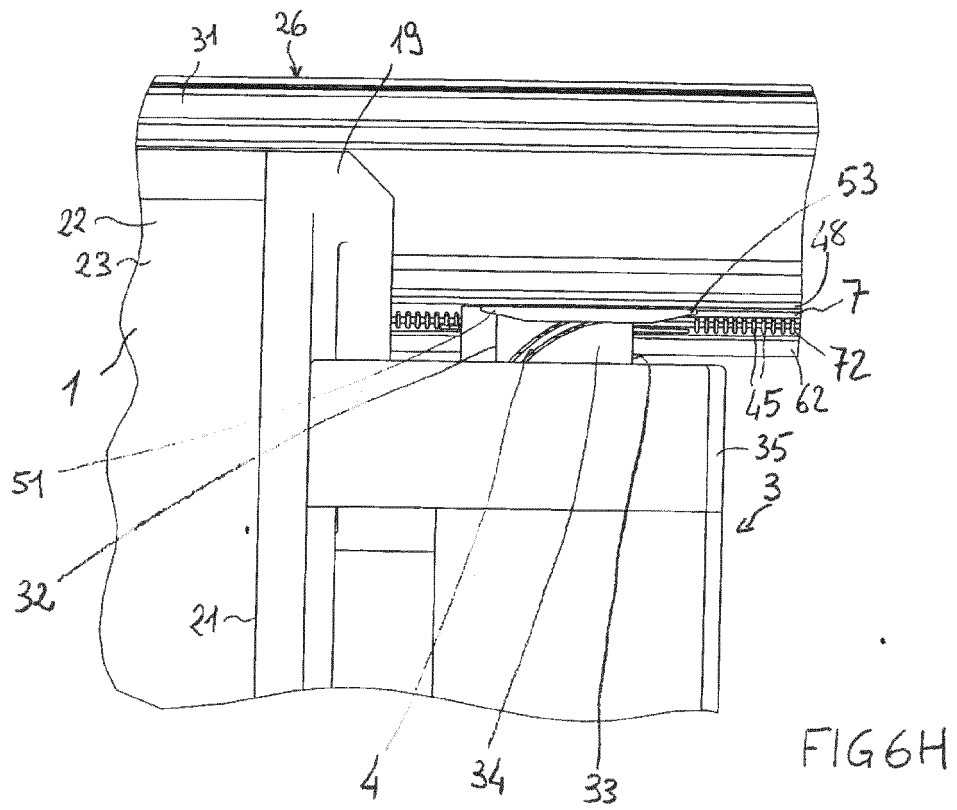
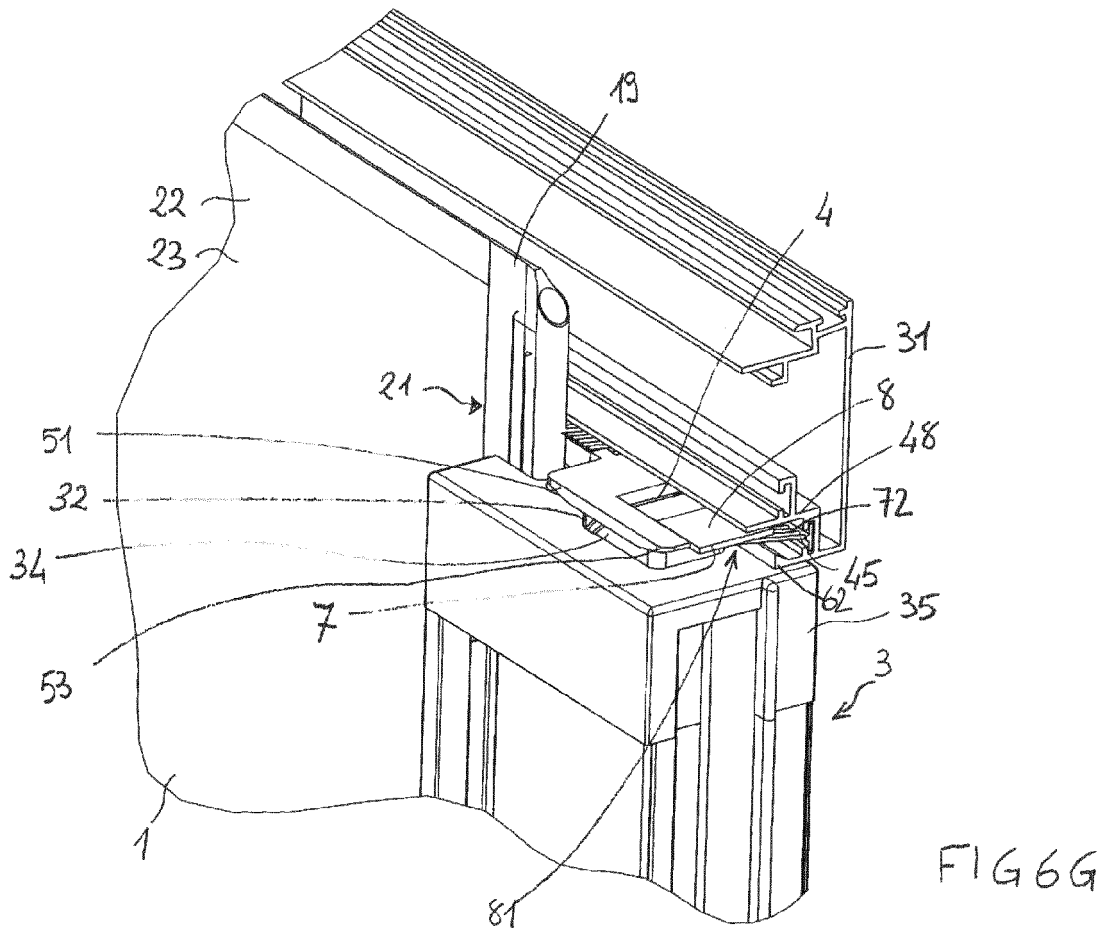
FIG 6



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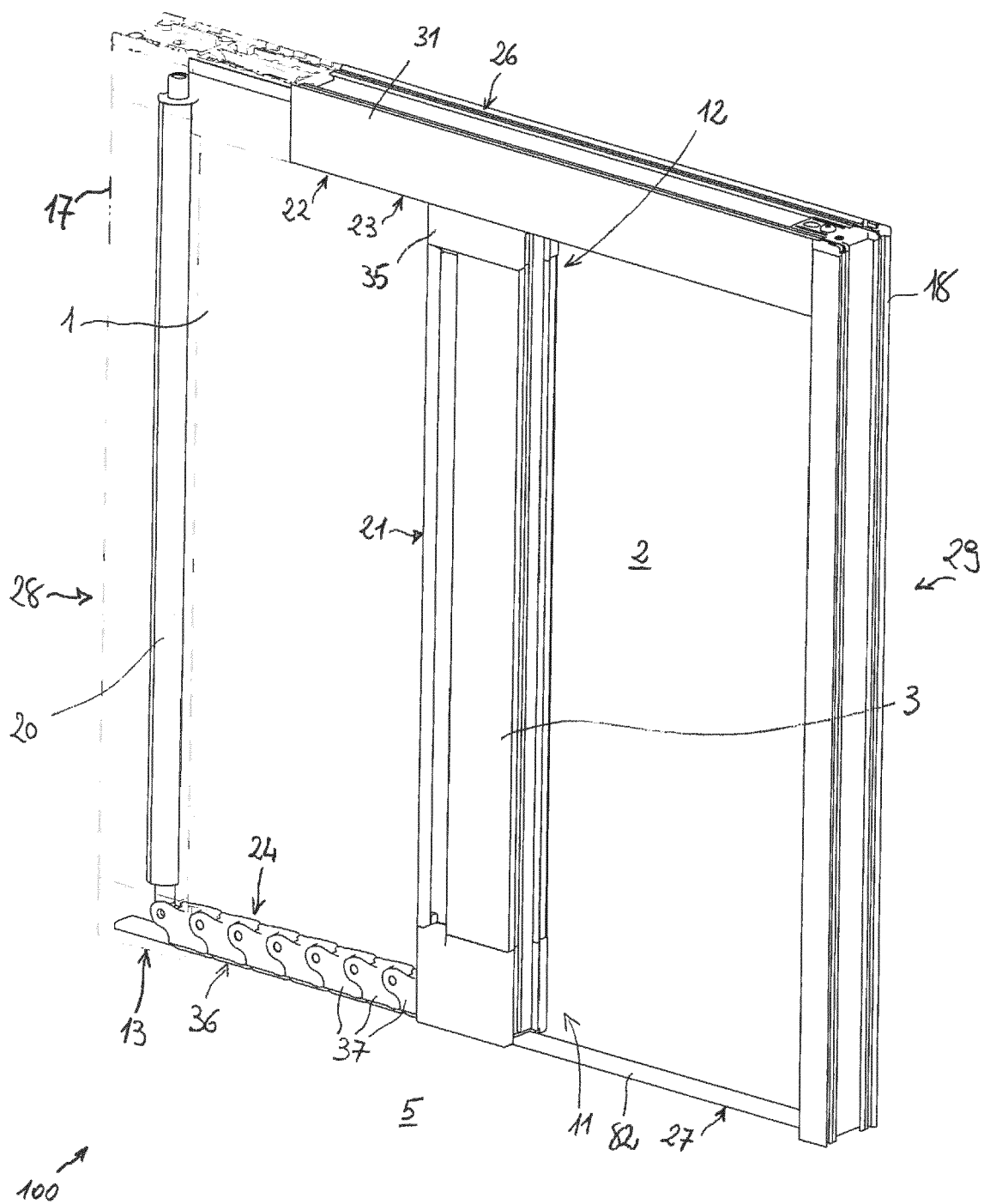
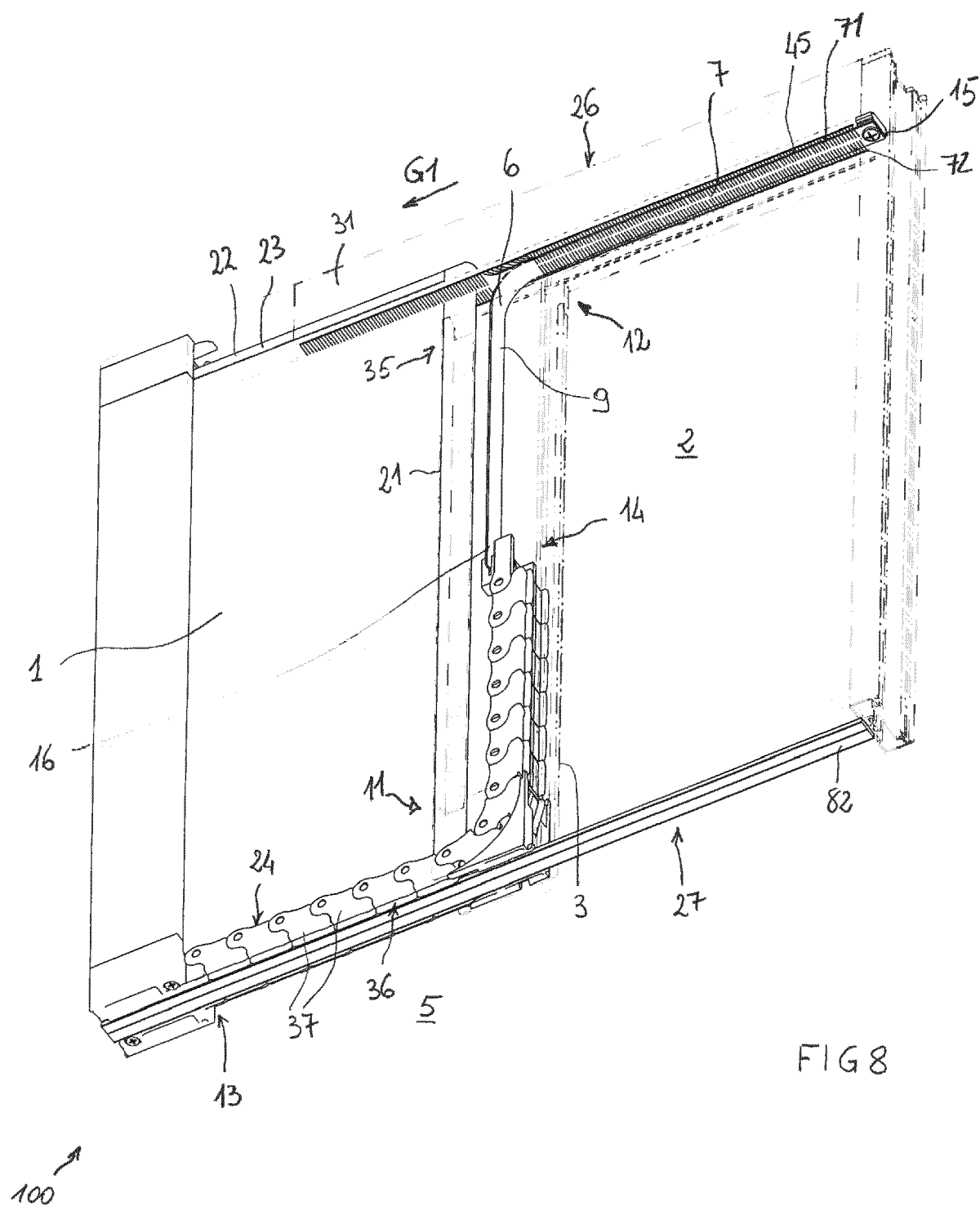
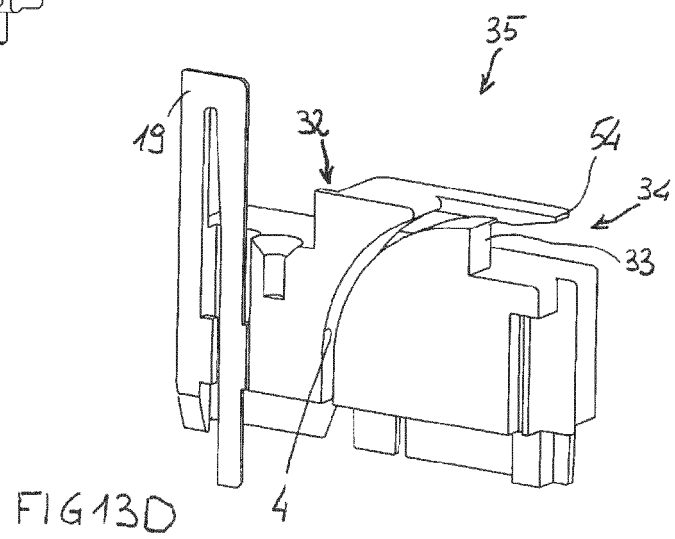
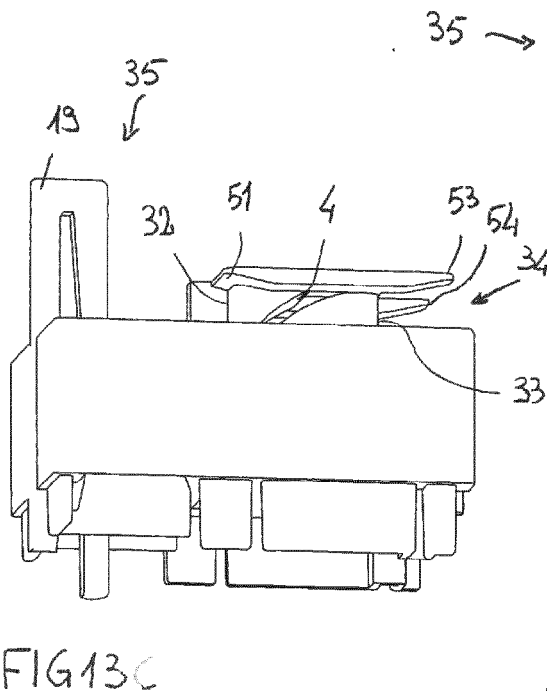
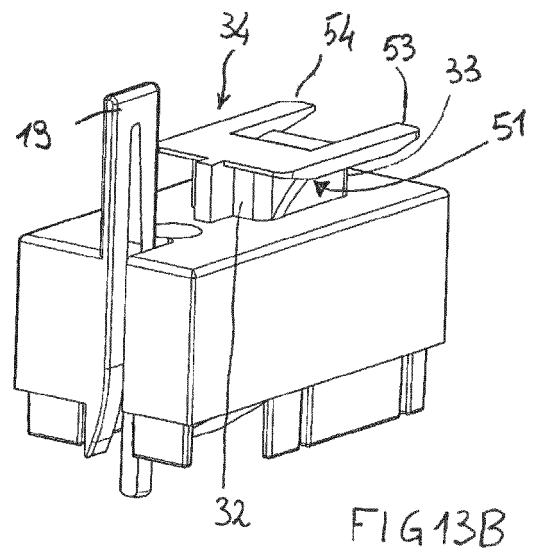
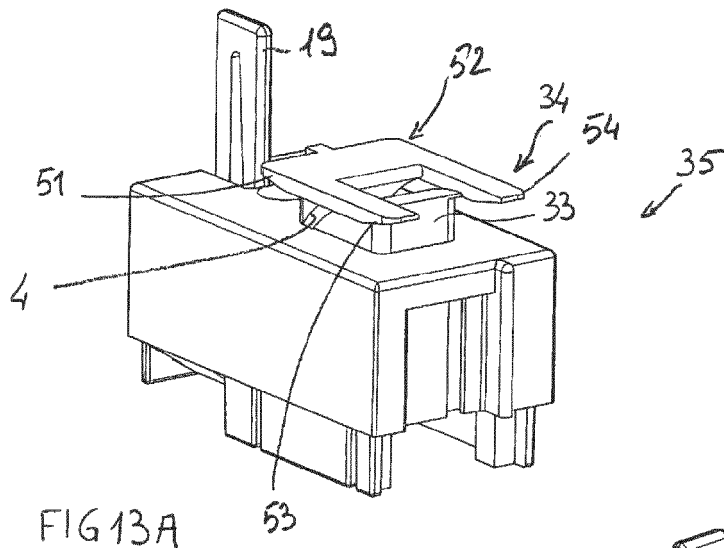
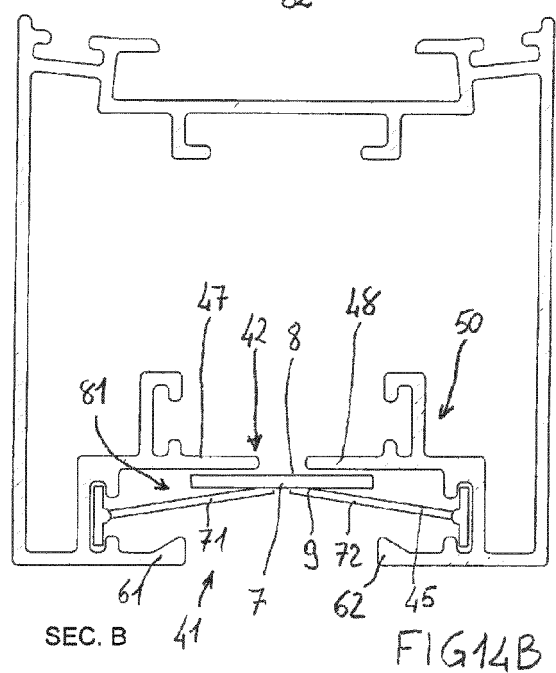
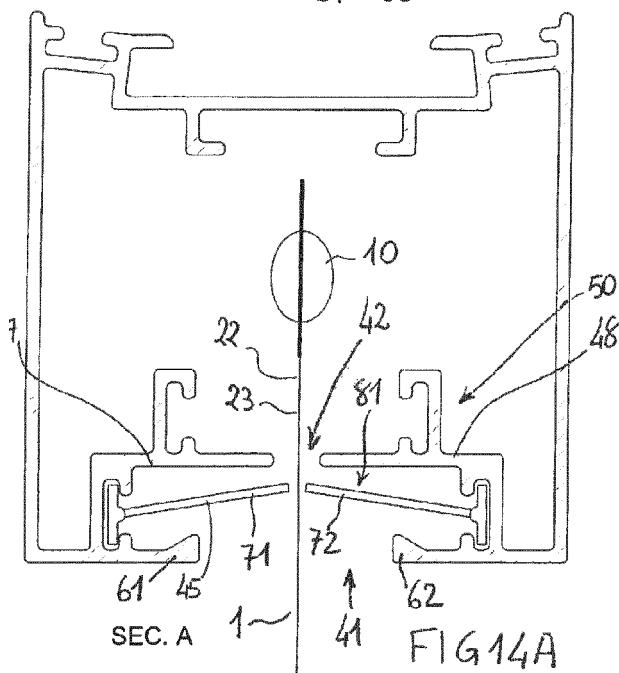
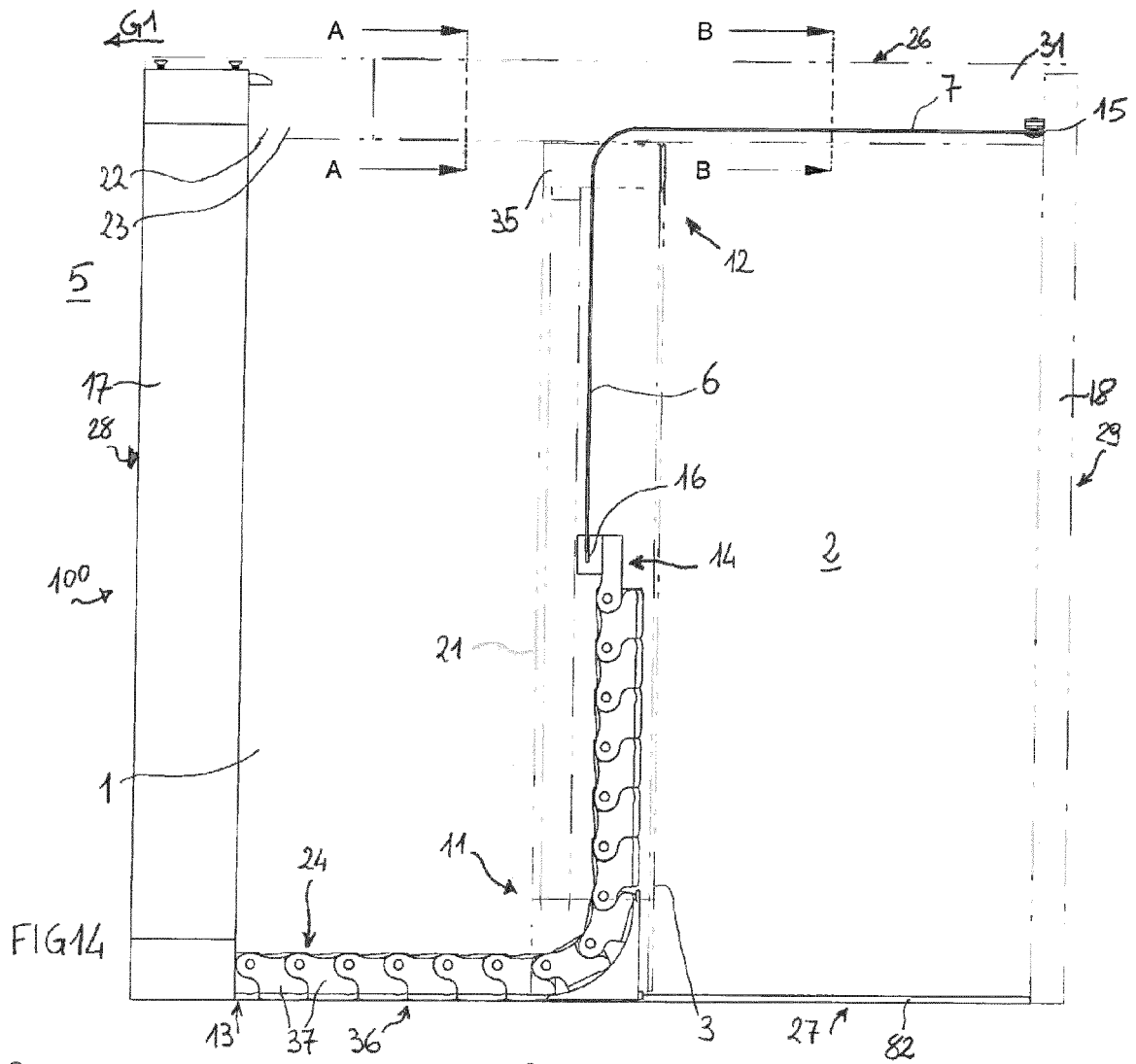
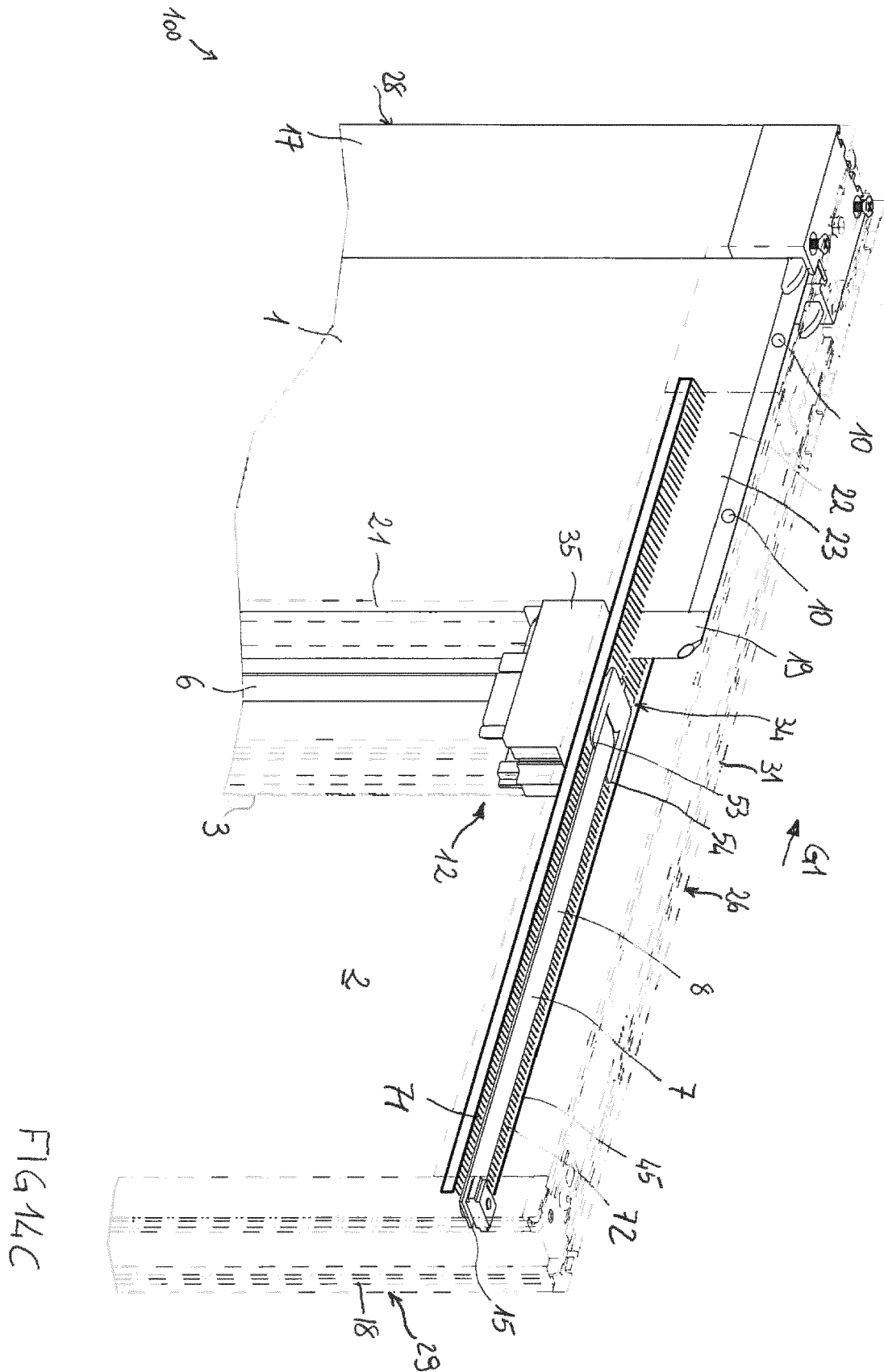


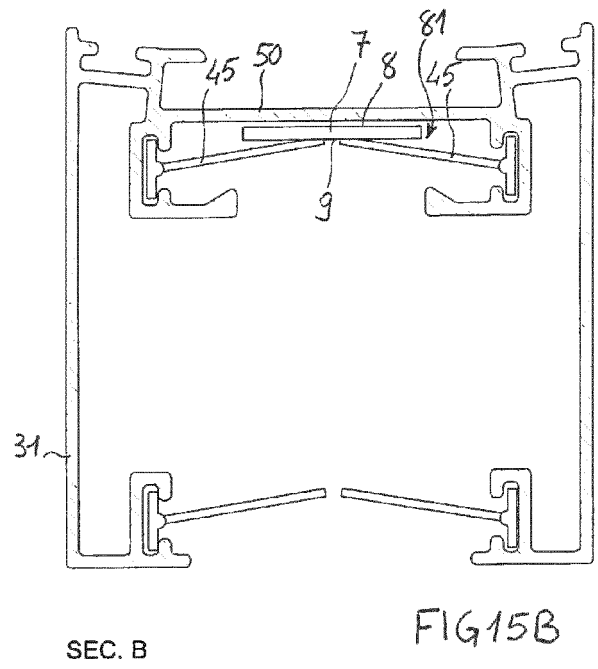
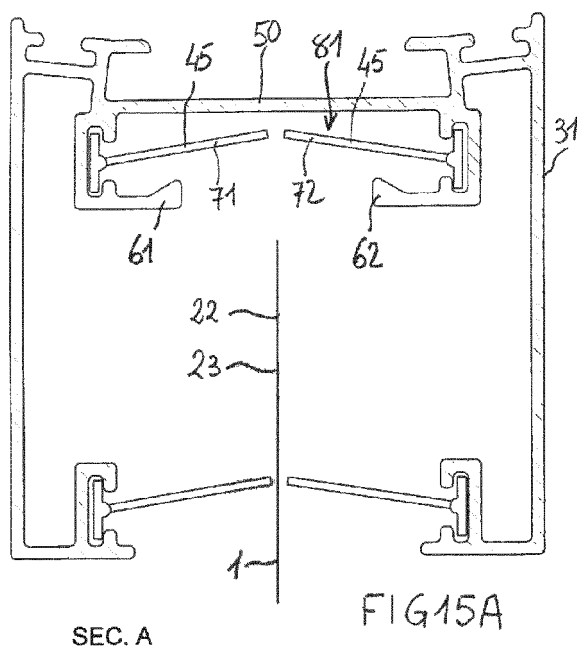
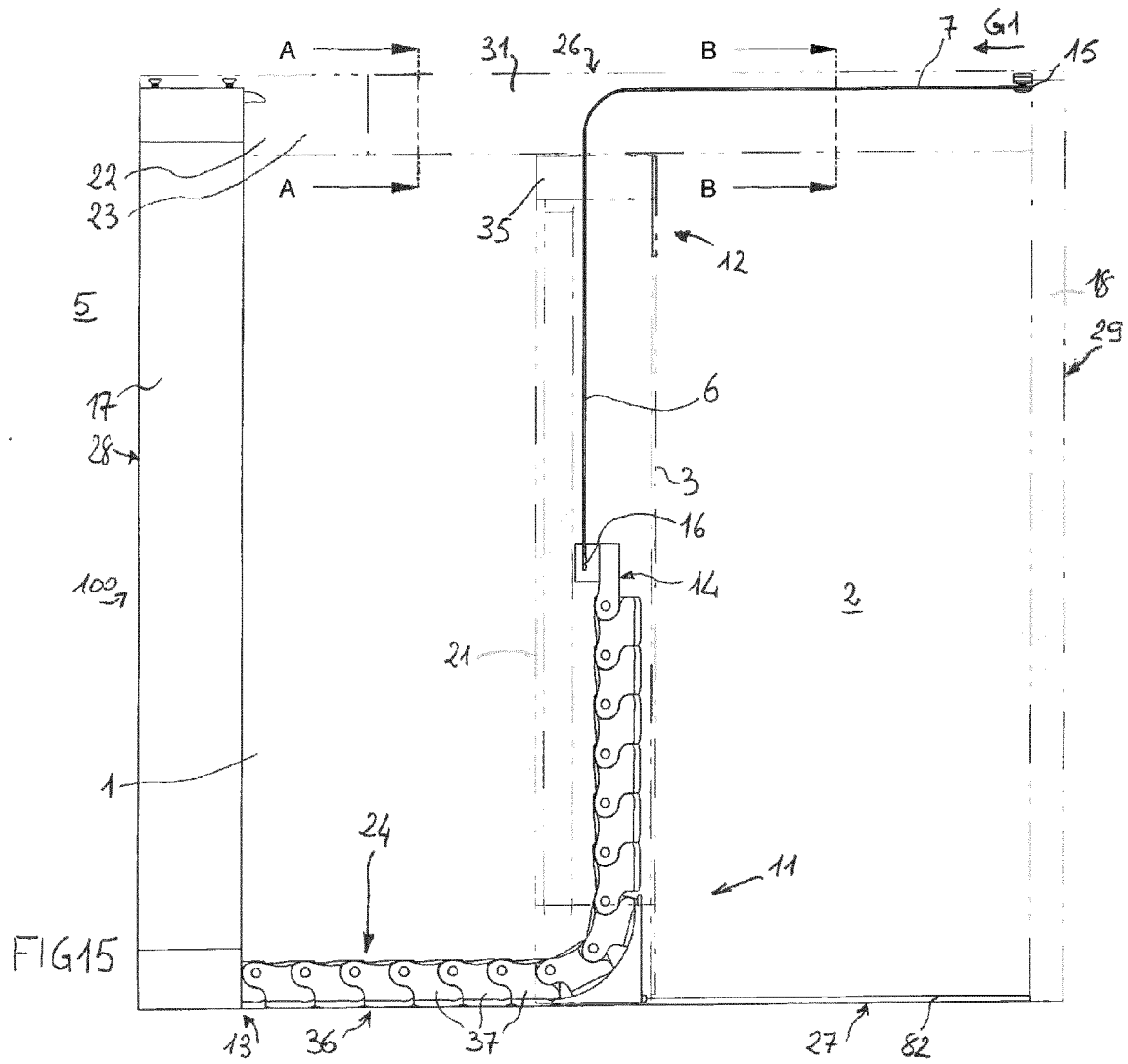
FIG 7

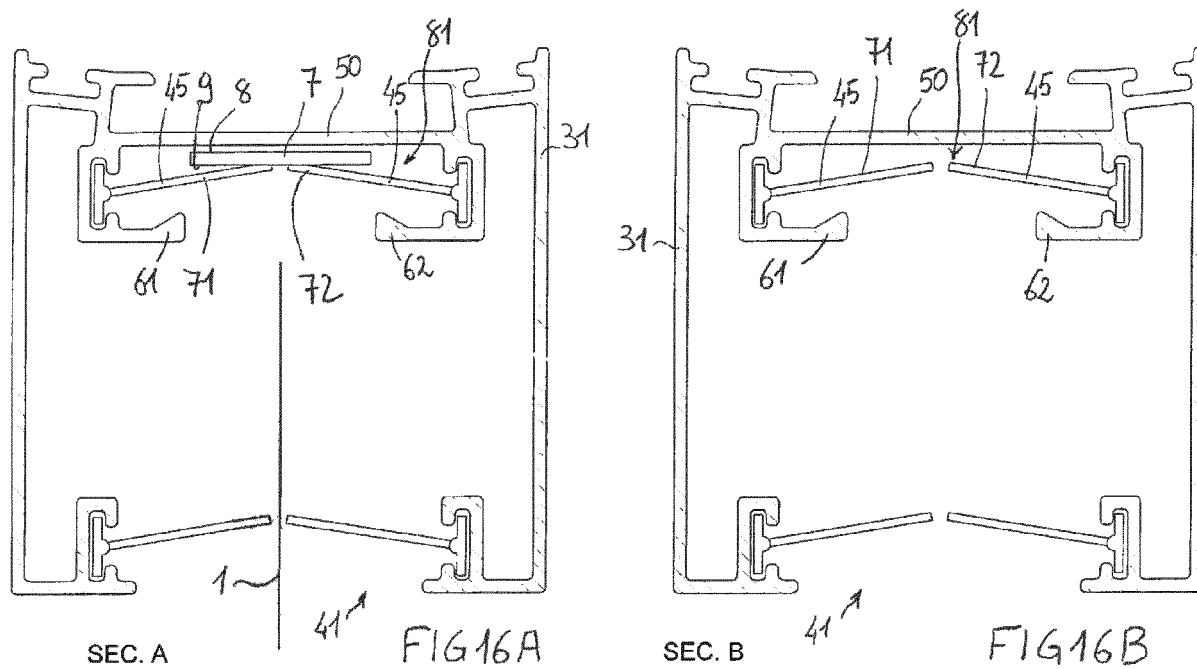
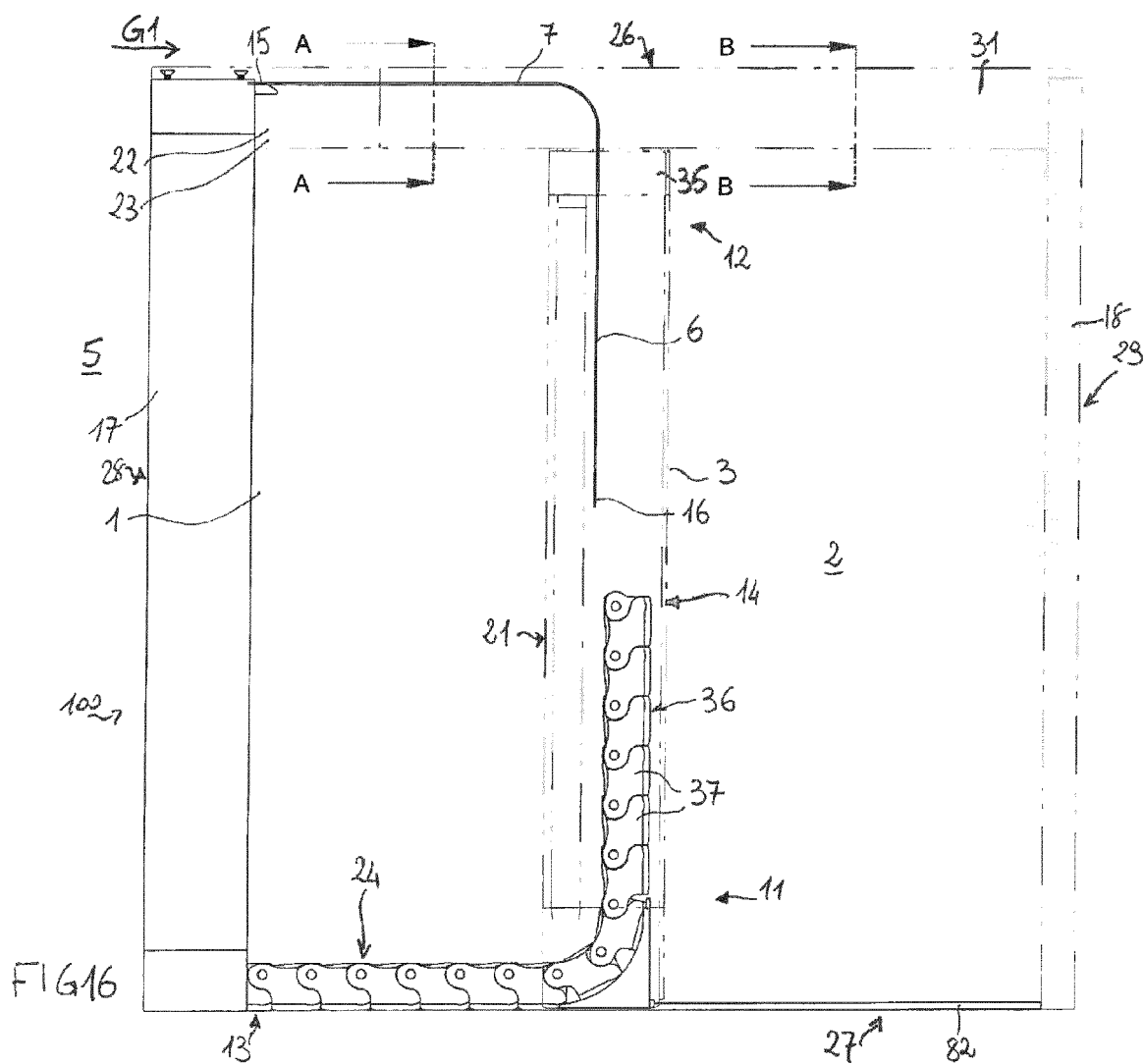


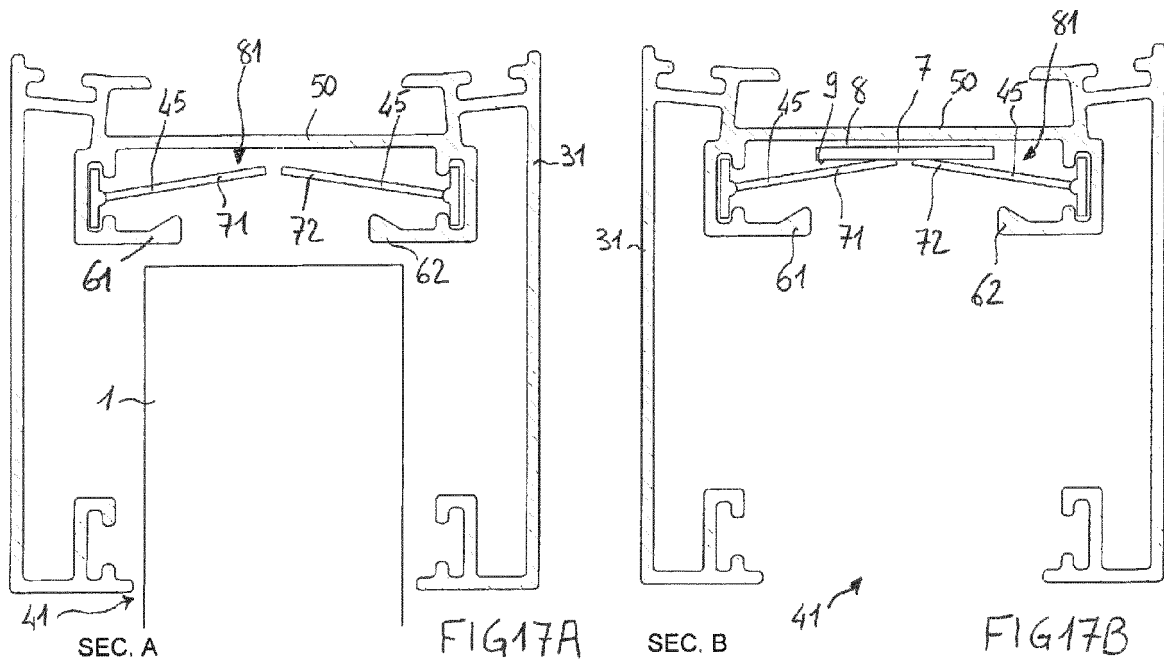
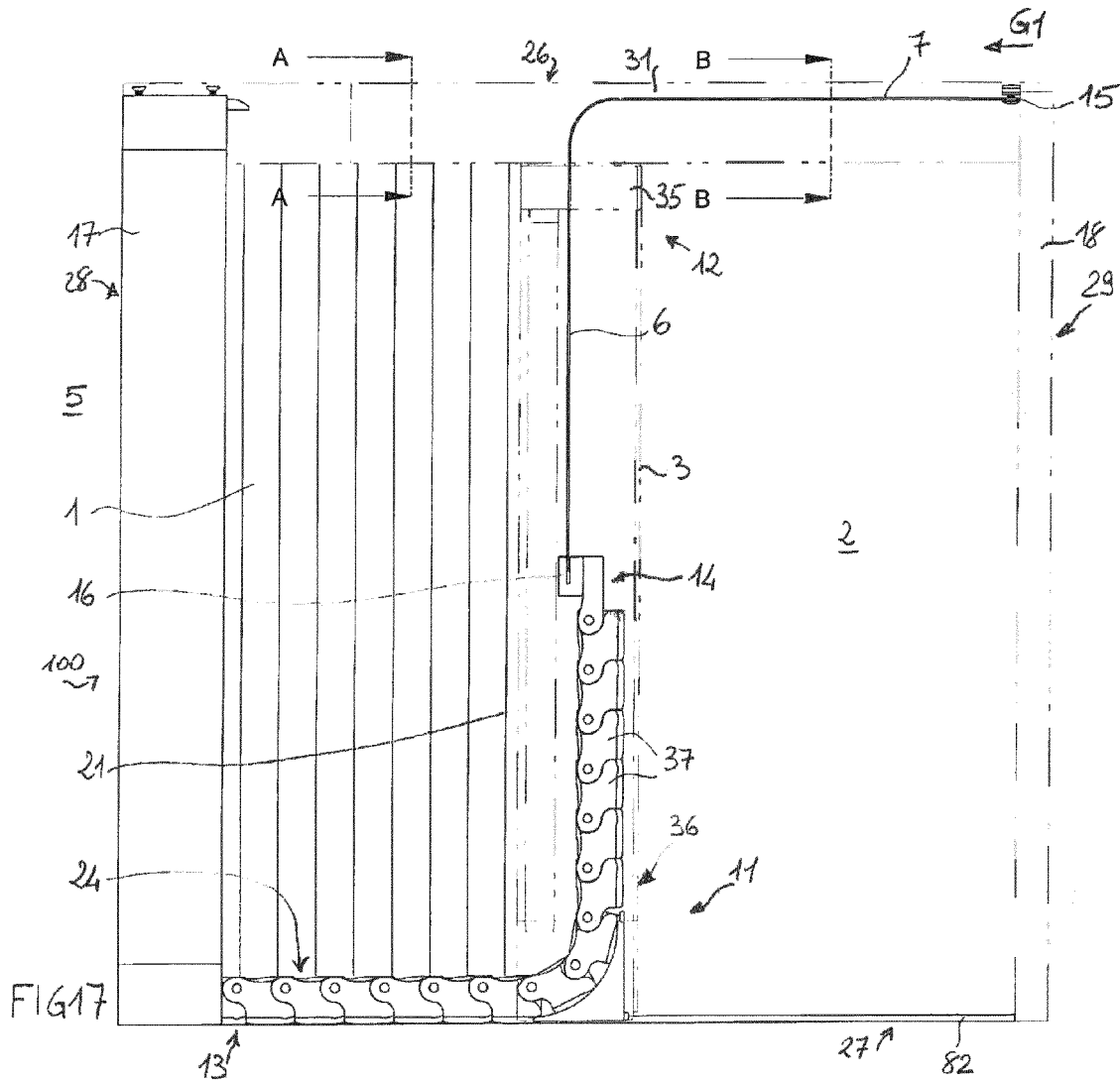


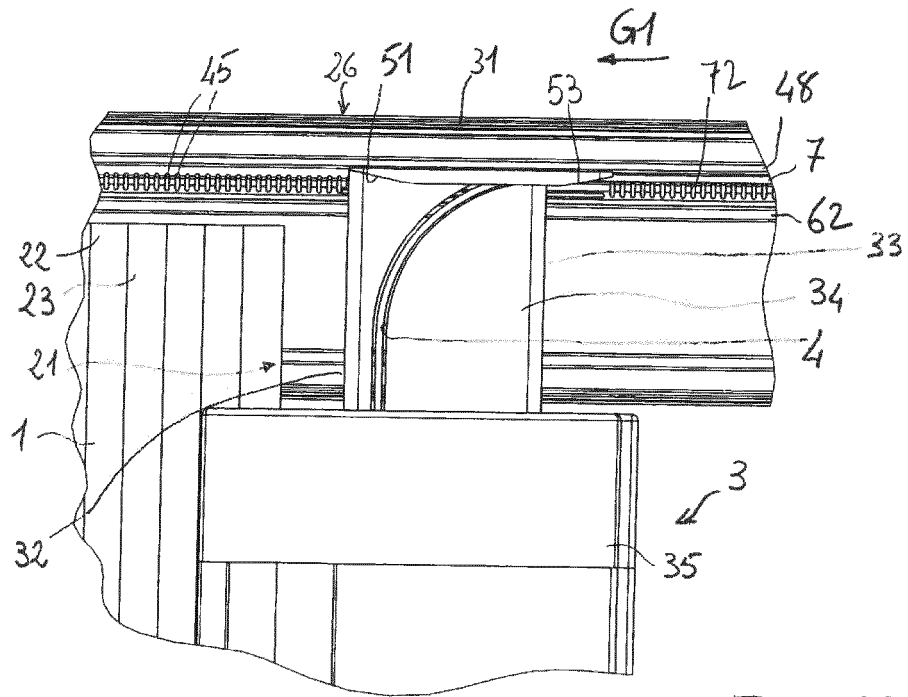
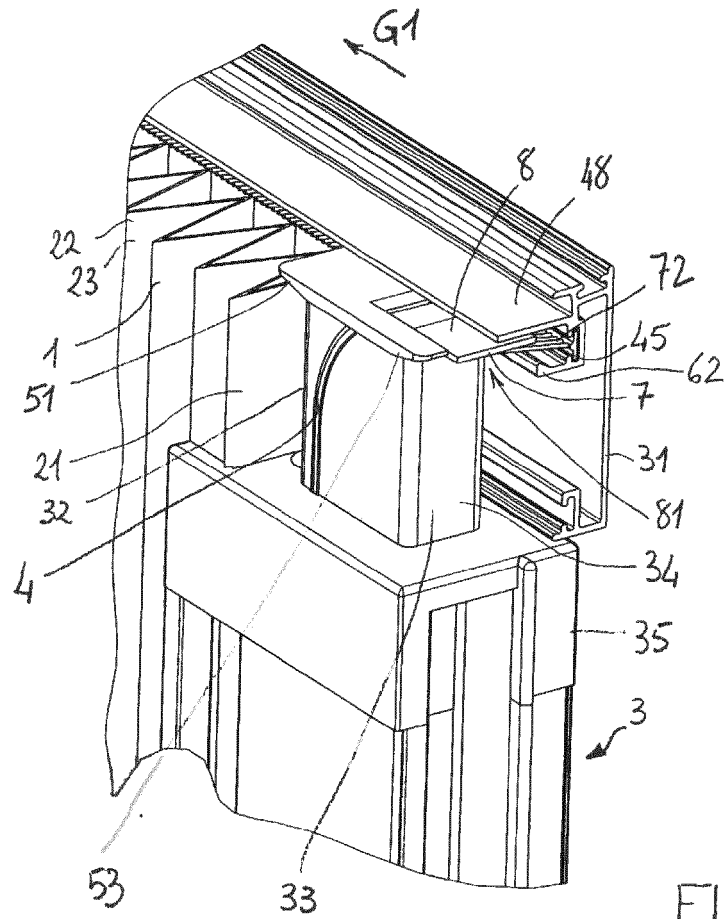


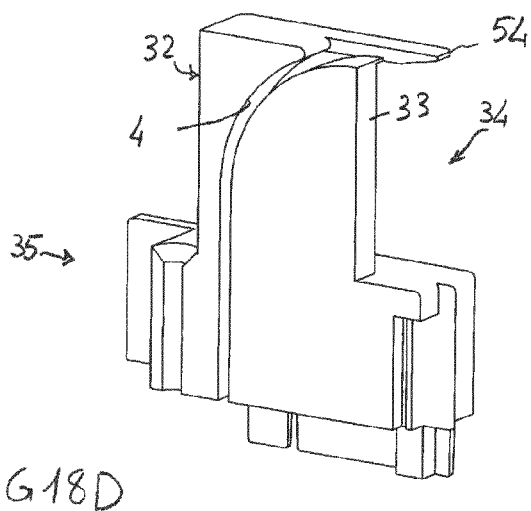
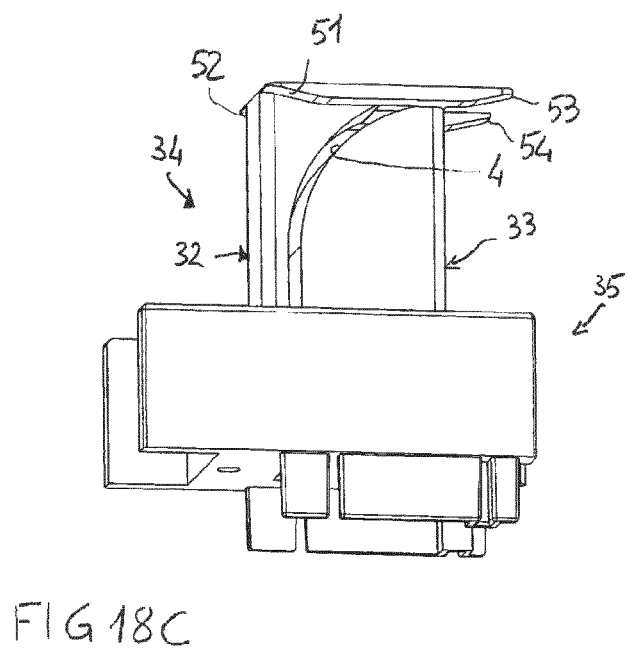
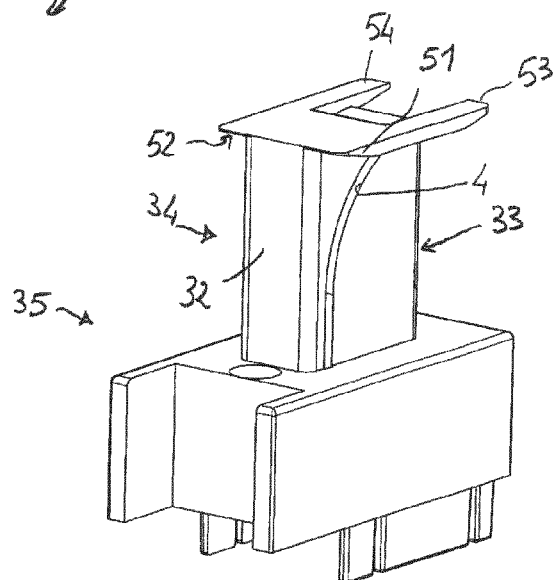
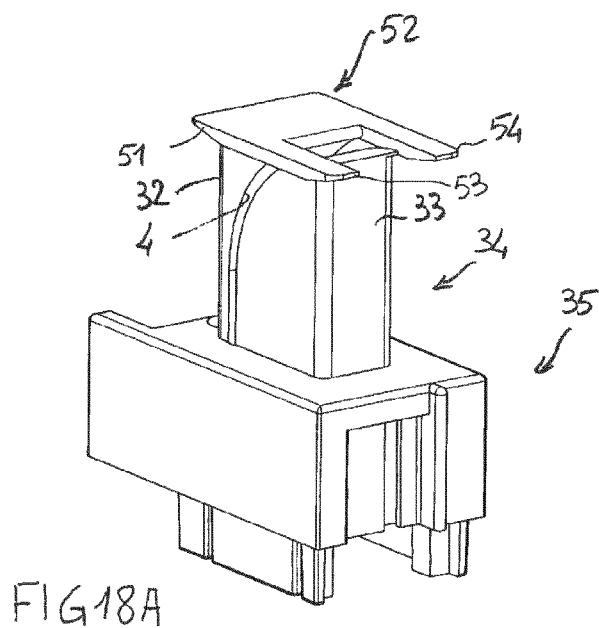














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Application Number
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			E06B
The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 13 October 2020	Examiner Altamura, Alessandra
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