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(54) **Sectional gate**

(57) Sectional gate comprising at least a spring system (10), two mounting plates (17) and two connecting systems (13) for connecting each an end portion of the spring system (10) to a mounting plate (17), whereby at least one connecting system (13) is a horizontally unidi-

rectional click system adapted for a unidirectional horizontal click in a direction defining a horizontal axis (H1) for the pivotment of the first connecting system (13) while being connected to the first mounting plate (17) supporting the first end portion of the spring system (10).

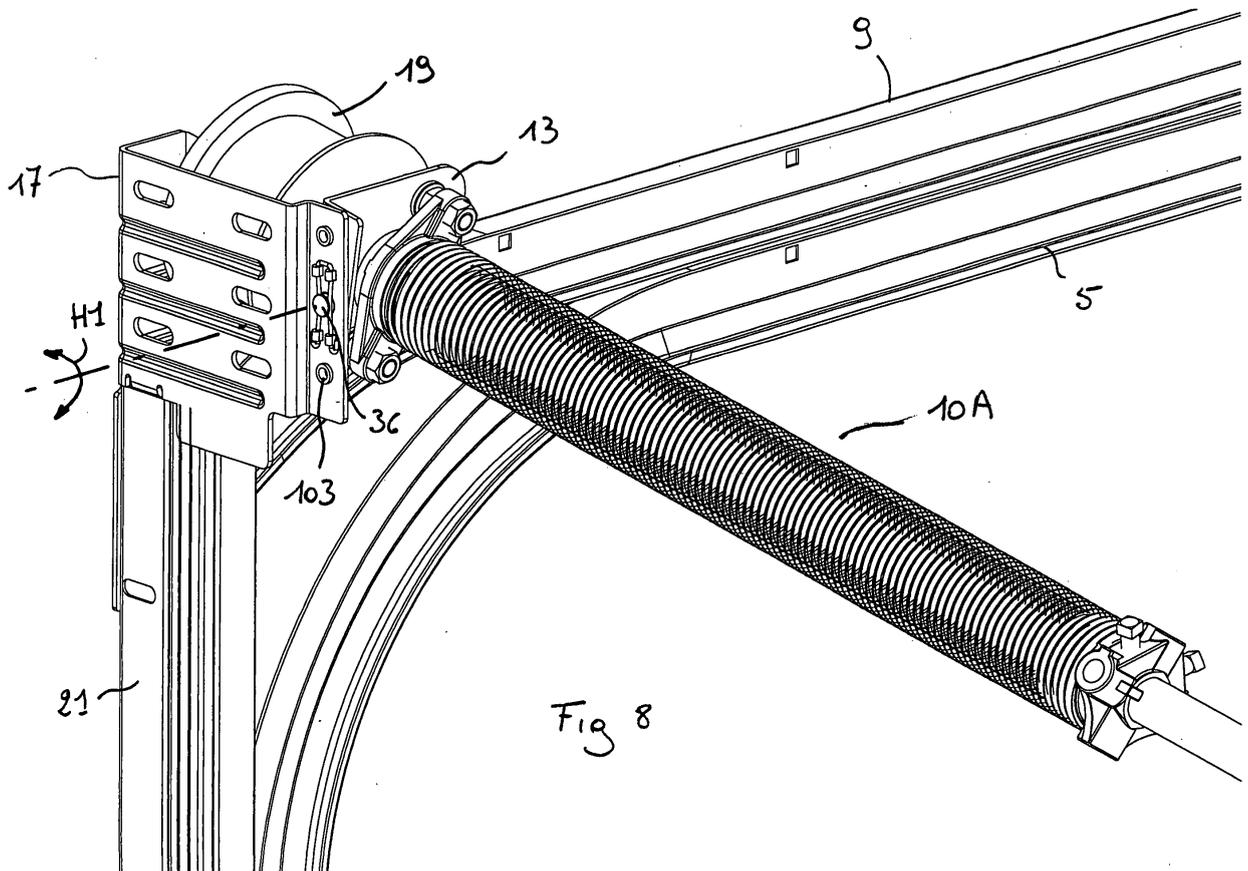


Fig 8

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Description

[0001] The present invention concerns a sectional gate, in particular a gate comprising an articulated wall intended to extend substantially in vertical plane when said wall is in closed position.

[0002] The panels of such sectional gate are mutually connected by means of articulating means which are also provided with roller means, which are meant to be guided by guide rails from a first position corresponding to the closed position of the sectional gate, to a second position corresponding to the open position of the sectional gate.

[0003] The opening and closing of the gate is usually facilitated by an electric motor and/or a spring system. The spring system usually comprises a spiral spring wound around a shaft and mounted on the lintel beam or the wall portion above the gate opening, and connected with the actual gate.

[0004] A problem that is known from such sectional gates is that the components of such gates are in general rather heavy and therefore, these gates are difficult to assemble and not suitable to be mounted by only one person.

[0005] In the case of a fire-resisting section gate, the panel, the guiding means, the spring system, and the electric motor become heavier.

[0006] It is known that, when bolts are used for mounting a sectional gate, at least two workmen, if not three, are required, one or two sustaining the pieces brought together while another screws the bolts in their fixed position. The placement of the spring system is time consuming.

[0007] Another known sectional gate makes use of a more intelligent mounting system, whereby one component to be mounted on another component is provided of one or more hooks from which the curved or widened free end can cooperate with a hole in the second component.

[0008] A problem though introduced by such mounting system comprising hook, consists of the fact that more space is required than the volume of both components.

[0009] Indeed, the hook should be brought through the hole and afterwards, the second component comprising the hook, or the first component comprising the hole, requires a secondary displacement as for example a downward movement.

[0010] It is clear that also sidewise secondary displacements require extra space.

[0011] Another problem is that the spring system requires to be correctly maintained and displaced in horizontal direction, movement which is not easy even when made by two workmen.

[0012] The required extra space is often critical as for example in the case of the spring system is to be mounted with such a hook mounting system.

[0013] Indeed, the available height between the top of the gate opening and the ceiling of a garage is often smaller than the required height for mounting such known

spring system.

[0014] The same occurs when an electric motor is to be mounted to the ceiling.

[0015] US 5,964,268 discloses a sectional gate for closing at least partly a gate opening, said gate comprising :

- an articulated wall comprising panels coupled together, whereby the gate extends in its closed position between a bottom edge of a bottom panel and an upper edge of an upper panel ;
- at least two guide rails adapted for guiding the movement of the panels between a closed position in which they are adapted for closing at least substantially an opening and an open position and an open position in which panels are not closing said opening ;
- at least one spring system with at least one flexible members attached to a panel, preferably to a bottom panel, said spring system being adapted for facilitating panels to move along the guide rails at least for the opening of the sectional gate, said spring system comprising an elongated member intended to extend substantially above the gate opening,
- at least two vertical profiles for supporting the spring system,
- at least two distinct connecting systems adapted for attaching the elongated member of the spring system to the vertical profiles so as to extend above the gate opening, whereby at least one of said connecting systems comprises a unidirectional click system,

[0016] In the embodiment of US 5,964,268, the vertical profile are provided with a bearing plate provided with a slot for receiving a cylindrical mounting portion of a gear housing, while the gear housing has two opposite flanges adapted for contacting two flange mounts of the bearing plate. Said bearing plate is attached to the profile by means of bolts.

[0017] A major problem, when mounting such sectional gate, especially of the type disclosed in US 5,964,268, is that it is rather difficult to place safely, correctly and without risk of damages of pieces of the sectional gate or parts thereof, especially when mounting the spring system.

[0018] Indeed, the spring system is quite heavy, especially in case of fire-resisting section gate. Moreover, the place where the spring system has to be located is difficult of access, due to limited space and as the spring system has to be mounted well above the ground level. It is therefore quite difficult to move simultaneously several cylindrical mounting portion in the slots of the various bearing plate, such movement requiring simultaneous identical movement of the ends of the spring system. Any difference of movement between the ends of the spring system will not permit a correct attachment or any attachment of the ends of the spring system.

[0019] Moreover, this step is even rendered more com-

plicated as it is necessary to ensure that simultaneously the various housings are correctly moved so that opposite flanges are directed so as to be able to move between the flange mounts of the bearing plate. Even with two workmen, the placement of the spring system is quite difficult. The placement of the spring system is even rendered more complicated, as in case the distance between the vertical profile is not correct, it is necessary to remove the possibly already attached end of the spring system and to lay back the spring system on the ground before adapting the position of the vertical profile. This is quite time consuming.

[0020] The mounting of the spring system of the sectional gate of US 5,615,723 is requiring high precision, as the position of the housing has to be accurate for enabling the movement of the cylindrical mounting portions in the several slots of the bearing plates.

[0021] The mounting of the spring system of US 5,615,723 will thus requires at least two workmen for correctly placing the spring system, as the placement will require workmen to sustain the spring system above, said workmen having then to displace the spring system in an inclined direction with respect to the vertical. Such a movement is quite difficult, as being done well above the ground level, with humans' arms in extended position. For ensuring a correct snap-in operation, the workmen need to be not too far from the cylindrical mountings and housings.

[0022] The sectional gate of the invention has for aim to facilitate the placement of the spring system, which can possibly be operated by one single workman. Indeed, in the sectional gate of the invention, a single workman can attach a first end portion of the spring system on a first mounting plate. After said attachment, the workman can pivot the spring system so as to place the second end portion at the place where it needs to be attached. The workman can thus easily attach said second end portion of the spring system, without any problem. Advantageously, substantially horizontal unidirectional click systems are used so as to further facilitate the mounting of the spring system.

[0023] Furthermore, in advantageous embodiment, by using simple tool, it is also possible for a single workman to remove very easily the spring system, so as to replace it by a new one, or so as to repair it on the ground and to relick it in place after repair or maintenance work.

[0024] The invention relates to a sectional gate for closing at least partly a gate opening, said gate comprising :

- an articulated wall comprising panels coupled together, whereby the gate extends in its closed position between a bottom edge of a bottom panel and an upper panel;
- at least one substantially vertical profile ;
- at least two guide rails adapted for guiding the movement of the panels between a closed position in which they are adapted for closing at least substan-

tially an opening and an open position and an open position in which panels are not closing said opening;

- possibly means adapted for driving the movement of panels at least between their closed position and their open position ;

- at least one spring system with at least one flexible members attached to a panel, preferably to a bottom panel, said spring system being adapted for facilitating panels to move along the guide rails at least for opening partly the sectional gate, said spring system comprising an elongated member intended to extend at a level substantially above the gate opening, said elongated member having an elongated axis,
- at least a first mounting plate for supporting a first end portion of the spring system and a second mounting plate for supporting a second end portion of the spring system, said mounting plates being advantageously adapted for being connected to vertical profiles or to guide rails or to at least one horizontal profile, possibly with interposition of one or more intermediate pieces,
- at least a first connecting system and a second connecting systems adapted for attaching respectively the first end portion of the elongated member of the spring system to the first mounting plate and the second end portion of the elongated member of the spring system to the second mounting plate,

said sectional gate being characterised in that the first connecting system while being connected to the first mounting plate supporting the first end portion of the spring system is adapted for enabling a pivotment of the elongated member of the spring system with respect to a substantially horizontal axis, when the second end portion of the elongated member of the spring system is not supported by said second mounting plate.

[0025] As only a first end portion of the spring system has to be lifted for its attachment, the weight to be lifted by the work man is reduced by a factor of about 2, while enabling an easy and quick attachment.

[0026] Advantageously, the first connecting system while being connected to the first mounting plate supporting the first end portion of the spring system is adapted for enabling a pivotment of the elongated member of the spring system with respect to a substantially horizontal axis, when the second end portion of the elongated member of the spring system is not supported by said second mounting plate, while the second connecting system while being connected to the second mounting plate supporting the second end portion of the spring system is adapted for enabling a pivotment of the elongated member of the spring system with respect to a substantially horizontal axis, when the first end portion of the elongated member of the spring system is not supported by said first mounting plate. With such an embodiment, the workman can select the end portion of the spring system to be firstly be attached.

[0027] According to a preferred embodiment, at least

the first connecting system is a horizontally unidirectional click system, said system being adapted for a unidirectional click in a direction perpendicular to the elongated axis of the spring system, said direction defining the substantially horizontal axis for the pivotment of the first connecting system while being connected to the first mounting plate supporting the first end portion of the spring system, when the second end portion of the elongated member of the spring system is not supported by said second mounting plate. Such an embodiment enables a very easy attachment of the first end portion of the spring system. There will thereafter be no problem for the workman to lift the second end portion of the spring system for pivoting it towards its substantially horizontal position for enabling the attachment thereof to the second mounting plate. Said second end portion can be attached to the second mounting plate by various connecting systems suitable for preventing a downwards pivotment of the second end. Such connecting systems are for example connecting systems using one or more hooks, connecting systems using one or more pins adapted to extend in hole(s) at least of the mounting plate for preventing a downwards pivotment, bolt(s), movable plates, profile, U-profile or corner plate(s) (for example movable towards a position acting as a support for the second end portion), one or more click system and combinations thereof.

[0028] Most preferably, the first connecting system is a horizontally unidirectional click system, said system being adapted for a unidirectional click in a direction perpendicular to the elongated axis of the spring system, said direction defining the substantially horizontal axis for the pivotment of the first connecting system while being connected to the first mounting plate supporting the first end portion of the spring system, when the second end portion of the elongated member of the spring system is not supported by said second mounting plate, and in that the second connecting system is a horizontally unidirectional click system, said system being adapted for a unidirectional click in a direction perpendicular to the elongated axis of the spring system, said direction defining the substantially horizontal axis for the pivotment of the second connecting system while being connected to the second mounting plate supporting the second end portion of the spring system, when the first end portion of the elongated member of the spring system is not supported by said first mounting plate.

[0029] According to a detail of preferred embodiments, the horizontally unidirectional click system(s) is/are provided or associated with a locking means adapted for exerting a force against the unlocking of the click system when locked. This is advantageous so as to avoid an accidental removal of a end portion of the spring system during its pivotment.

[0030] According to a further detail of an advantageous embodiment, at least the first end portion is provided or associated with a first bearing plate provided or associated with the horizontally unidirectional click system, the

latter comprising at least a protrusion adapted to be engaged in an opening or in a recess of the first mounting plate, said protrusion being adapted for acting as a pivotment axis for the pivotment of the first bearing plate, while being connected to the first mounting plate supporting the first end portion of the spring system, when the second end portion of the elongated member of the spring system is not supported by said second mounting plate.

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Preferably, the protrusion is provided with a groove adapted to extend in a vertical plane parallel to the elongated axis of the elongated member, said groove being adapted to receive an element of the mounting plate or attached to the mounting plate (for example movably attached to the mounting plate) for locking the protrusion on the mounting plate.

[0031] Most preferably, the second end portion is also provided or associated with a second bearing plate provided or associated with a horizontally unidirectional click system, the latter comprising at least a protrusion adapted to be engaged in an opening or in a recess of the second mounting plate, said protrusion being advantageously adapted for acting as a pivotment axis for the pivotment of the second bearing plate while being connected to the second mounting plate supporting the second end portion of the spring system, when the first end portion of the elongated member of the spring system is not supported by said first mounting plate.

[0032] According to a detail, the bearing plate bears a shaft provided with a reel or drum adapted for the winding of a flexible member, advantageously a cable of the spring system. The bearing plate is advantageously further provided with a spring safety device, for example in case of problem with the spring, the cable, etc.

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[0033] According to another detail, the mounting plate is adapted to be attached to a substantially vertical profile portion by means of a substantially vertical unidirectional click system.

[0034] Advantageously, said mounting plate and an upper end portion of the substantially vertical upper end portion are adapted to be coupled together by means of a substantially vertical unidirectional click system.

[0035] Preferably, the sectional gate comprises at least two connecting system comprising each a mounting plate adapted to be attached to a substantially vertical profile portion by means of a substantially vertical unidirectional click system. Most preferably, for each of said at least two connecting system, a mounting plate and an upper end portion of the substantially vertical upper end portion are adapted to be coupled together by means of a substantially vertical unidirectional click system.

[0036] According to a detail of an embodiment, the mounting plate is connected to an end portion of the profile so as to form an upper extension of said profile.

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Especially, the mounting plate has a shape corresponding substantially to the shape of the vertical end portion, advantageously a substantially L- or U-shape.

[0037] According to a characteristic of embodiments,

the unidirectional click-system coupling the mounting plate and the substantially vertical profile portion together or the unidirectional click system coupling the bearing plate and the mounting plate together comprises at least one locking means adapted for locking the coupling of two elements together.

Advantageously, the unidirectional click-system coupling two elements together comprises at least a protrusion provided on one element of the first element and the second element, and holding means provided on the other element of said first element and second element, whereby the protrusion means and/or the holding means comprise(s) at least one locking means adapted to be displaced or deformed by bringing the protrusion in the holding means.

Preferably, the protrusion means and/or the holding means comprise(s) at least one locking means adapted to be displaced or deformed by bringing the protrusion in the holding means, said locking means being associated to a return mechanism or being made at least partly into an elastic material adapted to exert a return force when submitted to a deformation or displacement, whereby the locking means is submitted to a movement against the action of the return mechanism or against the return force at least when bringing the protrusion in the holding means, while the locking means is submitted to a return movement by the action of the return mechanism or by the return force when the protrusion means is suitably engaged in the holding means.

According to a specific detail, the protrusion is provided with at least one groove adapted to cooperate at least with a portion of the holding means.

According to a further detail, the locking means is associated to a spring return mechanism and/or in that the locking means has at least a portion made of elastic deformable material.

The use of locking means enabling the undoing of the connection, for example by applying with a tool a force for displacing the locking means in an unlocked position, enable a quick removal of the spring system and therefore a quick replacement thereof in case it is required.

[0038] According of an advantageous detail, the unidirectional click system comprises a protrusion adapted to be engaged into an opening or a recess, whereby said protrusion is provided with directing means guiding the movement of the movement into the opening or recess.

[0039] According to another advantageous detail, at least one end portion of the elongated member is provided with a protruding part extending or adapted to extend the length of the elongated part, said protruding part being advantageously mobile or removable with respect to elongated member of the spring system.

[0040] According to a further detail, the unidirectional click system is provided with directing means guiding the movement between the mounting plate and the substantially vertical profile portion when clicking unidirectionally said mounting plate and the substantially vertical profile portion together.

[0041] The invention further relates to a sectional gate for closing at least partly a gate opening, said gate comprising :

- 5 - an articulated wall comprising panels coupled together, whereby the gate extends in its closed position between a bottom edge of a bottom panel and an upper panel;
- at least one substantially vertical profile ;
- 10 - at least two guide rails adapted for guiding the movement of the panels between a closed position in which they are adapted for closing at least substantially an opening and an open position and an open position in which panels are not closing said opening;
- 15 - possibly (but advantageously) means adapted for driving the movement of panels at least between their closed position and their open position ;
- at least one spring system with at least one flexible members attached to a panel , preferably to a bottom panel, said spring system being adapted for facilitating panels to move along the guide rails at least for opening partly the sectional gate, said spring system comprising an elongated member intended to extend at a level substantially above the gate opening,
- 20 - at least two vertical profiles or a horizontal profile for supporting the spring system,
- at least two distinct connecting systems adapted for attaching the elongated member of the spring system to the vertical profiles so as to extend above the gate opening, whereby at least one of said connecting systems comprises a unidirectional click system,
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- 35 -
- 40 -
- 45 -
- 50 -
- 55 -

whereby said sectional gate is characterised in that at least one of said connecting systems (preferably at least two) comprises a mounting plate adapted to be attached to a substantially vertical profile portion or to a substantially horizontal profile or to a guiding rail by means of a substantially vertical unidirectional click system.

Said sectional gate has advantageously one or more characteristics of the first subject matter of the invention.

[0042] The invention relates also to a kit for mounting a sectional gate of the invention or at least fo mounting a portion of such a sectional gate, in particular for mounting at least the spring system of the sectional gate of the invention. Said kit comprises at least a spring system, mounting plates, and at least first and second connecting means, whereby the first and second connecting means are advantageously as disclosed hereabove or whereby the mounting plates are advantageously as disclosed hereabove. Said kit can further comprise panels adapted to form a wall, guiding rails, at least a profile, cables, etc. According to a preferred embodiment of the kit, at least the first connecting system while being connected to the first mounting plate for supporting the first end portion of the spring system is adapted for enabling a pivotment of the elongated member of the spring system with respect to a substantially horizontal axis, when the second end portion of the elongated member of the spring system is

not supported by said second mounting plate.

The kit of the invention has advantageously one or more characteristics of the sectional gate as disclosed hereabove for the sectional gates of the invention.

[0043] The invention relates also to a kit for mounting a sectional gate according to the invention, said kit comprising a spring system, a profile adapted to form a substantially vertical profile or a horizontal profile of the sectional gate and a mounting plate adapted to be attached to a substantially vertical or horizontal profile portion by means of a substantially vertical unidirectional click system, said kit having advantageously one or more characteristics of the sectional gate of the invention disclosed hereabove. Said kit can further comprise panels adapted to form a wall, guiding rails, at least a profile, cables, etc.

[0044] The invention further relates to a process for mounting a sectional gate according to the invention, especially by using a kit of the invention, said process comprising at least the steps of:

- placing at least a mounting plate or the two mounting plates;
- attaching the first end portion of the spring system on the first mounting plate by the first connecting system, whereby supporting the first end portion of the spring system, while enabling a pivotment of the elongated member with respect to a substantially horizontal axis;
- attaching the second mounting plate if not yet attached;
- pivoting the elongated member of the spring system around said substantially horizontal axis so as to place the second end portion of the elongated member in a position for enabling the second connecting system to be connected to the second mounting plate for supporting the second end portion of the elongated member, and
- connecting the second connecting system to the second mounting plate for supporting the second end portion of the elongated member.

[0045] Advantageously, the first connecting system is connected to the first mounting plate by a horizontally unidirectional clicking movement perpendicular to the elongated axis of the spring system.

[0046] Preferably, the second connecting system is connected to the second mounting plate by a horizontally unidirectional clicking movement perpendicular to the elongated axis of the spring system.

[0047] The mounting of the spring system is thus very easy.

[0048] The invention still relates to a process for mounting a sectional gate according to the invention, especially by using a kit of the invention, said process comprising at least the steps of:

- placing at least one profile portion substantially vertical or at least guiding rails or a profile horizontally;

- attaching the mounting plates of the spring system on said profile(s) or guiding rails, and
- moving downwards in a substantially vertical unidirectional the mounting plate so as to click it on said profile(s) or guiding rail(s).

The mounting plate of the spring system does not require a difficult displacement, but only a substantially vertical downwards movement of the mounting plate(s). Such a mounting is more user friendly and can be operated by a single workman.

[0049] Details and characteristics of preferred embodiments of the invention will appear from the following description, in which reference is made to the following drawings.

[0050] In said drawings,

- figure 1 is a schematic and perspective view of a preferred sectional gate of the invention, with the spring system extending adjacent to the opening to be closed;
- figure 2 is a further schematic partial view of the sectional gate of figure 1;
- figure 3 represents a detail of an first end portion of the spring system of Figure 1;
- figure 4 is a view of said first end portion of Figure 3 before the clicking operation in the horizontal direction ;
- figure 5 is a view of the second end portion of the spring system of figure 1;
- figures 6A and 6B are schematic views of the end of a vertical profile provided with a mounting plate;
- Figure 7 is a view of the mounting step of the spring system of Figure 1;
- Figure 8 is a view of a detail of Figure 7;
- Figure 9 is a further view of the detail of Figure 8;
- Figure 10 is a view similar to figure 7;
- Figure 11 is a view similar to Figure 7;
- Figure 12 is a view similar to figure 10, but after the clicking of the second end portion of the spring system;
- Figures 13 and 14 are enlarged views of the end portions of the spring system of Figure 12;
- Figure 15 is a view of a step for mounting a spring system at the rear side or away from the opening to be closed by the sectional gate;
- Figures 16 and 17 are views of the clicking operation of the first end portion of the spring system of figure 15,
- Figure 18 is a perspective view of spring system after the attachment of the first end portion of the spring system of Figures 16 and 17;
- Figure 19 is a view similar to Figure 18 after pivotment of the spring system;
- Figure 20 is a view of a detail of the spring system of Figure 19, after the clicking of the second end portion of the spring system;
- Figure 21 is a perspective view of the spring system

- of Figure 15 after its attachment;
- Figure 22 is a detail view of the second end portion of the spring system of Figure 21;
- Figures 23 to 27 are cross-section views of clicking systems;
- Figure 28 is a detail view of a specific embodiment of a mounting plate attached to an end of a vertical profile;
- Figure 29 is a cross section view along the line XXIX-XXIX of Figure 28;
- Figures 30 and 31 represent an alternative embodiment of the portion as represented in Figure 29.

[0051] Figures 1 and 2 shows a sectional gate 1 composed of panels 2 which are mutually connected forming an articulated wall by means of articulating means 3 provided of roller means 4.

[0052] These roller means 4 can co-operate with guide rails 5 at both sides of the gate opening, mainly composed of U-shaped profiles, from which in figure 1 only one side is represented.

[0053] Both guide rails 5 are more in particular composed of a vertical guide rail 6 and a horizontal guide rail 7 which are interconnected by means of a curved portion 8. Said vertical guide rail 6 is attached to a L-shaped vertical profile 21.

[0054] In order to guarantee that the upper panel 2A is positioned in line with the other panels 2 when the sectional gate 1 is closed, the roller means 3A that are provided at the top of the upper panel 2A are guided by a separate mainly horizontal guide rail 9 which is slightly bent downwards near the gate opening.

[0055] The sectional gate 1 further comprises a spring system 10 comprising for example two spiral springs 11 wound around a tubular shaft 12 (the axis of which defines the elongated axis of the spring system 10), each with one end connected to the shaft 12 and with the other end connected to a fixed bearing plate 13 supporting each an end portion of the shaft 12.

[0056] At a distance from the gate opening, an electric motor 14 is provided, in this case fixed to the ceiling of a garage and provided of a chain 15 connected to the upper panel 2A of the sectional gate 1.

[0057] Figure 6 shows more in detail how the bearing plate 13 is provided of a hole 16 through which a free end of the shaft 12 is brought.

[0058] The bearing plate 13 is connected to a mounting plate 17 by means of a horizontal unidirectional click-system.

[0059] The mounting plate 17 is fixed by means of bolts 18 to the wall portion aside and above the gate opening.

[0060] The portion of the shaft 12 extending through the opening 16 in the bearing plate 13 is provided with a reel 19 whereon a cable 20 is wound which is connected with the lower panel 2B of the sectional gate 1.

[0061] The mounting plate 17 is interconnected with a vertical generally L-shaped profile 21 whereon the U-shaped profile of the vertical guide rail 6 is mounted. Ac-

cording to the invention, the interconnection is realised with a vertical unidirectional click-system.

[0062] After said clicking, the mounting plate 17 can be further fixed by means of bolts 18 to the wall portion aside and above the gate opening. Said further fixing is easy as it is no more necessary to sustain the spring system 10.

[0063] Figure 6 represents the downwardly oriented portion 22 of the second horizontal guide rail 9 near the gate opening, which is mounted on the generally L-shaped profile 21 by means of a unidirectional click-system.

[0064] Figures 6 illustrates that the mounting plate 17 is generally L-shaped and comprises a first substantially vertical flank 23 (perpendicular to the mounting direction Z of the bolts 18, when bolts are required), and a second substantially vertical flank 24 which is substantially perpendicular to the first vertical flank 23 (and parallel to said direction Z of the bolts 18 when used).

[0065] The first vertical flank 23 is provided of four holes 25 for possible bolts 18, two ribs 26 for fortifying the flank 23, and a protruding end portion 27 with U-shaped cross-section wherein two holes 28 are provided.

[0066] Further, the first flank 23 is provided of a downwardly oriented projection 29 (vertical projection).

[0067] The second flank 24 stretches out to well below the first flank 23, and is provided of a downward oriented hook 30, two protruding points 31, a hole 32 and an elastic lip 33.

[0068] The bearing plate 13 mounted on the mounting plate 17 is composed of a plate portion 34 wherein the hole 16 is provided with an end portion 35 which form and shape are such that it can co-operate with the protruding end portion 27 of the mounting plate 17.

[0069] The end portion 35 is provided with one single protrusion 36 adapted to co-operate with the hole 28 provided in the protruding end portion 27 of the mounting plate 17.

[0070] When the protrusion 36 of the end portion of the bearing plate 13 (bearing a first end portion of the spring system 10) is pressed into the hole 28 of the protruding end portion 27 of the mounting plate 17, while the protrusion of the other bearing plate (bearing the second end portion of the spring system) is not engaged in the hole 28 of the other mounting plate, the spring system 10 is able to pivot around the horizontal axis H1 which is the axis of the protrusion 36.

[0071] In figure 23, the protrusion 36 and the co-operation with its respective hole 28 is more in detail represented.

[0072] In this embodiment, the protrusion 36 connected to the bearing plate 13 is built up as a mainly conical portion 37 widening from its free end 38 up to its transition into a cylindrical portion 39 with a slightly smaller diameter as compared to the biggest diameter of the conical portion 37, which cylindrical portion 39 stretches out to a shoulder 40. In the conical portion 37 and the cylindrical portion 39 a groove 41 is provided that reaches up to the

shoulder 40 and that provides the protrusion 36 of two flexibly movable legs.

The cylindrical portion 39 of the protrusion 36 facilitates the pivotment of the spring system with respect to the horizontal axis of said cylindrical portion 39.

[0073] The generally L-shaped profile 21, represented in detail in figures 6A and 6B, whereon the mounting plate 17 is to be mounted, is provided of a first flank 42 and a perpendicular second flank 43.

[0074] The free end of the first flank 42 is folded such that an end portion 44 is parallelly oriented to the second flank 43.

[0075] The end portion 44 is near its upper free end 45 provided of a cut 46, and an upper portion 47 of this folded end portion 44 is further folded so that it is positioned parallel to the first flank 42 and forming a narrow space 48 in between. Said narrow space 48 acts as guiding means.

[0076] The second flank 43 is provided of two square holes 49 and a round hole 50, which holes are positioned with respect to the upper portion 47 such that they can co-operate with the two protruding points 31 on the mounting plate 17, when the downwardly oriented projection 29 of the mounting plate 17 is slit in the narrow space 48.

[0077] Both flanks 42 and 43 of the generally L-shaped profile 21 are further provided of a groove 51.

[0078] The mounting of such sectional gate 1 as described above is easy and as follows.

[0079] One could start by mounting, for example screwing, the L-shaped profiles 21 to the reveals or the side walls, where the screws can be brought through the grooves 51.

[0080] The mounting plates 17 at both sides of the gate opening are mounted on the generally L-shaped profiles 21, more in particular by sliding the downwardly oriented projection 29 of the mounting plate 17 in the narrow space 48.

[0081] At the same time, the two protruding points 31 on the mounting plate 17 are moved towards the two square holes 49 and coincide therewith when the hook 30 comes in contact with the generally L-shaped profile 21.

[0082] The elastic lip 33 in the meantime co-operates with the free border of the generally L-shaped profile 21.

[0083] According to an embodiment, the bearing plate 13 is assembled with the shaft 12 of the spring system 10. The spring system 10 is provided at least at one of its end portion, preferably at its two end portions 10A, 10B with a removable protruding part 100 (see figure 7). Said protruding parts make extension of the shaft 12, whereby enabling to place easily the spring system 10 on the guide rails 9. The spring system 10 is thus supported by said guide rails 9 in the neighbourhood of the mounting plates 17.

A single workman can then easily lift an end portion 10A of the spring system so that the protrusion 36 of the bearing plate 13 of said end portion is in front of the hole 28

of the mounting plate 17 (see figure 4). By a horizontal movement of the bearing plate 13 towards the mounting plate 17, the protrusion 36 enters into the hole 28, so that the first end portion 10A of the spring system is supported by the mounting plate 17. (see figures 8 and 9) Such a movement is quite easy as the workman has only to lift half of the weight of the spring system, said workman having furthermore only to correctly place a single protrusion 36 in front of a hole 28.

The workman has then to lift the other end portion 10B of the spring system 10, so that the protrusion 36 of the bearing plate 13 bearing the second end portion 10B of the spring system extends in front of the hole 28 of the mounting plate 17. During said lift movement, the spring system 10 pivotes (movement R1) around the axis H1 of the protrusion 36 connecting the first end portion 10A to the first mounting plate 17. (see figure 11) Thereafter, a horizontal movement of the protrusion 36 of the bearing plate 13 of the second end portion 10B is sufficient for engaging said protrusion into the hole 28 of the second mounting plate 17. The second end portion 10B of the spring system is then supported by the mounting plate 17. (see figures 12 to 14)

[0084] After the placement of the spring system 10 so as to be supported by the two mounting plates 17, the protruding parts 100 (forming extension of the shaft 12) can be removed.

[0085] In order to better attach the bearing plates 13 on the mounting plates 17, it is possible to use bolts 101 which are engaged in holes 102, 103 of the bearing plates and the mounting plates, holes which are located the one in front to another when the spring system is in horizontal position.

[0086] In order to prevent the removal of the protrusion 36 of a bearing plate during a rotation or pivotment of said bearing plate 13 with respect to the mounting plate 17, the mounting plate 17 is advantageously provided with a spring wire 104 having substantially a U shape. The protrusion 36 has then advantageously a circular groove extending between the cylindrical part 39 and the frustoconical end 37, said groove being adapted to receive portions of the spring wire. When pressing the protrusion into the hole 28, the legs of the U shaped spring 104 are moved away from each other. When the said legs of the U shaped spring are in front of the groove said legs spring into said groove and act as holding means for preventing any accidental removal of the protrusion 36 out of the hole 28 during a pivotment of the spring system 10.

[0087] In this method, the pivotment of the spring system 10 is quite limited, for example a few degrees, for example less than 10 degrees.

[0088] In another method, the spring system is not first lifted for being supported by the guide rails 9. In such a method, the shaft 12 is advantageously not provided with an protruding part.

In said method, the workman clips the protrusion 36 of a first bearing plate of the first end portion of the spring

system 10 on the first mounting plate 17, For said clipping the second end portion of the spring system contacts the ground, whereby less effort is required from the workman for achieving a correct position of the bearing plate with respect to the mounting plate intended to support the first end portion of the spring system.

After said clipping, the workman has to lift the second end portion of the spring system. Such a lift movement is facilitated as the first end portion is already supported. Said movement generates a pivotment of the spring system 10. Such a pivotment ensures that the bearing plate 13 of the second end portion of the spring system will be correctly placed with respect to the mounting plate, when the spring system is horizontal. A simple horizontal movement of the bearing plate towards the mounting plate 17, will then be sufficient for clipping the bearing plate and the mounting plate 17 together. (see figures 10 to 12)

[0089] Advantageously the distance between the bearing plates 13 of the spring system will be adjusted before attaching a first bearing plate on a first mounting plate for supporting the first end portion of the spring system, and thus before the pivotment step of the spring system. The distance between the bearing plates will thus be adapted in function of the distance between the mounting plates prior to the attachment of a first bearing plate on a first mounting plate.

[0090] The spring system can possibly be mounted away from the opening to be closed.

[0091] In such a case, the sectional gate is advantageously provided with a supporting profile 110 away from the opening to be closed, said profile 110 acting advantageously as support for a portion or an end of the guide rails 7 and 9.

[0092] On said supporting profile, the workman attaches two mounting plates 17, by means of screws or bolts, but advantageously at least by a clocking system.

[0093] Thereafter, the workman lift a first end portion of the spring system 10, while the other end portion still contacts the grounds. The lifting operation is so facilitated, whereby the correct positioning of the bearing plate 13 of said first end portion with respect to the first mounting plate 17 is also facilitated, as said positioning no more require the lifting of the spring system, but only a horizontal movement of the bearing plate towards the mounting plate 17. (see figures 15 to 17)

[0094] When said first bearing plate is attached to the first mounting plate, the spring system 10 is pivoted around the axis H1 of the protrusion 36 of the first bearing plate. The upwards movement of the second bearing plate and the second end portion of the spring system is thus facilitated. (figures 18 and 19)

[0095] As the distance between the bearing plates 13 was adapted to the distance between the mounting plates 17 prior to the fixation of the first bearing plate on the first mounting plate, when the shaft 12 of the spring system 10 is horizontal, the protrusion 36 of the second bearing plate will extend in front of the hole 28 of the mounting plate 17, whereby a simple horizontal movement will be

sufficient for clicking said protrusion into said hole 28. (figure 20 and 21)

[0096] Thereafter, as for the other embodiment, bolts 101 are engaged in holes 102,103 of the bearing plates and the mounting plates, holes which are located the one in front to another when the spring system is in horizontal position. (figure 22)

[0097] The protrusions / click systems 36 of the end portion 35 of the bearing plate are adapted to be clicked in the hole 28 of the end portion of the mounting plate 17, by a uni horizontal pushing movement.

[0098] Thanks to the narrow free end 38 of the conical portion 37 of the protrusions 36, the movement of the protrusions towards the holes 28 is further guided. Said conical end portions act as directing means integrated in the unidirectional click-system, whereby the relative positioning of the bearing plates 13 with respect to the mounting plates 17 is facilitated during said horizontal pushing. (see figure 23)

[0099] Further pushing causes an elastic deformation of the conical portion 37, i.e. the legs created by the groove 41 forming the locking means are pushed together.

[0100] The dimensions of the protrusions 36 and the choice of the elastic material make it possible that such elastic deformation is reversed when the end position is reached.

[0101] Indeed, when the conical portion 37 is completely brought through an opening 28, the cylindrical portion 39 having a smaller diameter than the hole 28 and the biggest diameter of the conical portion being bigger than the diameter of the hole 28, the legs of the protrusion 36 are moved in their original position.

[0102] This unidirectional mounting is extremely easy and makes sure that the bearing plate 13 is firmly mounted on the mounting plate 17. Furthermore, such a connection can be undone by applying an external force, more in particular by squeezing a conical portion 37 and pulling back the spring system.

[0103] After mounting the spring system 10, the mounting of a sectional gate 1 according to the invention can be continued by applying the guide rails 5, the electric motor 14, eventually provided of one or more similar unidirectional click-systems in order to make it possible for one person to mount such a sectional gate 1 according to the invention.

[0104] Further, the panels 2 are mounted by bringing the roller means 4 in the guide rails 5 and by connecting these panels 2 mutually by means of the articulating means 3.

[0105] The upper roller means 3A of the upper panel 2A are guided in the separate mainly horizontal guide rail 9 which is provided near the gate opening of the downwardly oriented portion 22.

[0106] The chain 15 is connected to the upper panel 2A and the cable 20 from the reel 19 is connected to the lower panel 2B.

[0107] It is clear that the unidirectional click-system

can be realised in different manners.

[0108] In figures 24 to 27, some alternative unidirectional click-systems are represented which in each case comprises at least a protrusion 52 provided on a first component 53 and holding means 54 for holding said protrusion 52 provided on a second component 55. According to the invention, the protrusion 52 or the holding means 54 comprise elastic locking means 56 that can be displaced into an open position by bringing the protrusion 52 in the holding means 54 and that is elastically repositioned into a closed position when both components 53 and 55 are in their final mounted position.

[0109] In figure 24, the unidirectional click-system is provided of a groove 57 and of a conical free extremity 58. In this case, the holding means 54 comprise a hole 59 in the second component 55 and also the above mentioned elastic locking means 56, which in this case comprise two opposing springs 60, each acting on a ball 61 captured in a housing 62.

[0110] The balls 61 are moved aside into an open position of the holding means 54, more in particular when the conical free extremity 58 is pushed in the hole 59. When the groove 57 coincides with the balls 61, the balls 61 move back to a closed position of the holding means 54 and as a consequence, the protrusion 52 is captured and held by the holding means 54. A strong pulling force or a force pulling back the springs 60 may suffice to pull loose the first component 53 from the second component 55.

[0111] Figure 25 represents a similar unidirectional click-system which therein differs from the preceding click-system that the balls 61 are substituted by chamfered block elements 63.

[0112] As opposed to the helical springs 60 of the preceding click-systems, the click-systems as represented in figures 26 and 27 are provided of holding means 54 made as one elastically deformable element 64.

[0113] It is clear that such a protrusion 52 can be provided of two or more grooves 57, so that the components can be mounted according to at least two preferred mutual positions by simply pushing the components further in the mounting direction until the desired position is reached.

[0114] In figure 28 such an alternative connection for the bearing plate 13 on the mounting plate 17 provided of two preferred mutual positions is represented. The connection is realised by sliding the surfaces of two components on top of each other. Further pushing the two components in that mounting direction will bring them in the second desired position. Such a clicking system can be used for attaching the second end portion of the spring system after having attached the first end portion by a connecting system enabling a rotation or pivoting of the spring system around a horizontal axis perpendicular to the axis of the spring system.

[0115] In this case and also in the unidirectional click-systems, as represented in the figures 29 to 31, it is the protrusion 52 that is provided of the above mentioned

elastic locking means 56.

[0116] Also in this case, it is clear that more than one preferred final mutual position can be obtained, for example by providing two recesses in line on the bearing plate for holding the movable protrusion.

[0117] In case, the bearing plate 13 is provided with two protrusions 36, the mounting plate has then to be provided with an opening for a first protrusion and a second opening adapted for enabling a movement of the other protrusion in and along the opening in case of a pivoting of the bearing plate. Possibly the two openings have to be shaped so as to permit such a pivoting.

[0118] It is clear from the discussed variants that a lot of variants for the unidirectional click-systems can be identified.

[0119] It should also be clear that a lot of components of the sectional gate 1, although all are not represented in the drawings, can be mounted by means of a unidirectional click-system. Indeed, it is clear that for example also the cone which is usually mounted on the bearing plate 13, more in particular on the opposite side from the reel 19, can be mounted thereon by means of a unidirectional click-system, for example existing of protrusions comprising sideways movable flanks which can elastically be moved in the body of the protrusion.

[0120] We also mention for reasons of completeness that a connection of components by means of a unidirectional click-system can be meant for facilitating the mounting, and that, after the mounting of two components by means of such a click-system, the components are often further connected by means of for example bolts.

[0121] It is clear that a sectional gate 1 with vertical panels can also be provided of such unidirectional click-systems, and that the advantages of the unidirectional click-system are even of more importance for the heavier components of fire resistant sectional gates 1.

[0122] Of course, the unidirectional click-system can also be applied to roller shutters for the same of similar reasons.

[0123] The present invention is by no means limited to the embodiments given as examples and can be realised according to different variants while still remaining within the scope of the invention.

Claims

1. Sectional gate (1) for closing at least partly a gate opening, said gate (1) comprising :

- an articulated wall comprising panels (2) coupled together, whereby the gate (1) extends in its closed position between a bottom edge of a bottom panel and an upper panel ;
- at least one substantially vertical profile (21);
- at least two guide rails (5) adapted for guiding the movement of the panels (2) between a

closed position in which they are adapted for closing at least substantially an opening and an open position in which panels (2) are not closing said opening ;

- possibly means (14) adapted for driving the movement of panels at least between their closed position and their open position ;

- at least one spring system (10) with at least one flexible member (20) attached to a panel (2), preferably to a bottom panel, said spring system (10) being adapted for facilitating panels to move along the guide rails (5) at least for opening partly the sectional gate, said spring system (10) comprising an elongated member (12) intended to extend at a level substantially above the gate opening, said elongated member (12) having an elongated axis,

- at least a first mounting plate (17) for supporting a first end portion of the spring system (10) and a second mounting plate (17) for supporting a second end portion of the spring system (10), said mounting plates (17) being advantageously adapted for being connected to vertical profiles (21) or to guide rails (5) or to other profile(s), possibly with interposition of one or more intermediary pieces,

- at least a first connecting system (13) and a second connecting systems (13) adapted for attaching respectively the first end portion of the elongated member of the spring system (10) to the first mounting plate (17) and the second end portion of the elongated member (12) of the spring system (10) to the second mounting plate (17),

characterised in that at least the first connecting system (13) is a horizontally unidirectional click system, said system (13) being adapted for a unidirectional click in a direction perpendicular to the elongated axis (12) of the spring system (10), said direction defining the substantially horizontal axis (H1) for the pivotment of the first connecting system (13) while being connected to the first mounting plate (17) supporting the first end portion of the spring system (10), when the second end portion of the elongated member (12) of the spring system (10) is not supported by said second mounting plate (17).

2. The sectional gate of claim 1 , **characterized in that** the first connecting system (13) is a horizontally unidirectional click system, said system (13) being adapted for a unidirectional click in a direction perpendicular to the elongated axis (12) of the spring system (10), said direction defining the substantially horizontal axis (H1) for the pivotment of the first connecting system (13) while being connected to the first mounting plate (17) supporting the first end portion (10A) of the spring system (10), when the second

end portion (10B) of the elongated member (12) of the spring system (10) is not supported by said second mounting plate (17), and **in that** the second connecting system (13) is a horizontally unidirectional click system, said system being adapted for a unidirectional click in a direction perpendicular to the elongated axis (12) of the spring system (10), said direction defining the substantially horizontal axis (H1) for the pivotment of the second connecting system (13) while being connected to the second mounting plate (17) supporting the second end portion (10B) of the spring system (10), when the first end portion (10A) of the elongated member (12) of the spring system (10) is not supported by said first mounting plate (17).

3. The sectional gate of any one of the preceding claims , **characterised in that** the horizontally unidirectional click system(s) (36) is/are provided or associated with a locking means (104) adapted for exerting a force against the unlocking of the click system (36) when locked.

4. The sectional gate of any one of the preceding claims, **characterised in that** at least the first end portion (10A) is provided or associated with a first bearing plate (13) provided or associated with the horizontally unidirectional click system (36), the latter comprising at least a protrusion (36) adapted to be engaged in an opening or in a recess (28) of the first mounting plate (17), said protrusion (36) being adapted for acting as a pivotment axis (H1) for the pivotment of the first bearing plate (13), while being connected to the first mounting plate (17) supporting the first end portion (10A) of the spring system (10), when the second end portion (10B) of the elongated member (12) of the spring system (10) is not supported by said second mounting plate (17).

5. The sectional gate of claim 4, **characterized in that** the protrusion (36) is provided with a groove (57) adapted to extend in a vertical plane parallel to the elongated axis of the elongated member (12), said groove being adapted to receive an element (61, 63, 64) of the mounting plate or attached to the mounting plate (17) for locking the protrusion (36) on the mounting plate (17).

6. The sectional gate of claim 4, **characterised in that** the second end portion (10B) is also provided or associated with a second bearing plate (13) provided or associated with a horizontally unidirectional click system (36), the latter comprising at least a protrusion (36) adapted to be engaged in an opening or in a recess (28) of the second mounting plate (17), said protrusion being advantageously adapted for acting as a pivotment axis (H1) for the pivotment of the second bearing plate (13) while being connected to the second mounting plate (17) supporting the second

end portion (10B) of the spring system, when the first end portion (10A) of the elongated member (12) of the spring system (10) is not supported by said first mounting plate (17).

7. The sectional gate of any one of the claims 1 to 6, **characterised in that** the mounting plate (17) is adapted to be attached to a substantially vertical profile portion (21) or to a guide rail (5) or to a profile (110) by means of a substantially vertical unidirectional click system.

8. The sectional gate of any one of the claims 1 to 7, **characterised in that** the unidirectional click-system coupling two elements together comprises at least a protrusion (36,52) provided on one element of the first element and the second element, and holding means provided on the other element of said first element and second element, whereby the protrusion means (36,52) and/or the holding means (28,54) comprise(s) at least one locking means (37,56) adapted to be displaced or deformed by bringing the protrusion (36,52) in the holding means (28,54).

9. A kit for mounting a sectional gate according to any one of the preceding claims or for mounting at least a portion of such a sectional gate, in particular at least the spring system of said sectional gate, said kit comprising at least a spring system (10), mounting plates (17), and at least first and second connecting systems (13) for connecting the spring system (10) to the mounting plates (17), whereby at least the first connecting system (13) while being connected to the first mounting plate supporting the first end portion (10A) of the spring system is adapted for enabling a pivotment of the elongated member (12) of the spring system with respect to a substantially horizontal axis (H1), when the second end portion (10B) of the elongated member of the spring system (10) is not supported by said second mounting plate (17), said kit having advantageously one or more characteristics of any one of the claims 2 to 8.

10. A process for mounting a sectional gate according to any one of the claims 1 to 8 or a portion of such a sectional gate, in particular the spring system (10) of said sectional gate, especially by using a kit of claim 9, said process comprising at least the steps of:

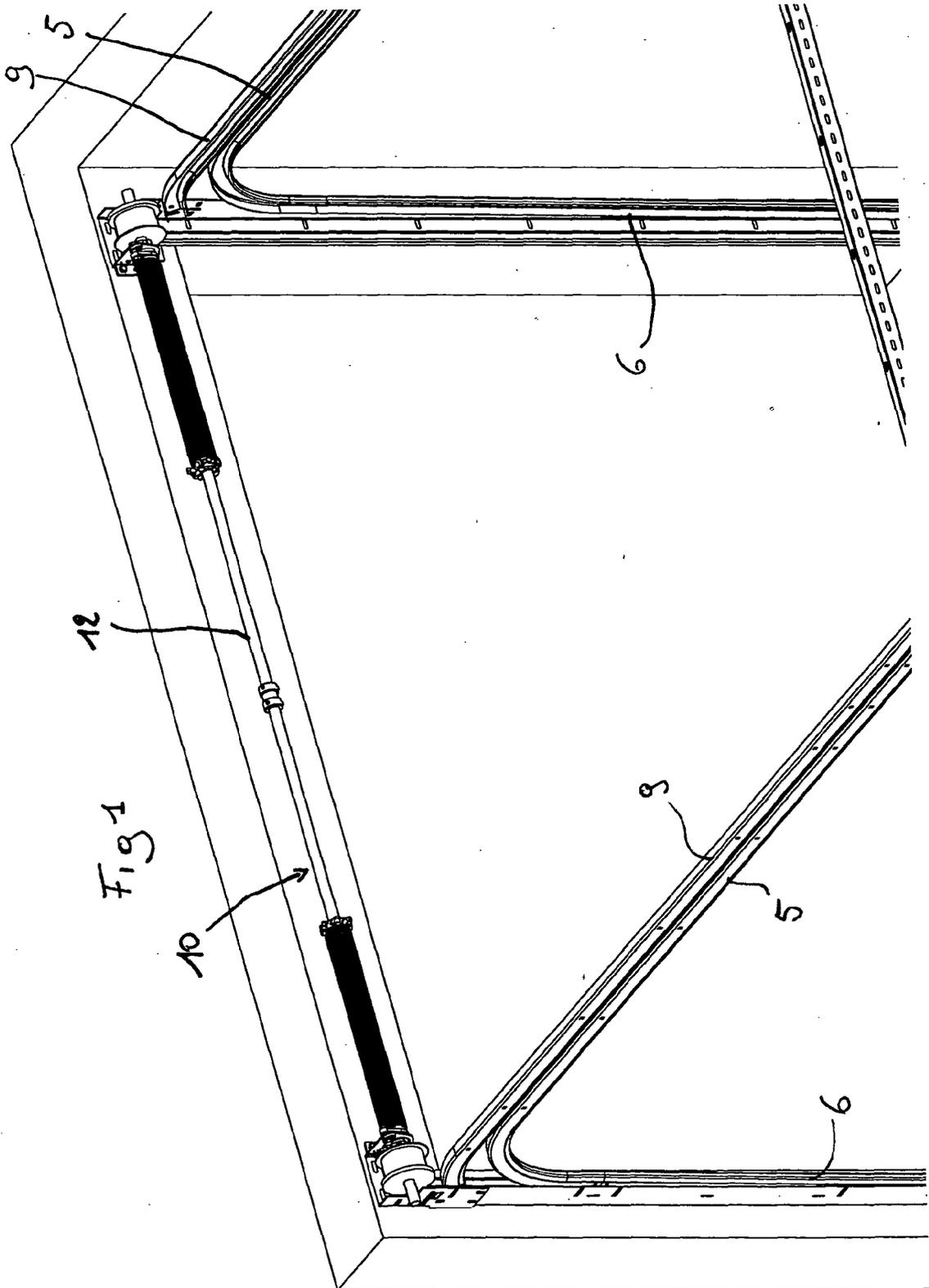
- placing at least a mounting plate (17) or the two mounting plates (17) ;
- attaching the first end portion (10A) of the spring system (10) on the first mounting plate by the first connecting system, whereby supporting the first end portion of the spring system, while enabling a pivotment of the elongated member with respect to a substantially horizon-

tal axis (H1);

- attaching the second mounting plate (17) if not yet attached;

- pivoting the elongated member (12) of the spring system (10) around said substantially horizontal axis (H1) so as to place the second end portion of the elongated member in a position for enabling the second connecting system to be connected to the second mounting plate for supporting the second end portion of the elongated member, and

- connecting the second connecting system to the second mounting plate for supporting the second end portion of the elongated member.



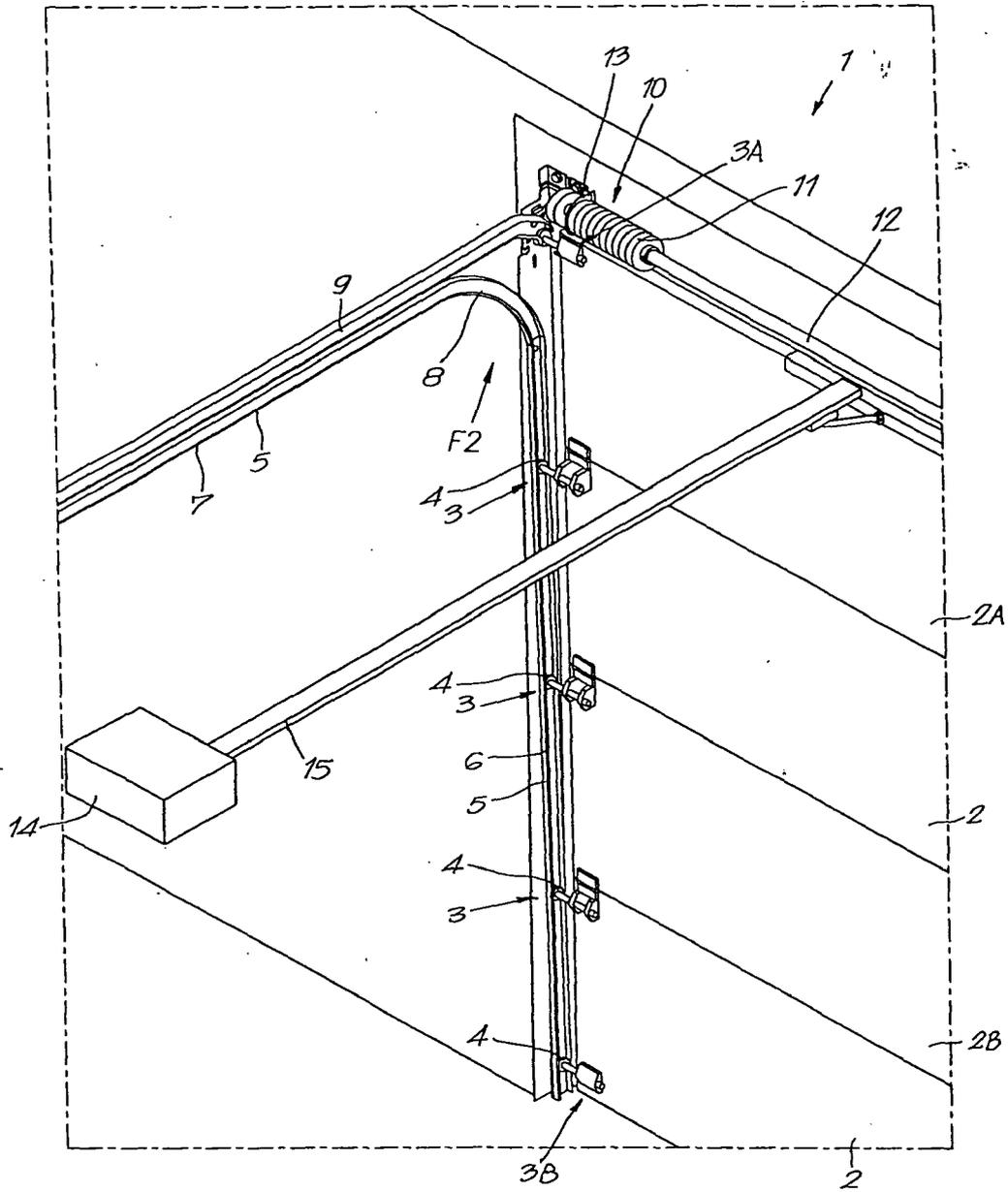
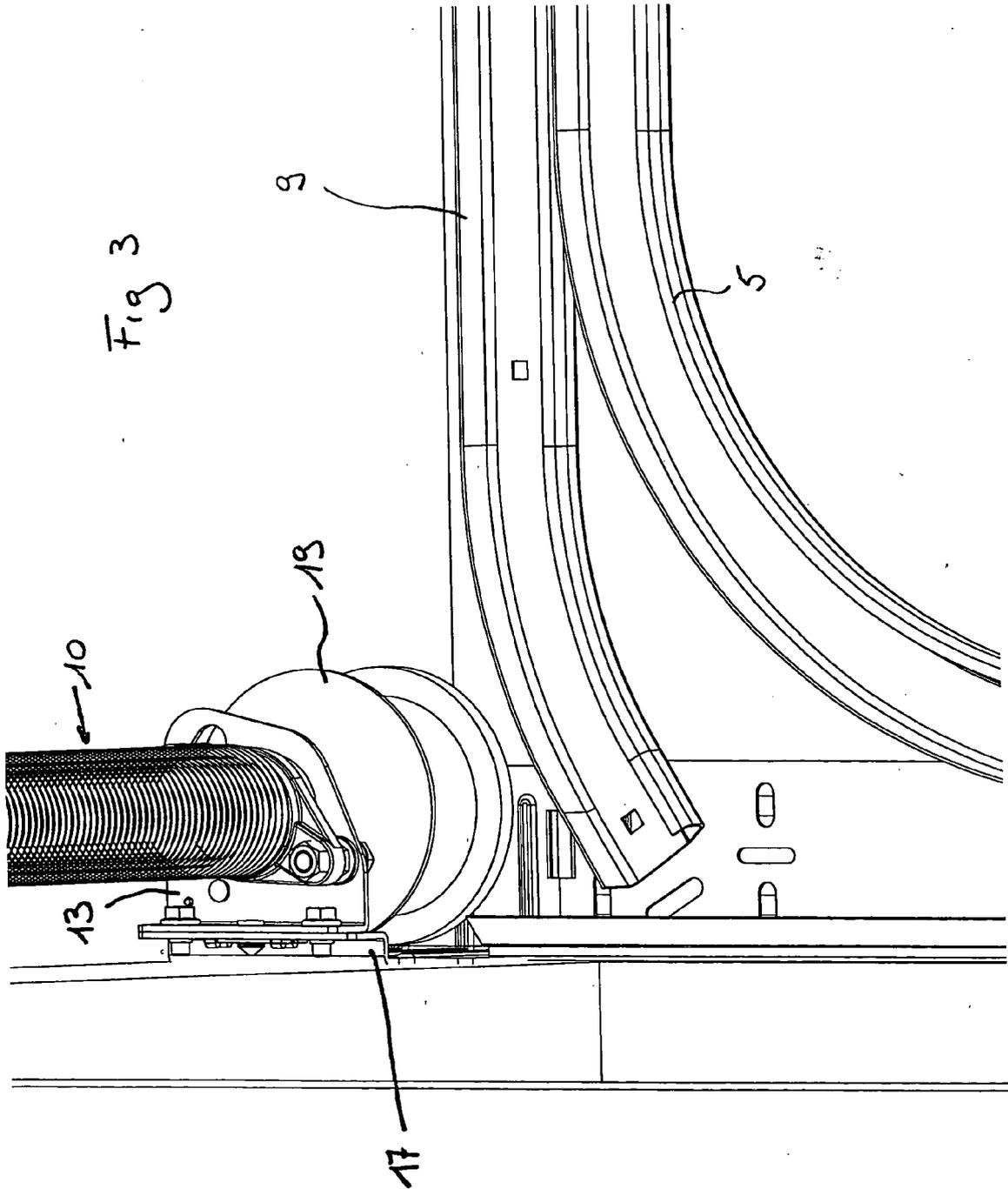
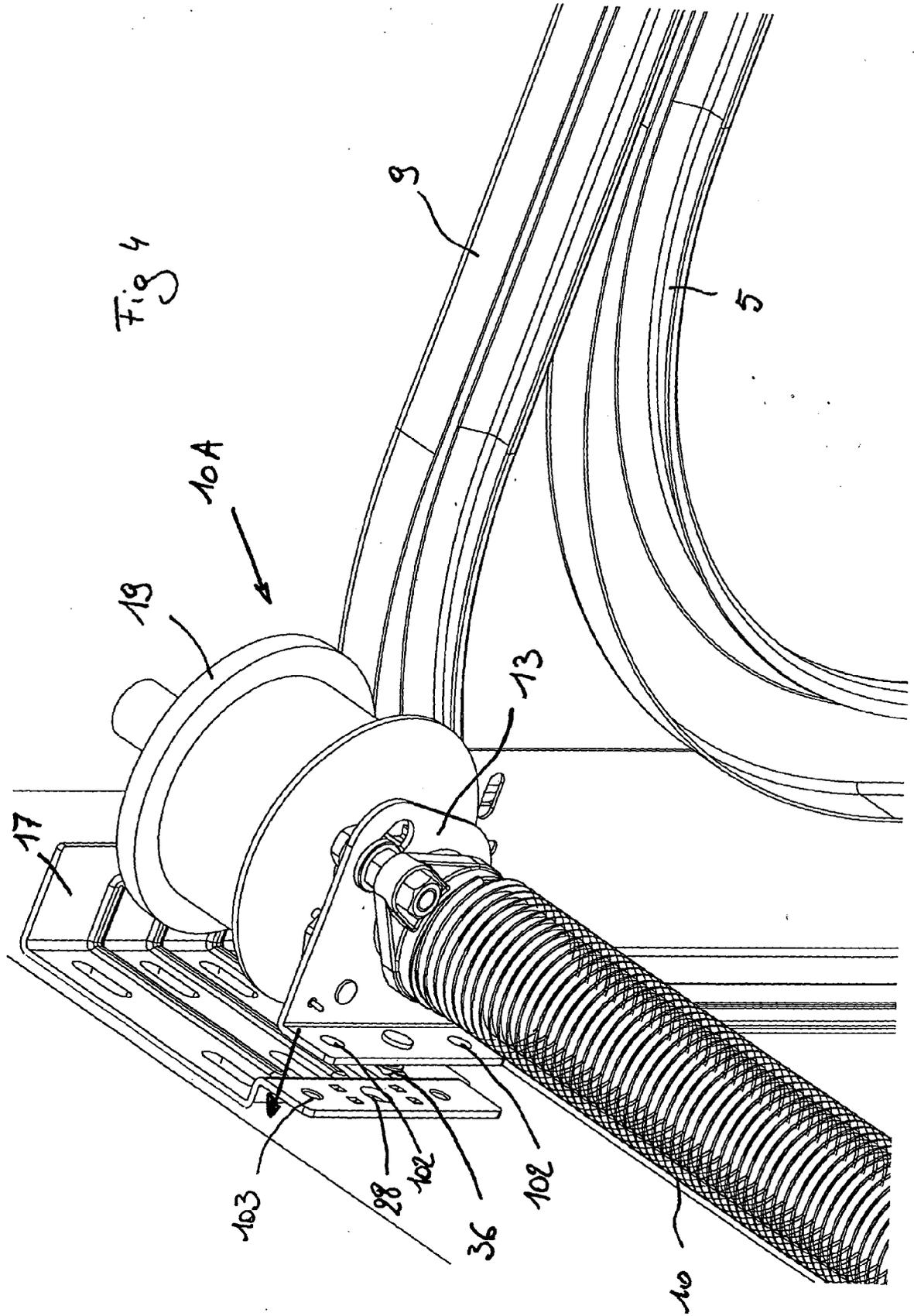
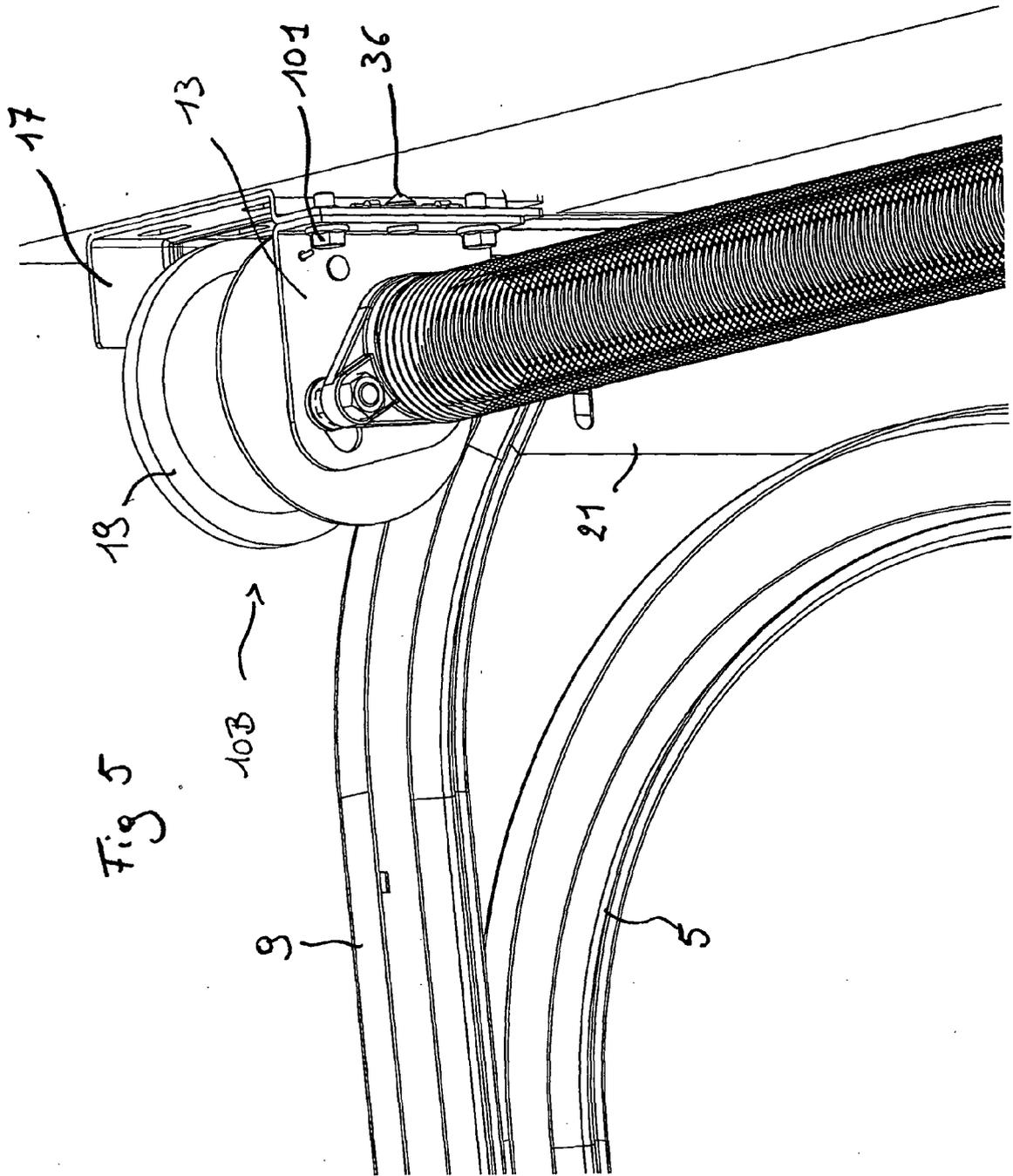


Fig. 1







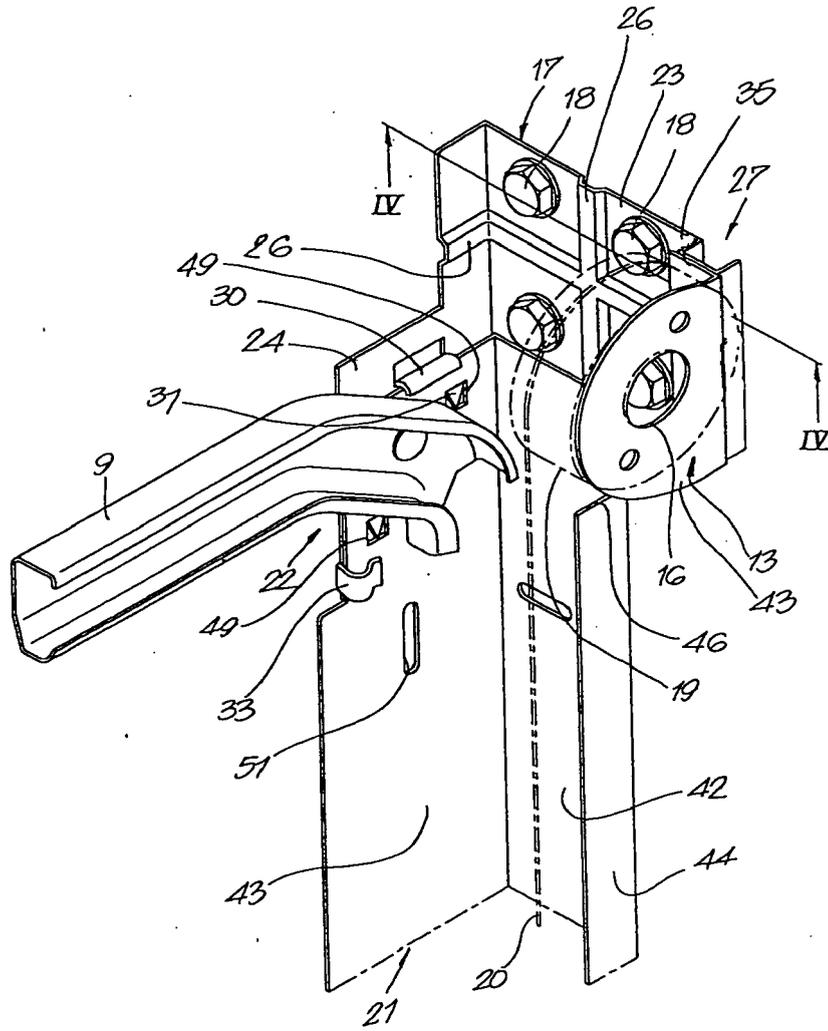


Fig. 6A

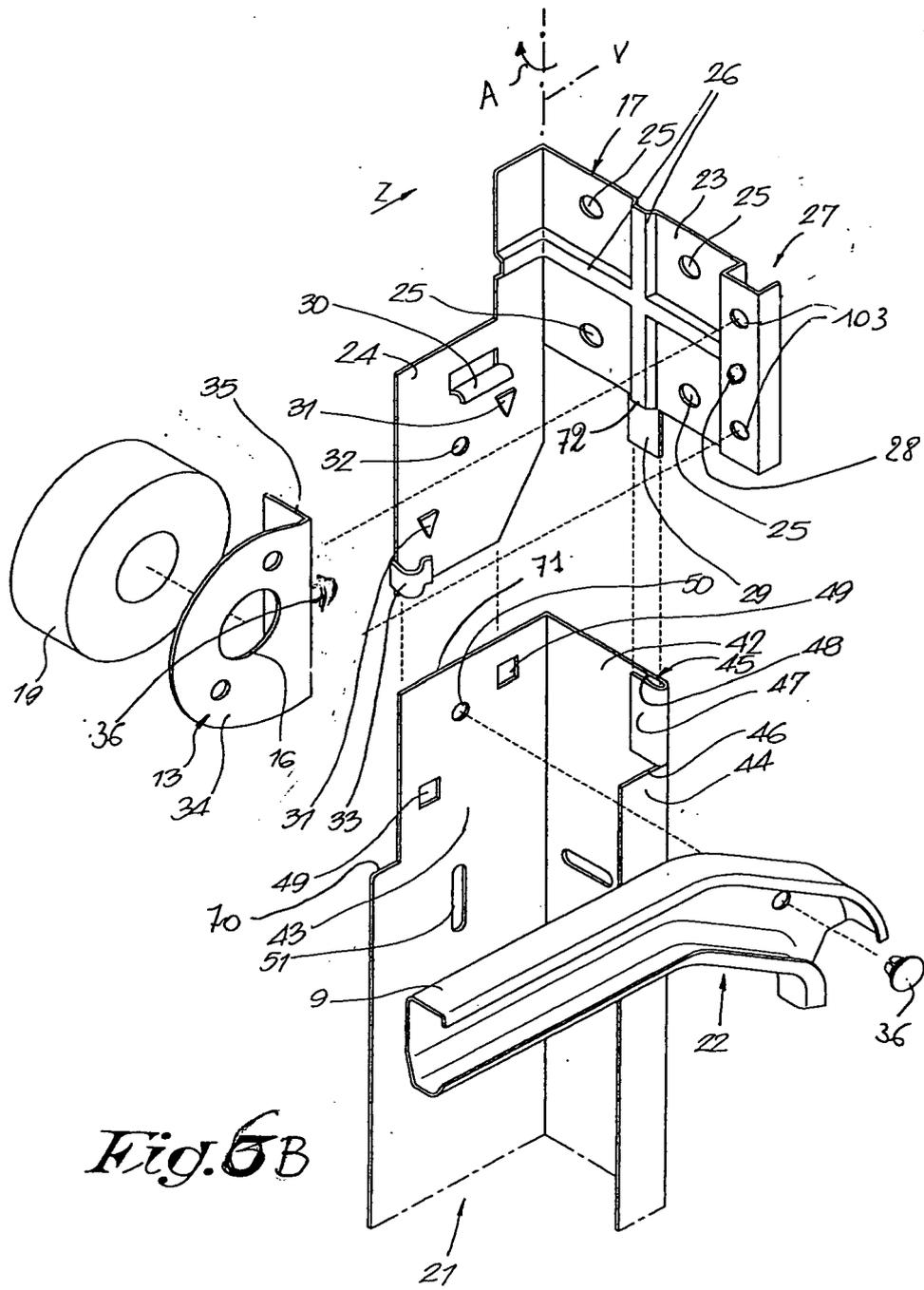
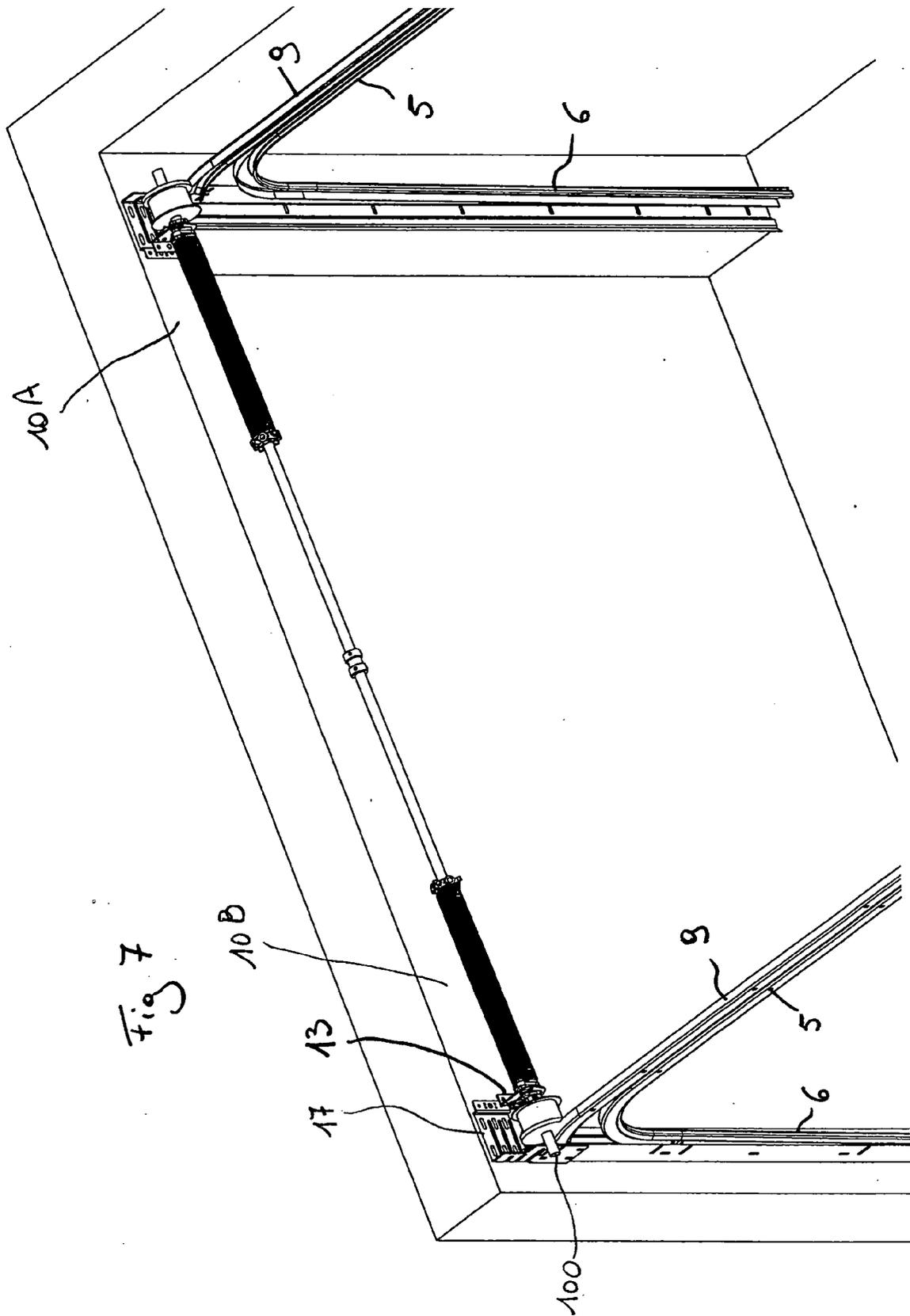
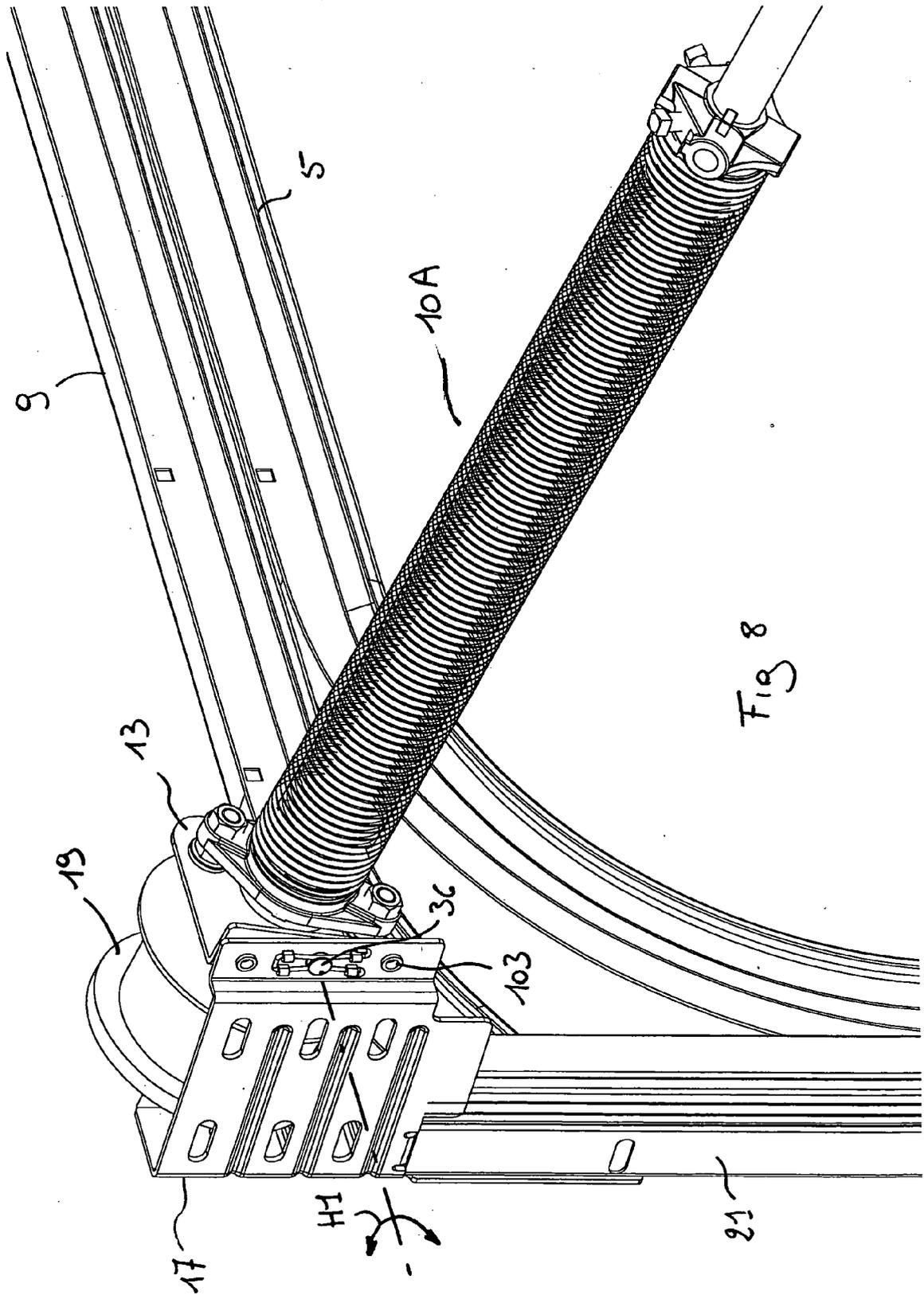


Fig. 6B





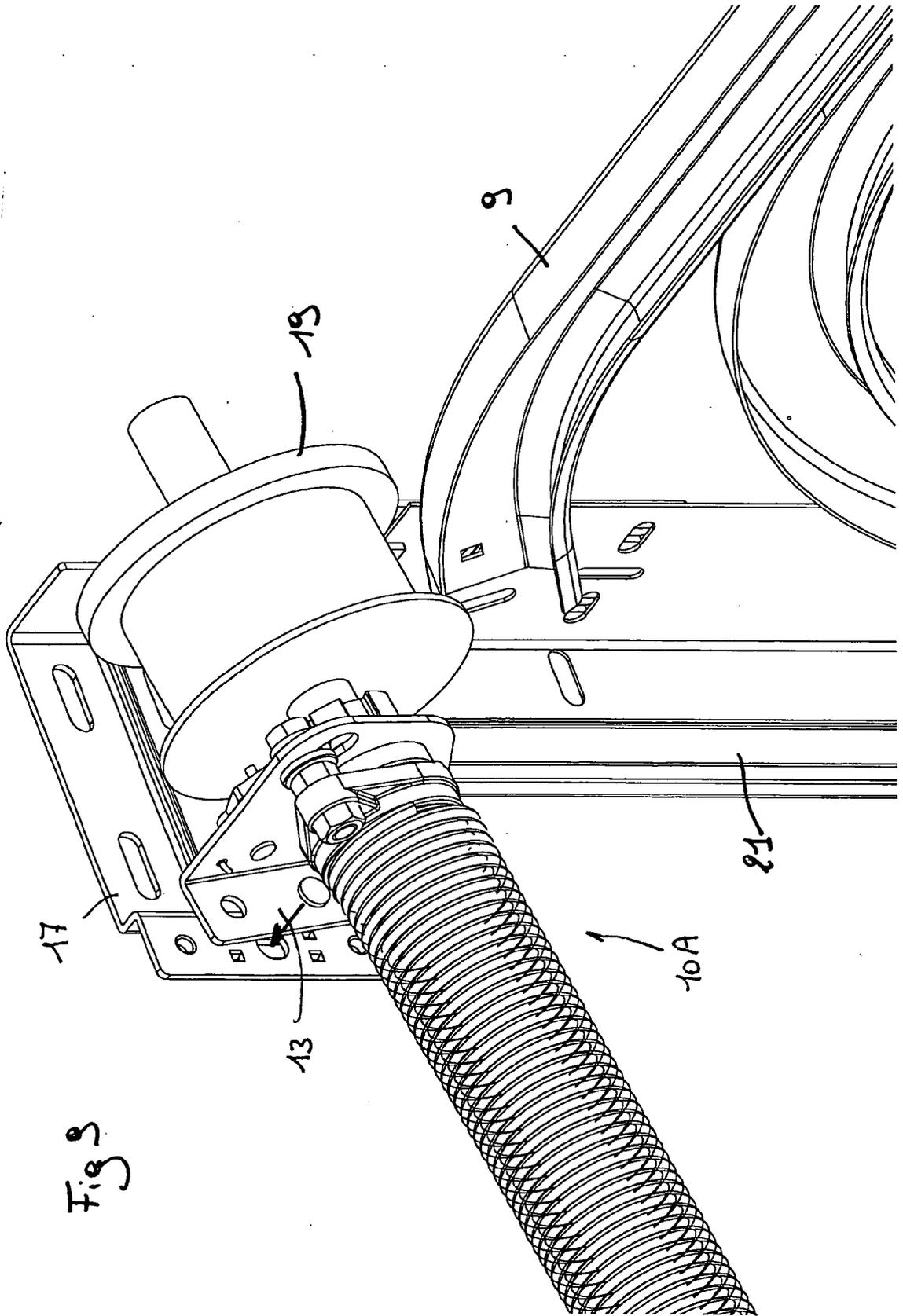
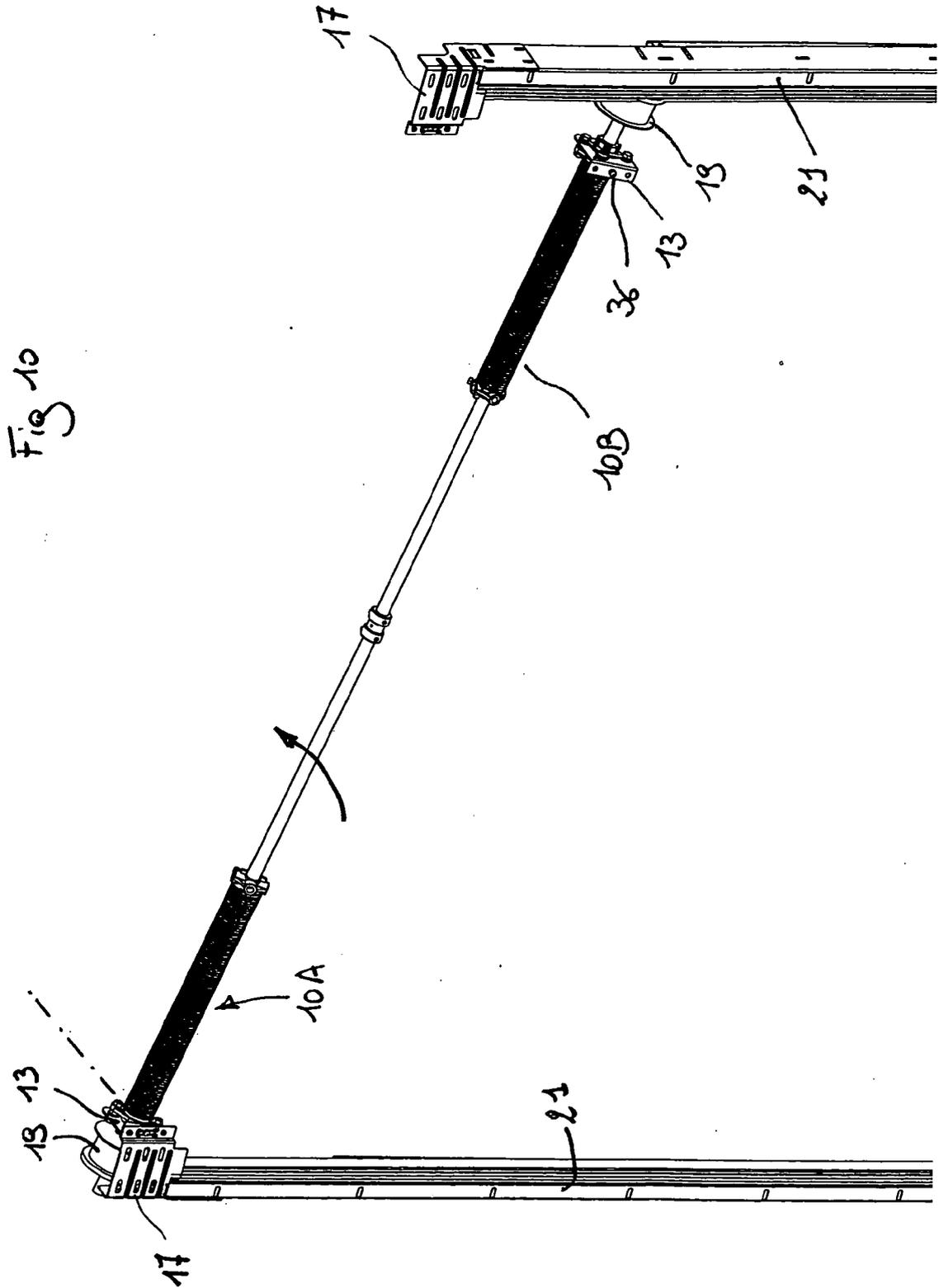
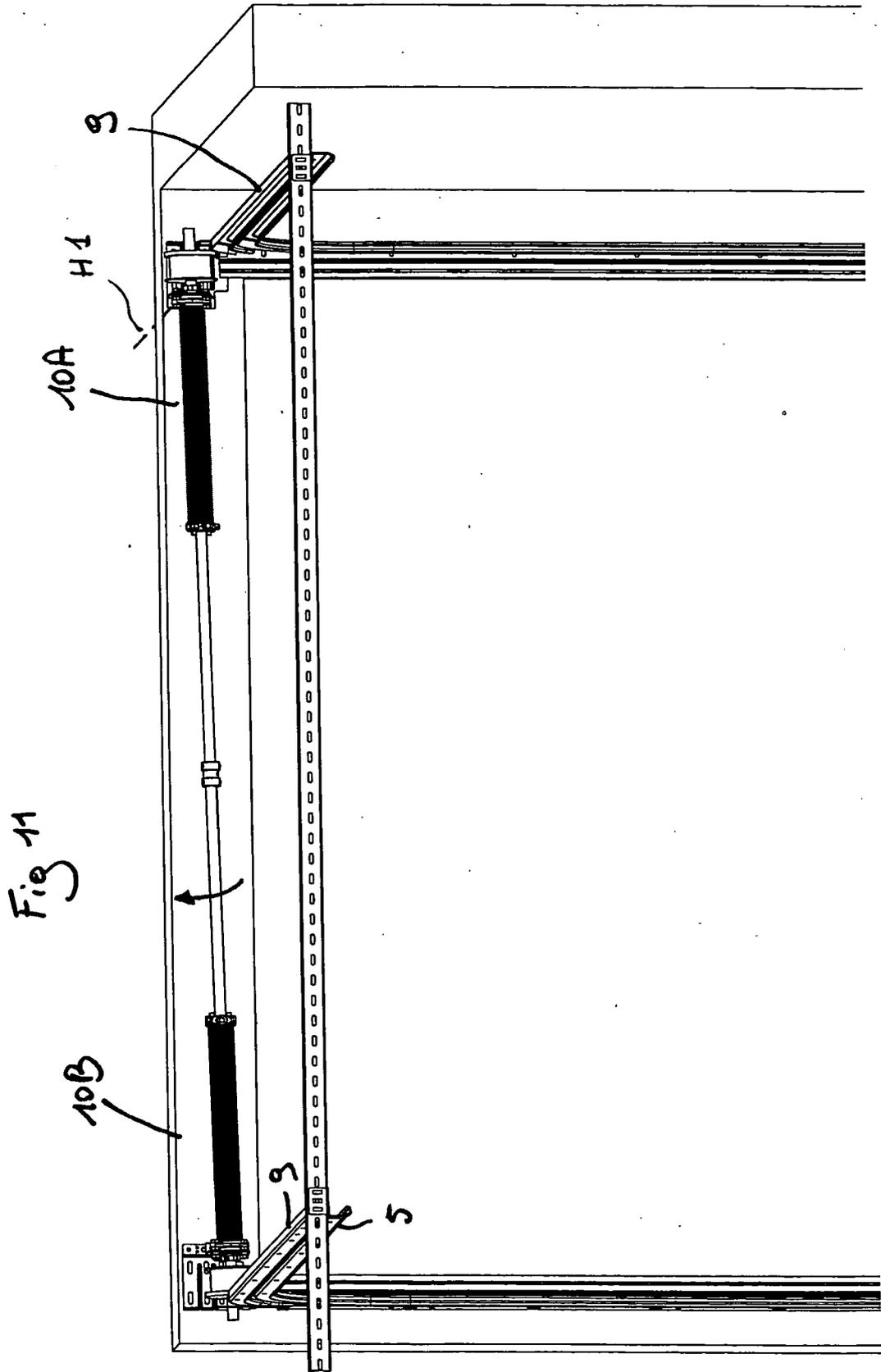


Fig 3





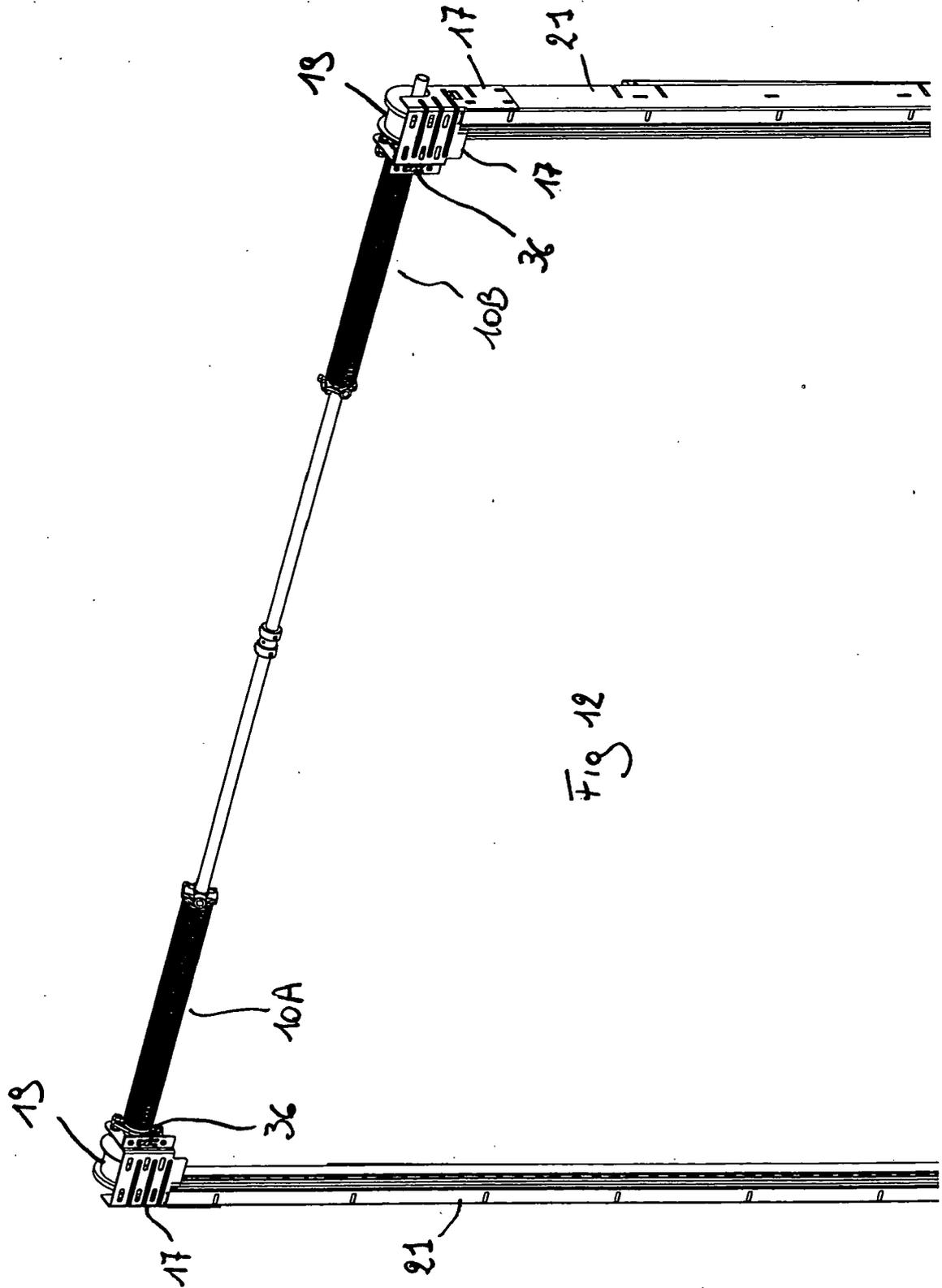
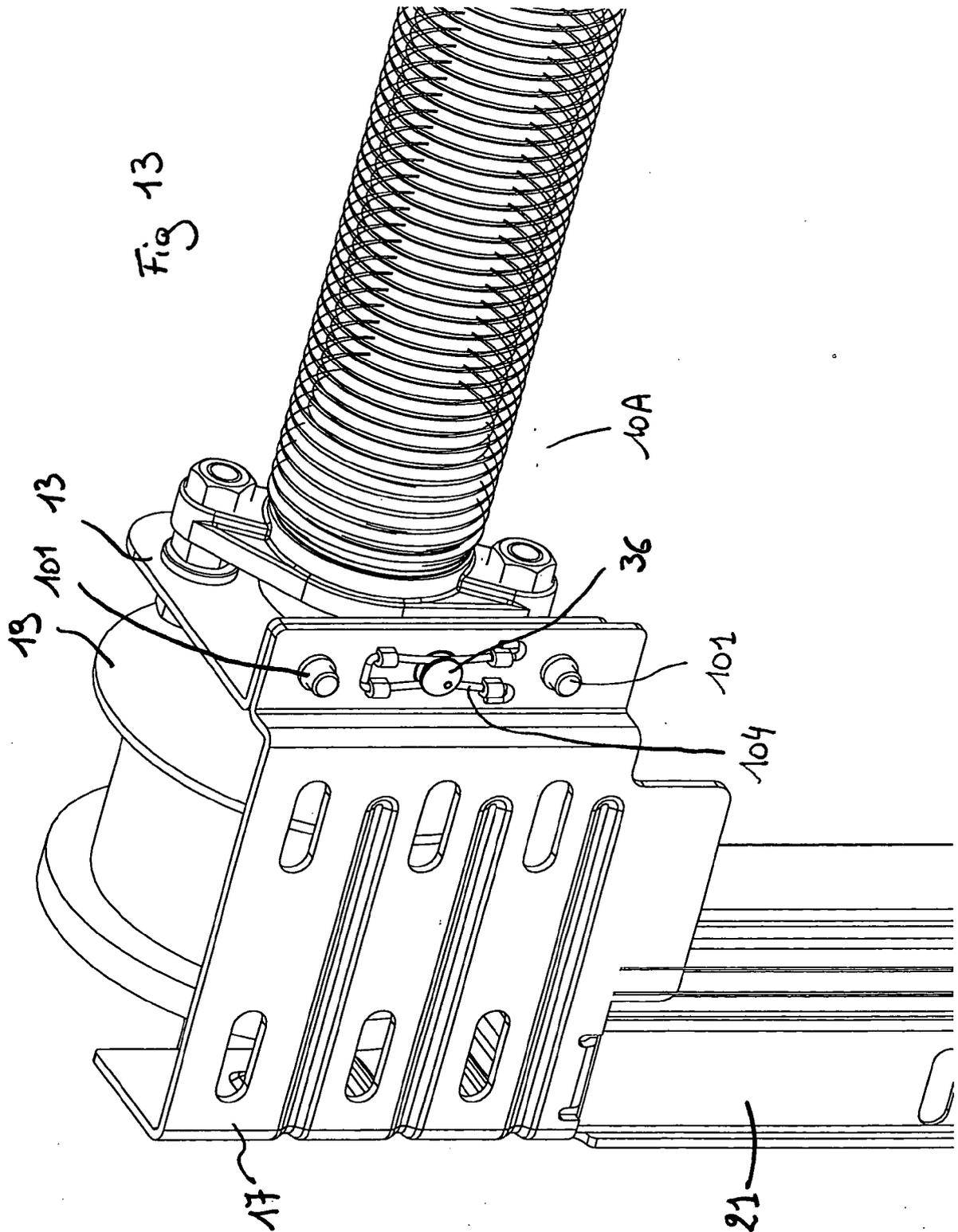


Fig 12



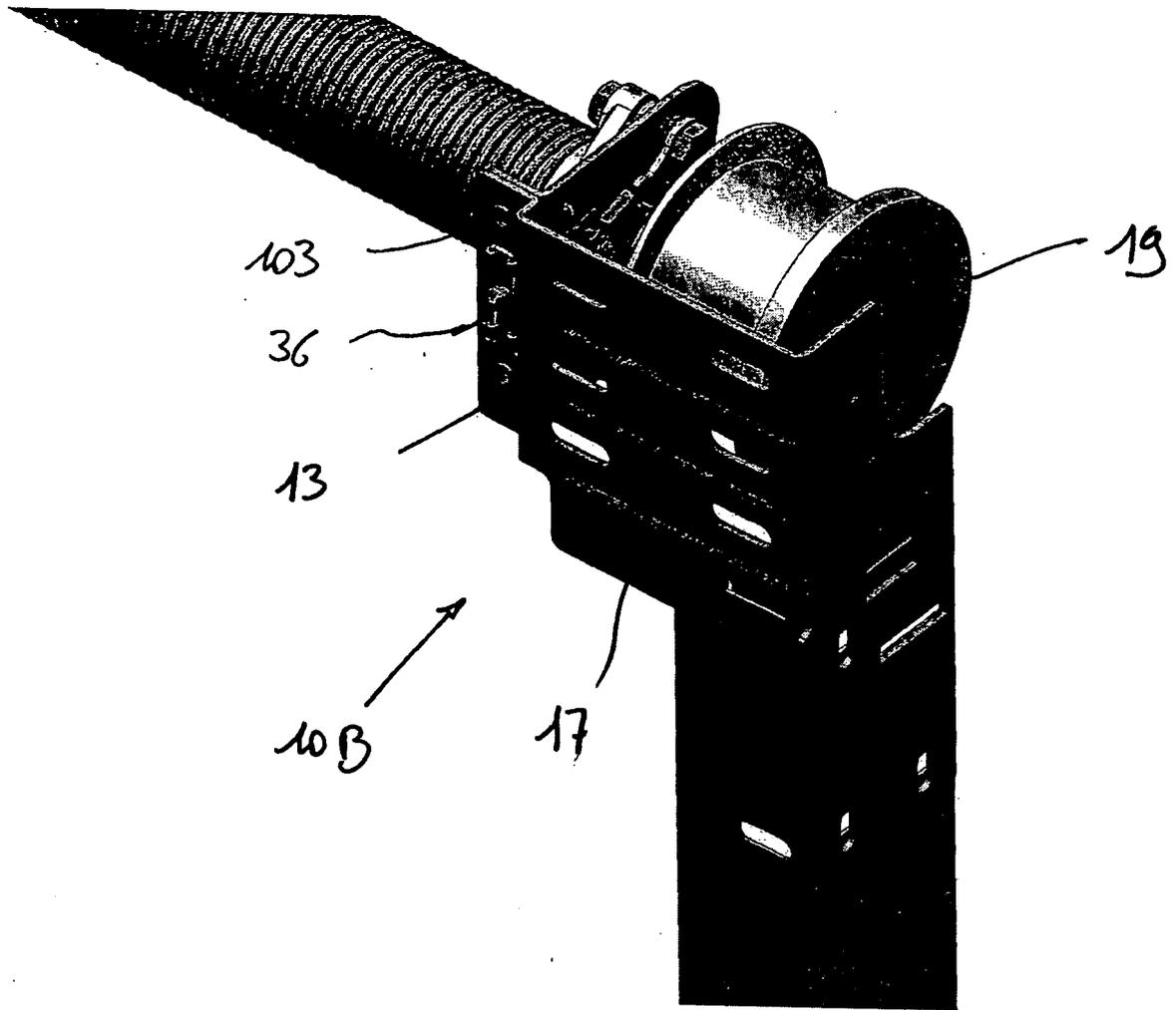
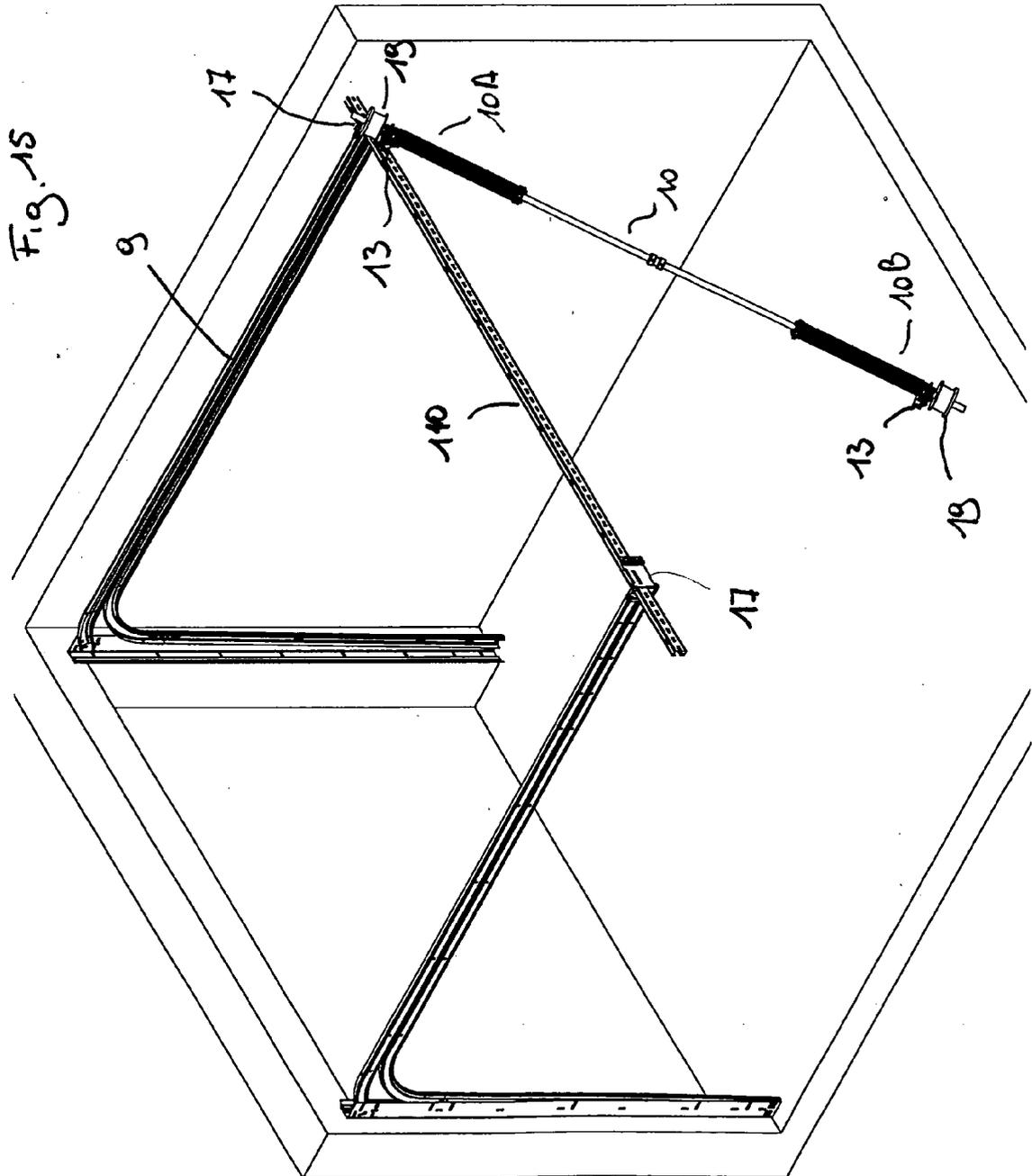


Fig 14



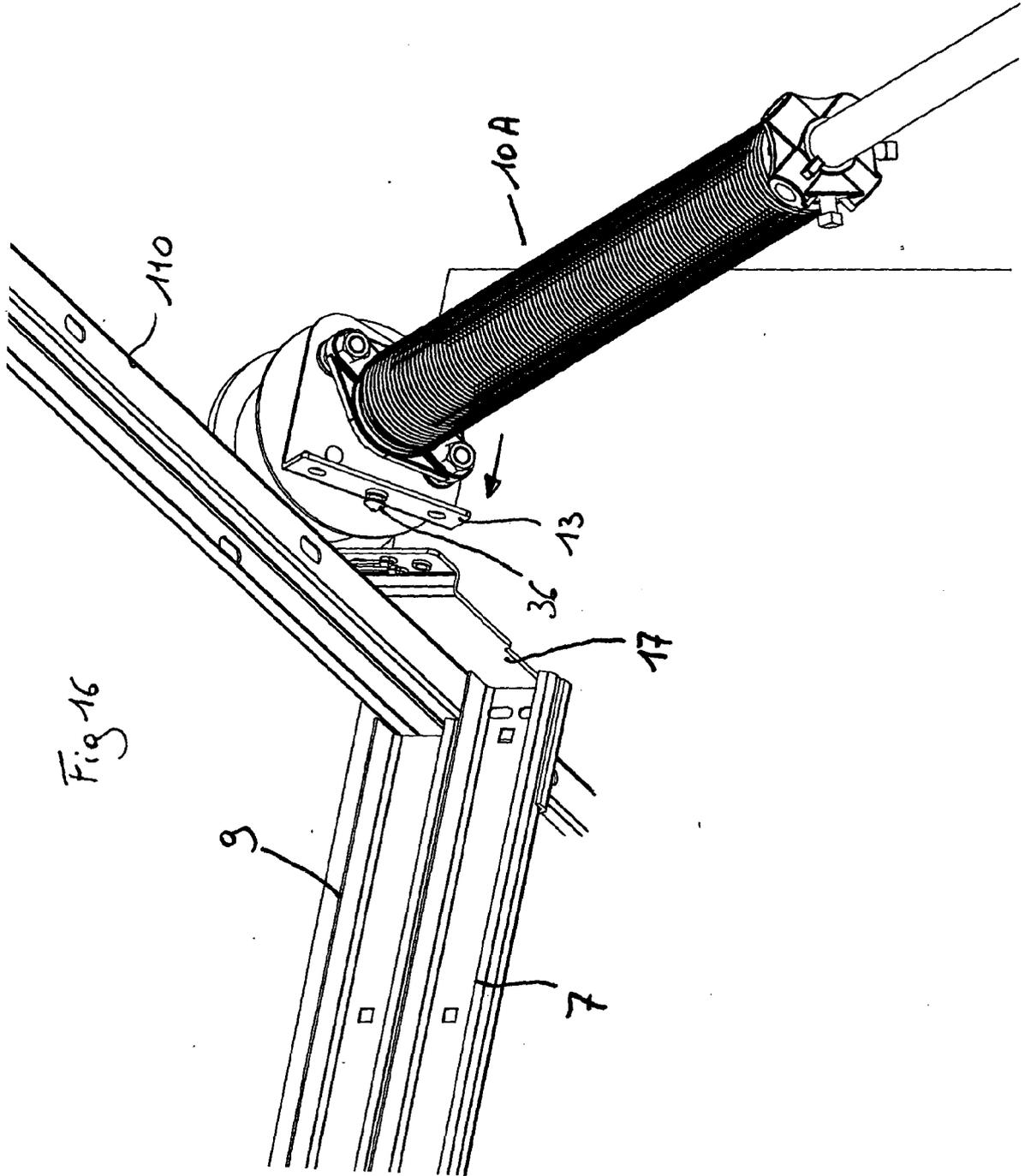


Fig. 16

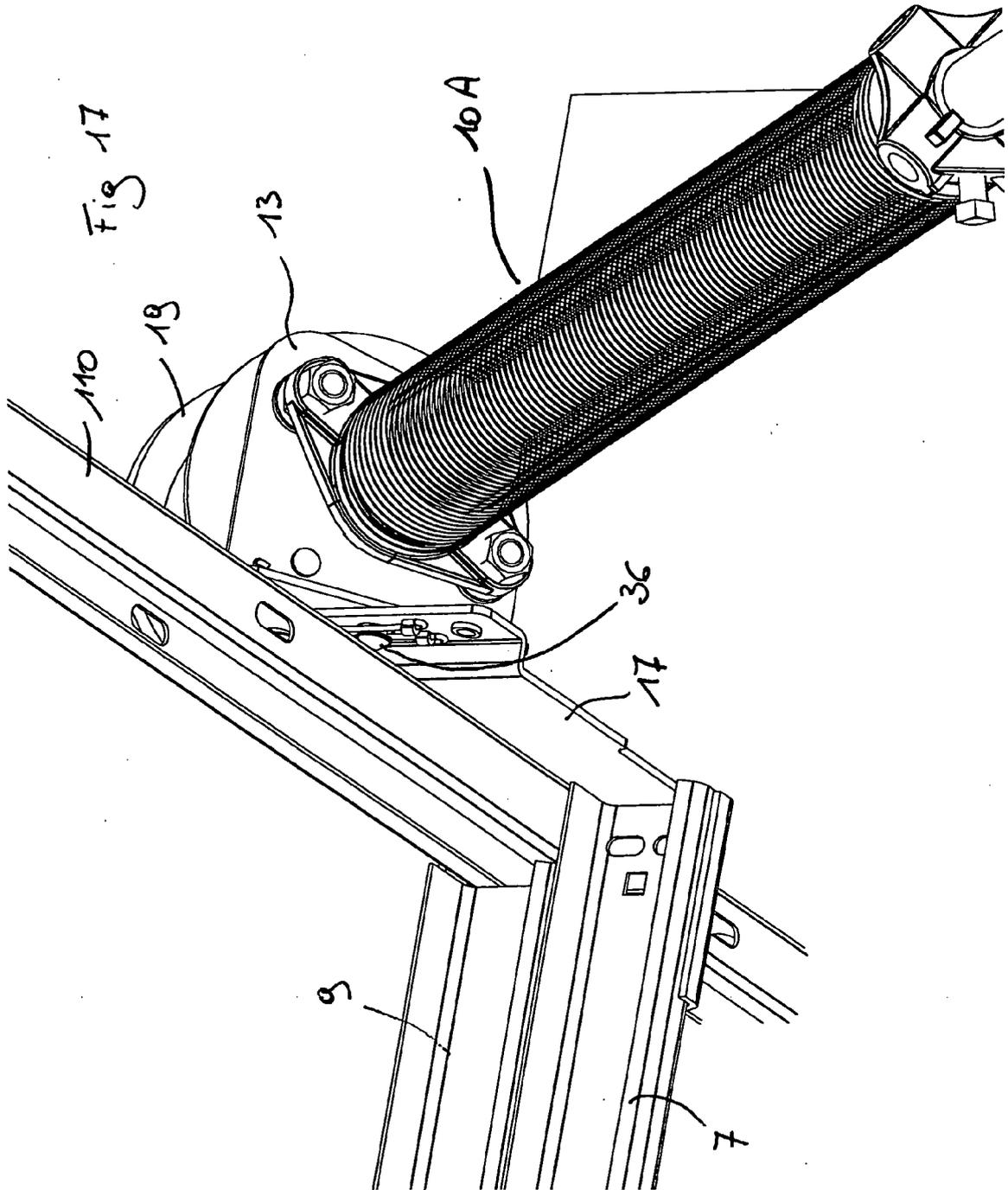
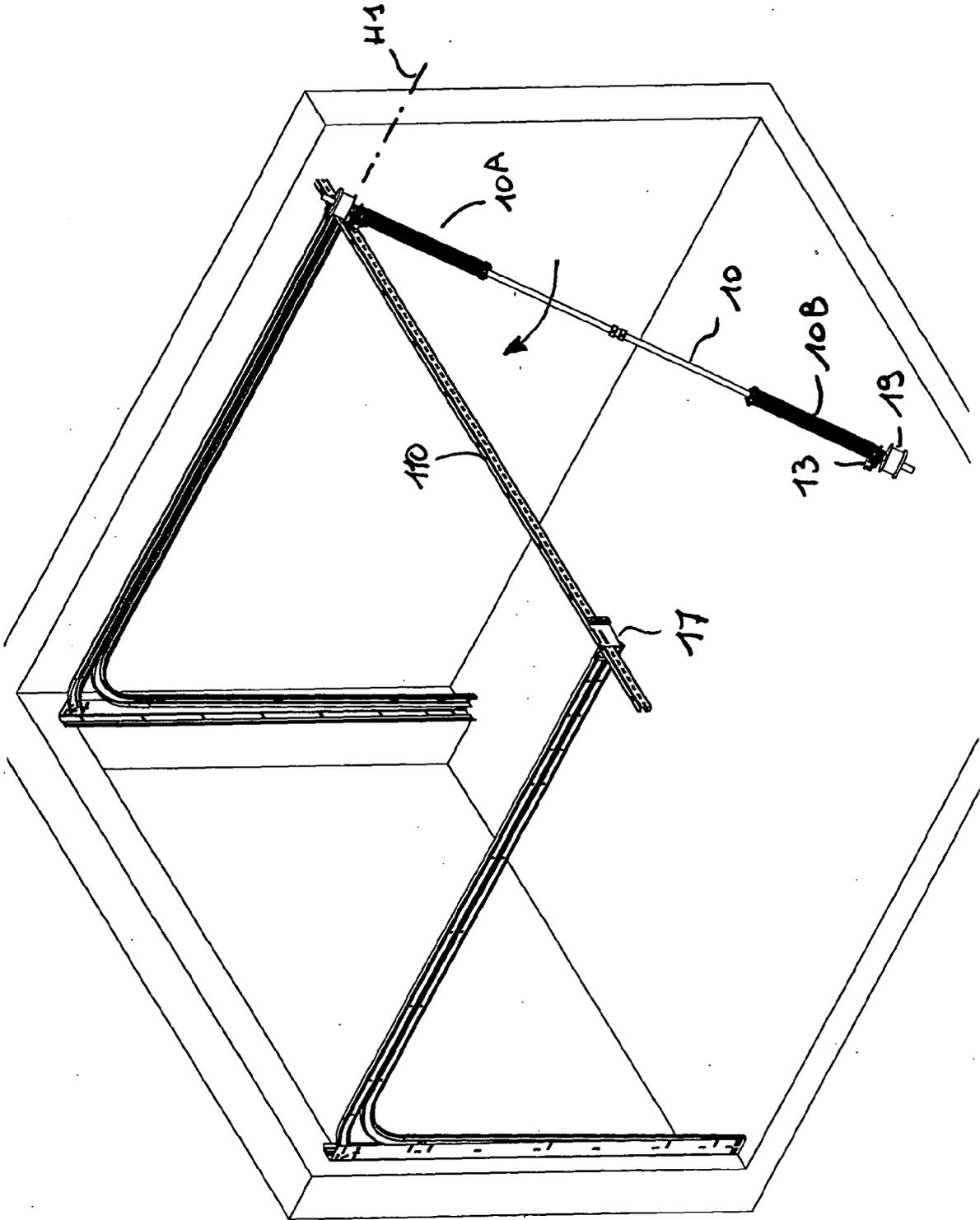


Fig 18



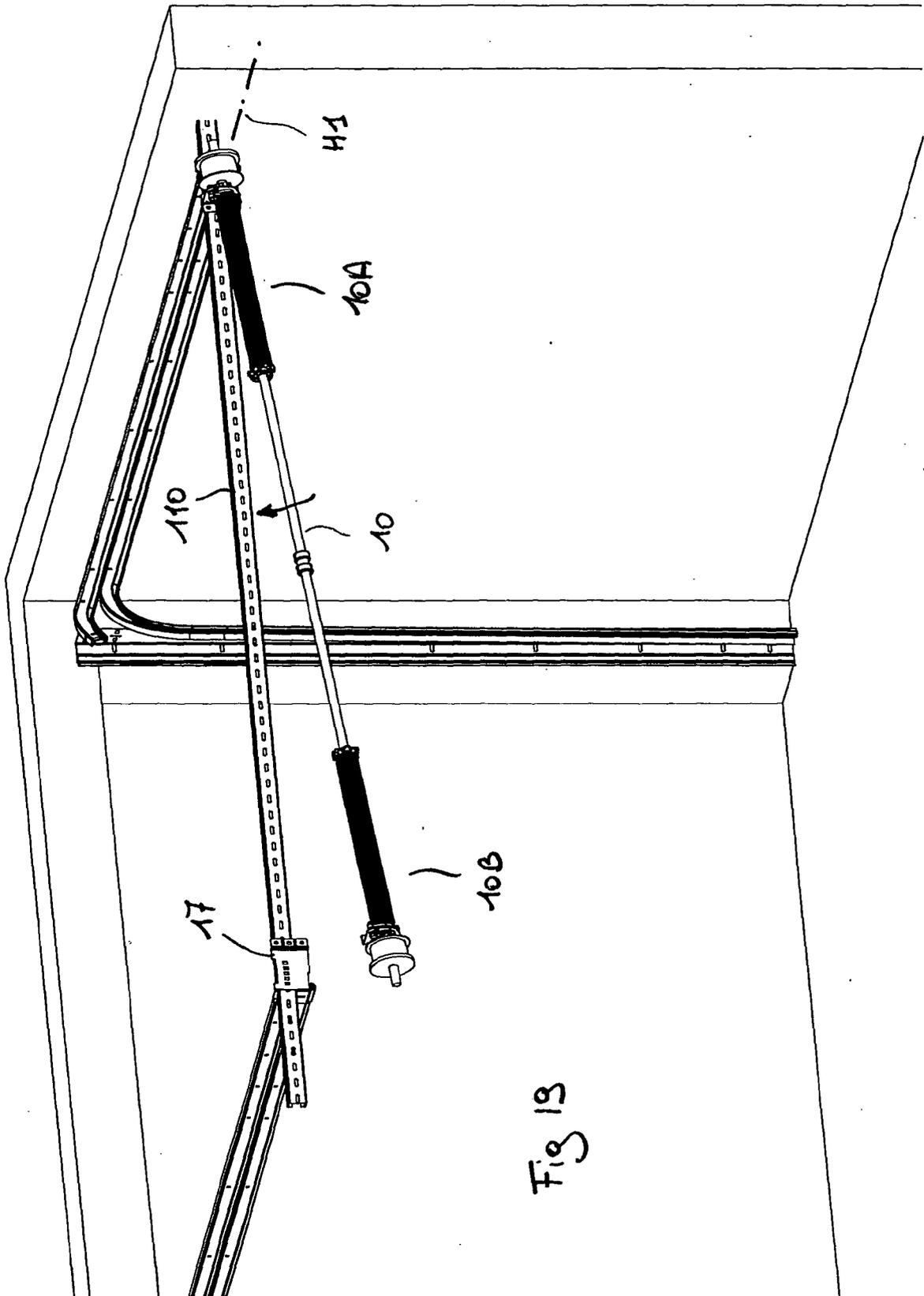
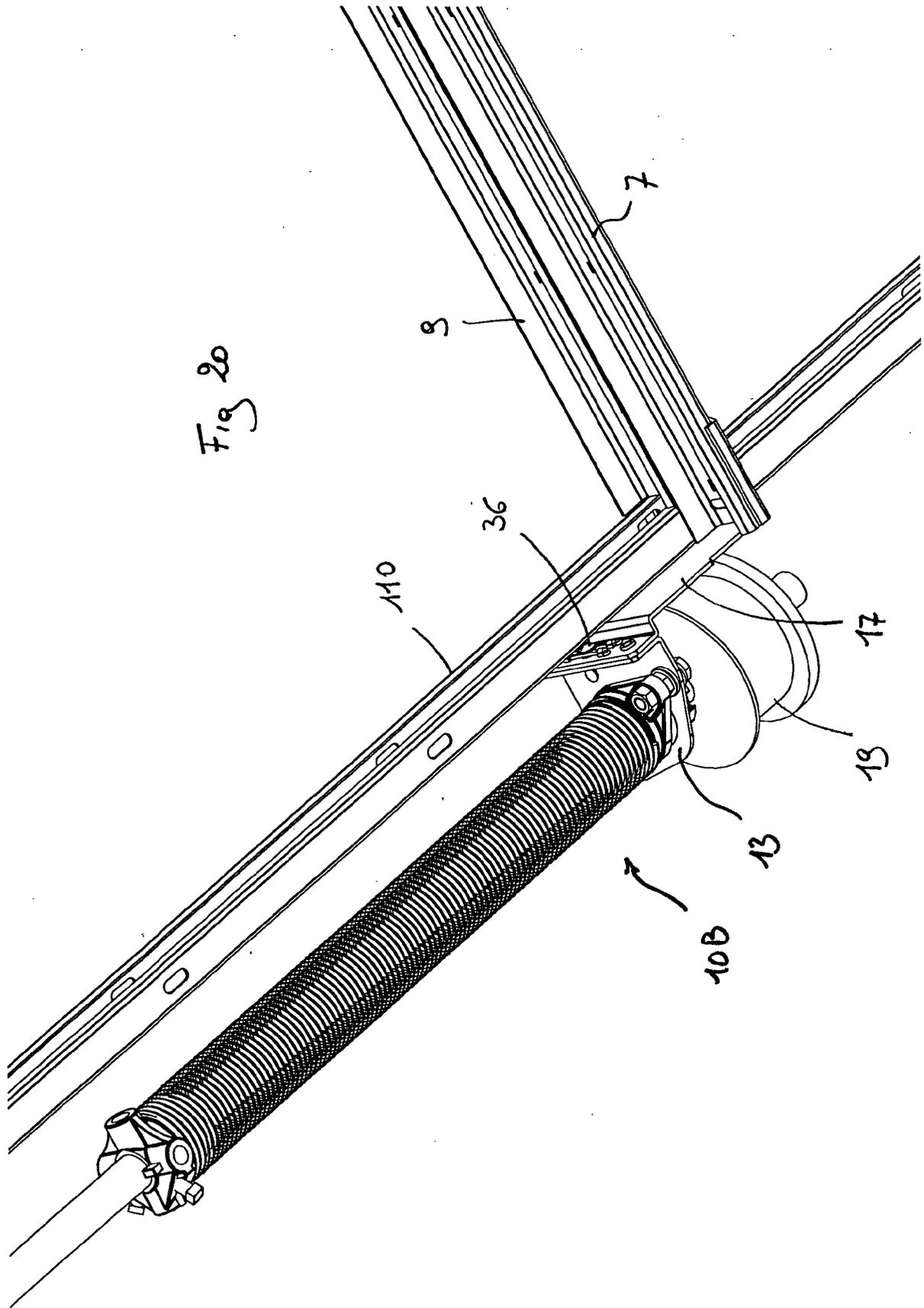


Fig 13



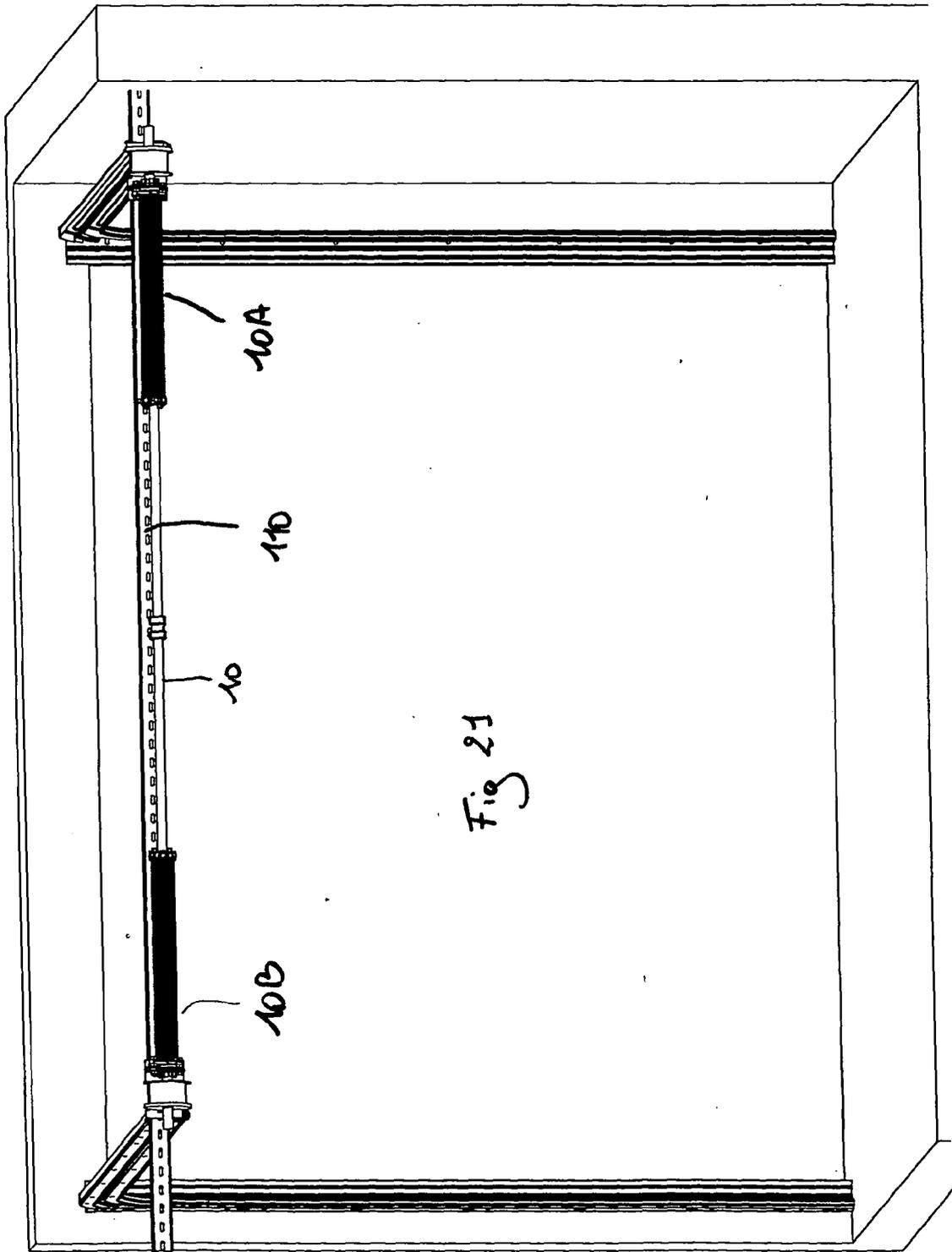


Fig 21

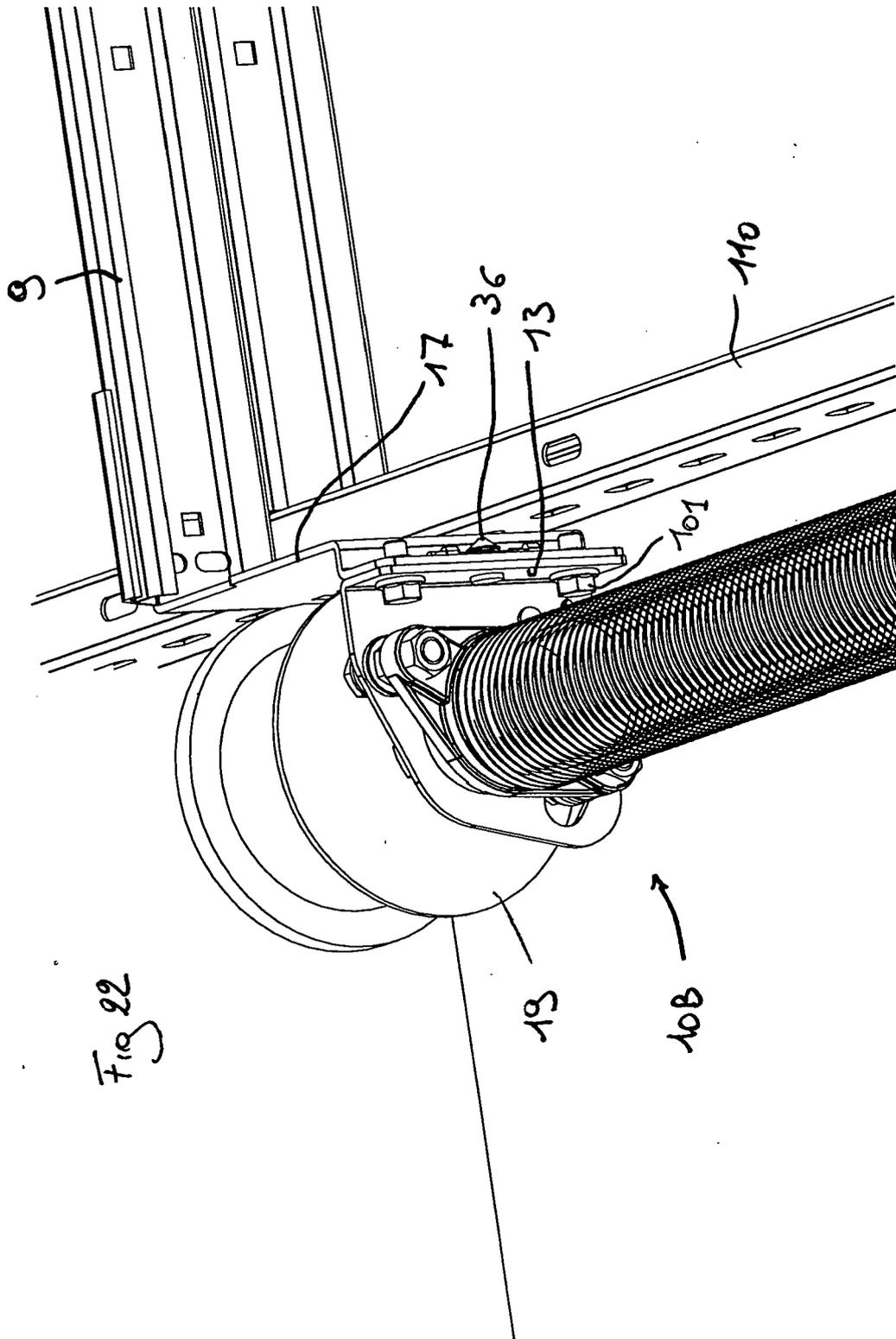


Fig 22

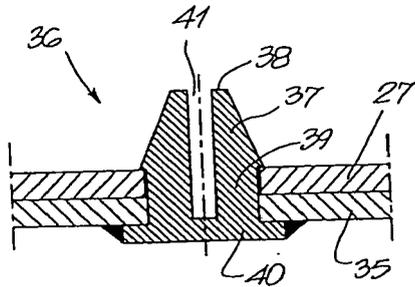


Fig. 23

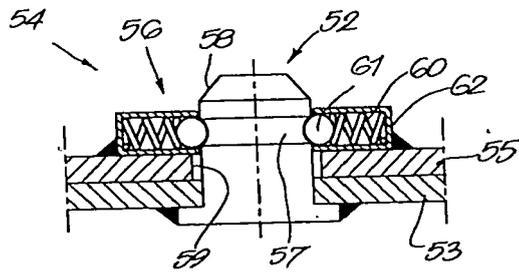


Fig. 24

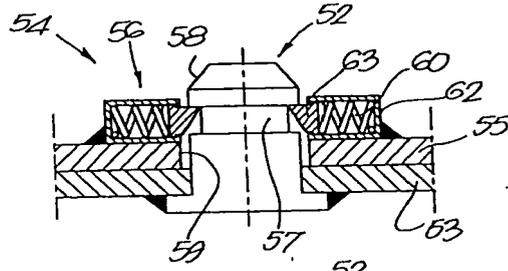


Fig. 25

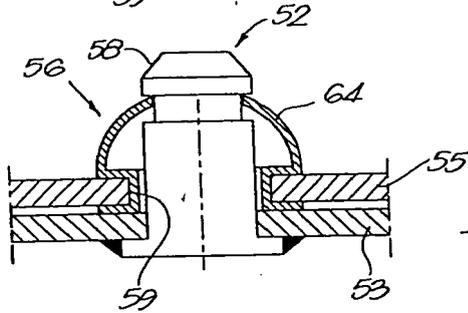


Fig. 26

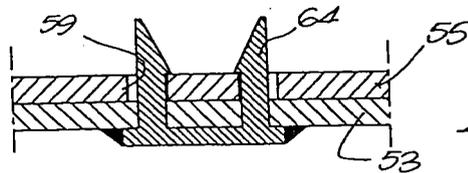
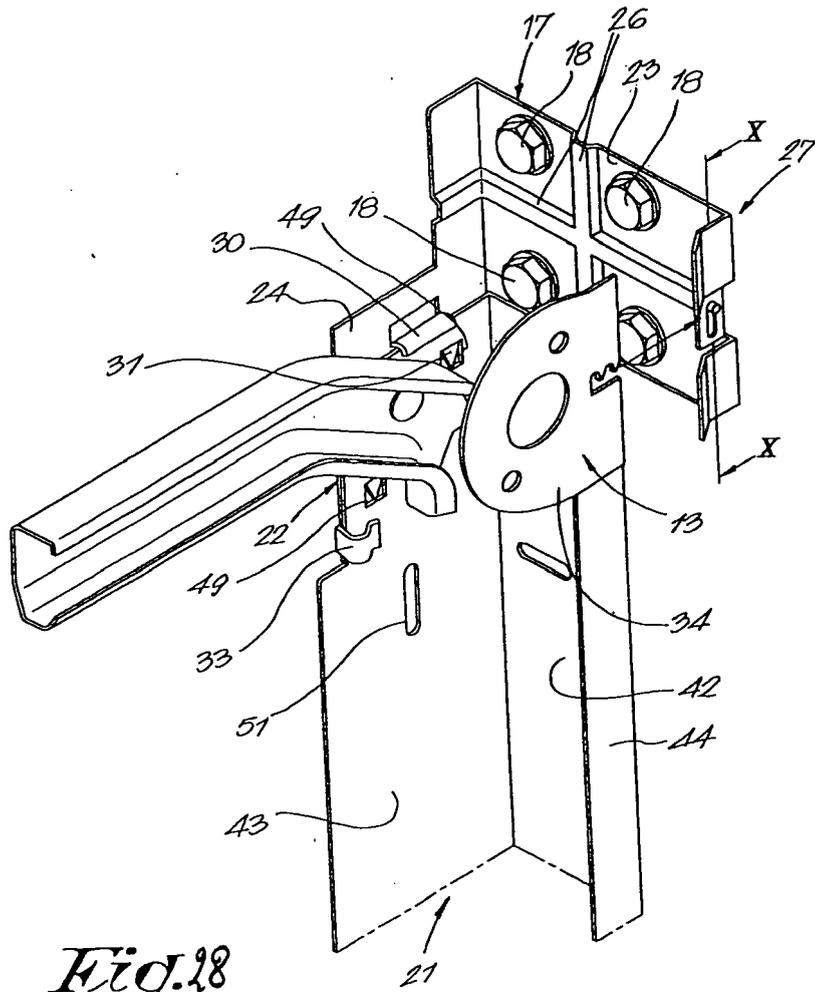


Fig. 27



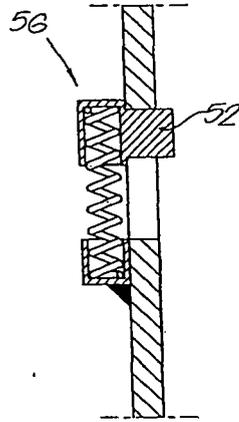


Fig. 29

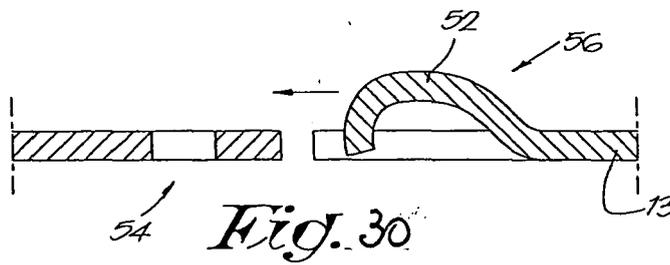


Fig. 30

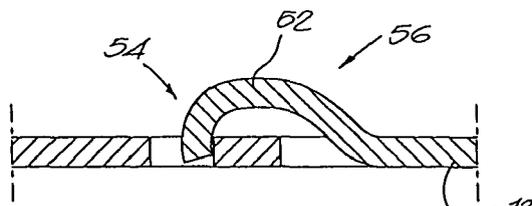


Fig. 31



DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
E	EP 1 818 488 A (MEULDERS PIERRE [BE]) 15 August 2007 (2007-08-15) * claims 1,2,5; figures 4-8 *	1-9	INV. E05D13/00
A	FR 2 595 110 A1 (SOMFY [FR]) 4 September 1987 (1987-09-04) * page 2, paragraph 3 - page 4, paragraph 2; figures *	10	
D,A	US 5 964 268 A (CARPER KENNETH E [US] ET AL) 12 October 1999 (1999-10-12) * column 13, lines 8-16; figures 10,13 *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05D E05F
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		6 September 2007	WITASSE-MOREAU, C
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons</p> <p>& : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.82 (F04C01)

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

EP 07 44 7025

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

06-09-2007

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
EP 1818488	A	15-08-2007	NONE	

FR 2595110	A1	04-09-1987	CA 1278799 C	08-01-1991
			DE 3760088 D1	11-05-1989
			DK 102187 A	29-08-1987
			EP 0234282 A1	02-09-1987
			FI 870865 A	29-08-1987
			JP 62206182 A	10-09-1987
			NO 870380 A	31-08-1987
			US 4825593 A	02-05-1989

US 5964268	A	12-10-1999	AU 2828195 A	05-01-1996
			CA 2191102 A1	21-12-1995
			DE 69512058 D1	14-10-1999
			DE 69512058 T2	27-01-2000
			EP 0765425 A1	02-04-1997
			WO 9534733 A1	21-12-1995

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 5964268 A [0015] [0016] [0017]
- US 5615723 A [0020] [0021]