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(54) FABRIC ROLLER BLIND

(57) Fabric roller blind, which comprises a handle bar (6) which is fixed to a lateral edge of a fabric (5) wound on a take-up roller (4) housed in a rolling-shutter box of a lateral upright (21). The blind (1) also comprises synchronization means (9) for synchronizing the advancement of the terminations (7, 8) of the handle bar (6) during its movement between an open position and a closed position. Such synchronization means (9) comprise an upper guide chain (10) provided with a first internal end (10A) slidably housed inside the handle bar (6), and with a first external end (10B) connected to the upper margin of a lateral abutment element (22) opposite the lateral upright (21) with the take-up roller (4) associated therewith. The upper guide chain (10) enters into the cavity of the handle bar (6) with a first concavity (12) directed towards the lateral abutment element (22). The synchronization means (9) also comprise a lower guide chain (11) provided with a second internal end (11A) slidably housed inside the handle bar (6) and with a second external end (11B) connected to the base of the lateral upright (21). The lower guide chain (11) enters into the cavity of the handle bar (6) with a second concavity (13) directed towards the lateral upright (21). The first and the second internal end (10A, 11A), respectively of the upper guide chain (10) and of the lower guide chain (11), are mechanically and adjustably connected to each other in order to be jointly moved within the handle bar (6).

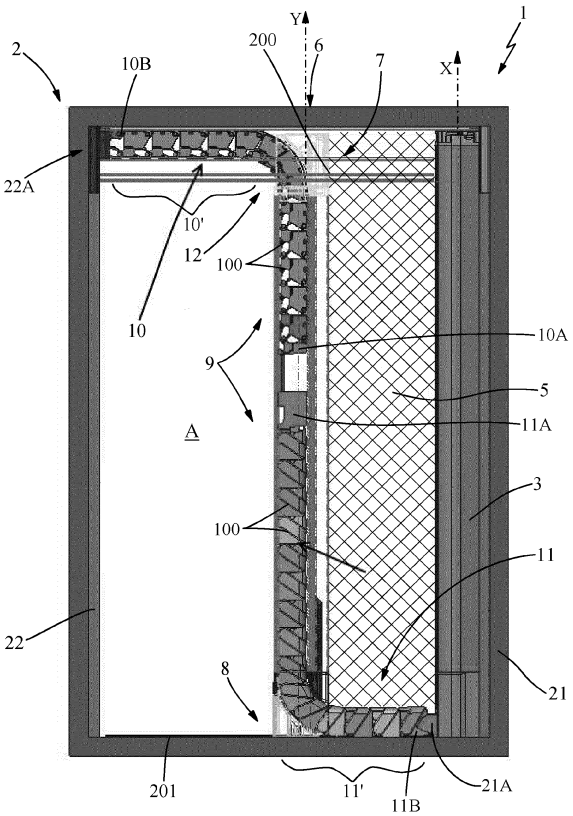

Fig. 1B

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Description

Field of application

[0001] The present invention regards a fabric roller blind according to the preamble of the independent claim number 1.

[0002] The present fabric roller blind is intended to be advantageously employed for adjustably closing provided openings of building walls, in particular for windows, for doors, for French windows and similar doors/windows/shutters.

[0003] Preferably, the fabric roller blind, object of the present patent, is a blind or mosquito netting of the type with vertical handle bar which closes and opens the opening by means of a horizontal translation of the same handle bar.

[0004] The blind, object of the present invention, is therefore inserted in the industrial field of production of doors/windows/shutters or also in the field of production of fabrics for sun protection, in the field of mosquito netting or of similar applications.

State of the art

[0005] Blinds for closing openings of doors/windows/shutters (such as windows, doors or French windows) are known on the market; these are provided with a rolling-shutter box, which is vertically fixed to a lateral upright of the building wall which defines the opening to be closed, and at its interior houses a roller on which a flexible cover fabric is susceptible of being wound and unwound.

[0006] The fabric usually has rectangular shape and is provided with a first lateral edge fixed to the roller and with a second lateral edge opposite the first lateral edge and fixed to a handle bar aimed to stretch the fabric itself during a movement thereof along a horizontal direction.

[0007] In addition, the blind comprises two guides arranged horizontally along the corresponding upper and lower walls which define the opening and to which the handle bar is slidably constrained.

[0008] In particular, the handle bar usually comprises an aluminum section, which is closed at its upper and lower ends by two terminations, which are slidably engaged in the respective horizontal guides.

[0009] Normally, each of the upper and lower horizontal guides is generally obtained by means of an aluminum section fixed to the upper or lower wall which defines the opening. Each aluminum section of the two guides is provided with a longitudinal slit which is extended along the extension of the same section and which slidably houses at its interior the corresponding upper or lower terminal of the handle bar. The slits of the two guides are facing and delimit two sides of the opening to be closed with the fabric roller. The handle bar is movable by a user between an open position, in which it is side-by-side the rolling-shutter box with the fabric completely wound around the roller so as to free the opening to be screened, and a closed position in which the handle bar is side-by-side the opposite lateral wall, with the fabric substantially completely unwound from the roller and placed to close the opening.

[0010] In operation, starting from the open position, the user grips the handle bar and drives it along the horizontal guides up to the desired position, for example up to the closed position, in which the fabric is placed to totally close the opening.

[0011] During this movement, the upper and lower terminals of the handle bar respectively slide along the upper and lower guides.

[0012] The blinds of known type described briefly up to now have in practice demonstrated that they do not lack drawbacks.

[0013] A first drawback of the blinds of known type lies in the fact that for the movement of the handle bar between the open position and the closed position, the handle bar may be gripped not precisely at half its height but at a non-centered position, for example in proximity to one of its ends. Such circumstance involves that the handle bar is stressed to be more greatly moved along the guide closer to where the handle bar has been gripped by the user and to a lesser extent along the guide further from where the handle bar has been gripped by the user.

[0014] This determines a non-alignment between the two ends of the handle bar, with one end of the handle bar more advanced in the direction of its movement and one end more retreated in the direction of its movement. Such non-alignment of one end with respect to the other end of the handle bar brings the fabric roller to be stretched in a nonuniform manner, forming folds which in the long run can also lead to deterioration and hence also to the breakage of the fabric itself.

[0015] In addition, such non-alignment leads to an undesired deterioration of the terminals inserted in the horizontal guides due to the stresses to which they are continually subjected. In addition, following such non-alignment, it can happen that the same terminals exit from the horizontal guides, requiring the maintenance intervention by a specialized technician.

[0016] This drawback is worsened if the handle bar is very high (over 2 meters).

[0017] In order to at least partially overcome such drawbacks of the abovementioned prior art, blinds with fabric roller have been developed, also of known type, which are provided with means for aligning the terminals of the handle bar which maintain the terminals thereof vertically aligned during the movement of the same handle bar between the open and closed positions. Such means for aligning the terminals of the handle bar therefore allowing remedying a vertical non-alignment of the terminals, i.e. their different sliding in the direction also if the handle bar is gripped and driven in proximity to one of its ends.

[0018] One example of a fabric roller blind is known which is provided with the above-indicated main mem-

bers and components and with alignment means housed in the handle bar. More in detail, the fabric roller is constituted by an anti-mosquito netting, with substantially regular shape, which is fixed at one lateral end thereof to the take-up roller which is housed within the vertical rolling-shutter box and at the other end is fixed to the handle bar, which is susceptible of being gripped by a user in order to move the blind between the open and closed positions.

[0019] The above-described fabric roller blind of known type comprises a guide chain (or "carriage" in the technical jargon of the field) composed of a plurality of elements pivoted to each other in succession and capable of rotating with respect to each other only in one rotation sense so as to attain - when extended and aligned in succession - a rigid member in the opposite rotation sense susceptible of attaining a guide for the fabric. Such elements are housed within a corresponding vertical seat made within the handle bar when the blind is in open position. The chain is constrained at one end thereof to the rolling-shutter box in which the take-up roller is housed, while the other end is slidably inserted within the vertical seat of the handle bar.

[0020] When the blind is moved from the open position to the closed position, the guide chain is driven outside the vertical seat of the handle bar, being set on the lower wall (usually the floor or a window sill) which delimits the opening to be screened, thus acting as a lower guide for the fabric.

[0021] The guide chain, with the blind in closed position, therefore defines a horizontal rectilinear guide for the fabric, which allows retaining it in the spread-out position to close the opening to be screened.

[0022] One embodiment of a fabric roller blind of the type described above is known, which provides for the use of means for aligning the terminals of the handle bar. Such alignment means for example comprise flexible cables arranged inside the handle bar and connected to the ends thereof in order to synchronize the advancement thereof during the unwinding of the chain. Due to such alignment means, even if one of the ends of the handle bar meets an obstacle, the handle bar is not tilted, always ensuring the correct vertical position.

[0023] The main drawback of such blind of known type lies in the use of connection cables inside the handle bar which require an implementation in the factory and which cannot be modified at the site of blind installation. Therefore, if the blind must have reduced height, as happens rather frequently so that it can enter within the space where intervention is required, then the blind must be sent back to the factory for the reworking, with clear increases of costs and and increased installation times.

[0024] In addition, the cables are pliable elements over time, which require periodic calibrations with the intervention of a specialized technician.

[0025] Another drawback from the commercial and industrial standpoint tied to the abovementioned blind embodiment of known type lies in the fact that it can only be sold custom-fit. Indeed it is not possible to sell the blind with multiple standard sizes and then cut it to the right size at the installation site, due to the need to recalibrate the length of the cables.

[0026] Also known from patent EP 2530236 is a fabric roller blind of the abovementioned known type, in which the means for aligning the terminals of the handle bar comprise - in place of the cables - a metal strap with curved section placed in proximity to the upper rectilinear guide, fixed on one side to the vertical upright and on the other side fixed to the end of the guide chain through a connector strap.

[0027] Such metal strip, like the guide chain, which extended during the opening of the handle bar defines a rigid member in the sense that it does not allow the upper terminal to return back or stay behind with respect to the lower terminal.

[0028] Also this blind of known type which uses such metal strip as alignment means has in practice shown that it does not lack drawbacks.

[0029] In addition to all of the drawbacks mentioned above for the blinds with alignment means constituted by cables, such blind of known type is rather complex to make and to install and consequently involves high production and installation costs.

[0030] In addition, the metal strap requires being produced to size and hence cannot be modified during installation in order to adapt it to the dimensions of the opening if, for example, the measurements were not correctly made. Therefore, in this case, in order to modify the height of the handle bar and/or the length of the metal strap, it is necessary to send the blind back to its place of production, or to a specialized laboratory, clearly with increased overall costs associated with this blind.

[0031] Therefore, the above-described fabric roller blind of known type can be produced to size for each client, based on the measurements of the opening to be screened, since as stated it is not possible to easily vary the dimensions of the blind on the field, during installation, and therefore it is costly and requires long times to attain.

[0032] A further drawback of the blind of known type lies in the fact that the metal strap, with the handle bar in closed position, is at least partially visible by the user and might not be aesthetically pleasing.

[0033] Further drawback of this blind lies in the fact that the strap has low maximum load strength, so that when it is compressed it can easily collapse. This very much limits the sizes of the products that can be attained.

[0034] Also known, for example from patents EP 1640554, EP 999335 and EP 1903175, are embodiments of blinds with fabric roller which have the general characteristics described above and comprise two guide chains, of which one is upper and one lower, which have one end connected at a same upright and the other slidable in the guide bar. Such blinds with fabric roller of known type comprise means for aligning the terminals of the handle bar obtained by joining, with flexible cables, the ends of the two chains. Such blinds have the same

drawbacks as mentioned above of the blinds provided with a single guide chain.

Presentation of the invention

[0035] In this situation, the problem underlying the present invention is to provide a fabric roller blind which has a handle bar movable between a closed position and an open position, maintaining an optimal alignment between its upper and lower ends regardless of the position in which the handle bar is gripped by the user in order to move it.

[0036] A further object of the present invention is to provide a fabric roller blind, which can be adapted to an opening to be screened even during its installation, in a quick and easy manner.

[0037] Another object of the present invention is to provide a fabric roller blind, which is entirely reliable in operation, and in particular capable of ensuring the aforesaid alignment also after an extended use over the years, without requiring a periodic maintenance.

[0038] Another object of the present invention is to provide a fabric roller blind, which is entirely efficient in operation, and in particular capable of ensuring the correct alignment of the upper and lower ends of the handle bar also for handle bars with high extension, i.e. also for handle bars provided with an extension of over two meters. Another object of the present invention is to provide a fabric roller blind, which is structurally simple and inexpensive to make and install.

Brief description of the drawings

[0039] The technical characteristics of the invention, according to the aforesaid objects, can be clearly seen in the contents of the below-reported claims and the advantages thereof will be more evident in the following detailed description, made with reference to the enclosed drawings, which represent a merely exemplifying and non-limiting embodiment of the invention, in which:

- figure 1A shows a front view of the fabric roller blind, object of the present invention, with a provided handle bar in intermediate position between an open position and a closed position;
- figure 1B shows the front view of the fabric roller blind of figure 1A with several characteristics transparent in order to better view other characteristics;
- figure 2 shows a perspective view of an enlarged detail of the blind of figure 1 relative to an upper portion of the blind with several parts removed and others transparent in order to better view other parts;
- figure 3 shows a perspective view of a detail of the blind illustrated in figure 1, relative an internal part of the handle bar with means visible for connecting the first internal ends of two guide chains;
- figure 4 shows a detail in perspective view of the fabric roller blind, object of the present invention, relative to a portion of an upper guide chain of the two guide chains;
- figure 5 shows the detail relative to the chain portion of figure 4 in a side view;
- figure 6 shows a detail of the fabric roller blind, object of the present invention, relative to the connection of the second external end of the upper guide chain to a lateral upright of the frame;
- figure 7 shows the detail of the blind of figure 6 with the handle bar in position side-by-side the aforesaid upright;
- figure 8 shows a detail of the fabric roller blind, object of the present invention, relative to one part of the upper guide chain inserted within the handle bar, some parts having been removed in order to better illustrate other parts;
- figure 9 shows a detail of the fabric roller blind, object of the present invention, relative to one part of the lower guide chain inserted within the handle bar, some parts having been removed in order to better illustrate other parts;
- figure 10 shows the detail of the blind of figure 9, a lower guide terminal of the handle bar having been removed;
- figure 11 shows a detail of the blind, object of the present invention, relative to its handle bar with some parts in exploded view and others removed in order to better illustrate still other parts.

Detailed description of a preferred embodiment

[0040] With reference to the enclosed set of drawings, reference number 1 overall indicates the fabric roller blind, object of the present invention.

[0041] The blind 1 is operatively employable for adjustably closing an opening A of a door/window/shutter, e.g. of a window, of a door or of a French window, made in a load-bearing structure such as the building wall of a building.

[0042] In accordance with the embodiment illustrated in the enclosed figure 1, the fabric roller blind 1, object of the present invention, comprises a support frame 2 intended to be fixed to the load-bearing structure in which the opening A is made. The latter is defined at least between two lateral walls, an upper wall and a lower wall of the load-bearing structure of the building.

[0043] The support structure 2 comprises a lateral upright 21 and at least one lateral abutment element 22, opposite the lateral upright 21.

[0044] Preferably, the lateral upright 21 of the support structure 2 directly comprises or defines a rolling-shutter box 3 intended to be positioned laterally with respect to the opening A to be screened.

[0045] Advantageously, the rolling-shutter box 3 is a hollow tubular section, in particular obtained with an aluminum extrusion, which is extended with substantially vertical axis between two opposite upper and lower ends.

[0046] Advantageously, the lateral abutment element

22 is part of the support structure and also constituted by a hollow tubular section, in particular obtained with an aluminum extrusion, which is extended parallel to the lateral upright 21 with substantially vertical axis between two opposite upper and lower ends.

[0047] The abutment element 22 can nevertheless also be obtained as an element not constituting part of the support structure 2 and for example constituted by the internal wall of the load-bearing structure of the building which defines the opening A for the blind, or by a coupling element for the pin 101' of the final ring of the upper guide chain 10 (specified hereinbelow). Such coupling element which in this case defines the abutment element 22 can be fixed (e.g. screwed) directly on the aforesaid internal wall of the load-bearing structure of the building, or it can be fixed to the upper guide crosspiece 200 (introduced hereinbelow).

[0048] Advantageously, the abutment element 22, in accordance with the embodiment illustrated in the enclosed figures, constitutes a second lateral upright arranged to the side of the opening A in position facing the lateral upright 21, with the rolling-shutter box 3 associated therewith.

[0049] The blind 1 also comprises a take-up roller 4 having a substantially vertical rotation axis X, rotatably constrained to the lateral upright 21 of the support frame 2 and preferably housed within the rolling-shutter box 3.

[0050] The blind 1, object of the present invention, also comprises a fabric 5, which preferably has rectangular shape and is extended between a first lateral edge thereof fixed to the take-up roller 4 and a second lateral edge thereof opposite the first lateral edge.

[0051] The fabric 5 can be defined for making a darkening screen, for example in substitution of a roller shutter, of a brise-soleil screen for filtering sunlight, or for making a mosquito netting. In an entirely general manner, the fabric 5 can be dedicated to closing the opening of a door/window/shutter in order to protect an internal area from the sun and/or from the wind and/or, more generally, from the weather conditions of the outside environment.

[0052] The fabric 5, as a function of its different applications, can be made of synthetic or natural fabric and can have the shape of a net or have a continuous surface of darkening, filtering or transparent type. If the fabric 5 is formed by a net, it could make a mosquito netting in order to prevent the entrance of insects through the opening A.

[0053] The fabric 5 wound around the take-up roller 4 passes through a vertical slit which is made on a lateral wall of the rolling-shutter box 3 which is directed towards the opening A.

[0054] The blind 1 also comprises a handle bar 6, which is fixed to the second lateral edge of the fabric 5. Such handle bar 6 is extended along an extension axis Y substantially parallel to the rotation axis X of the take-up roller 4 between an upper termination 7 and a lower termination 8.

[0055] The handle bar 6 is provided with an internal axial cavity which is extended along its extension axis Z.

[0056] Advantageously, the handle bar 6 is made with a hollow tubular body, in particular made with an aluminum extrusion.

[0057] The handle bar 6 is movable between an open position, in which it is placed in proximal position with respect to the take-up roller 4, and in particular it is abutted against the rolling-shutter box 3, freeing the opening A of the fabric 5, and a closed position, in which the handle bar 6 is placed in distal position with respect to the take-up roller 4 in abutment against the lateral abutment element 22 with the fabric 5 which is spread to cover the opening A.

[0058] The handle bar 6 is associated with the lateral abutment element 22 i.e. with the second lateral upright when it reaches closed position. Such lateral abutment element 22 advantageously also has locking/unlocking means for stopping the handle bar 6 in closed position or for releasing it so as to allow the return into open position.

[0059] The blind 1 also comprises synchronization means 9 for synchronizing the advancement of the terminations of the handle bar 6 during its movement between the open position and the closed position.

[0060] According to the idea underlying the present invention, the aforesaid synchronization means 9 comprise an upper guide chain 10, susceptible of being extended at the top of the opening A of the load-bearing structure of the building and a lower guide chain 11 susceptible of being extended at the lower part of the opening A of the load-bearing structure of the building.

[0061] The upper guide chain 10 is provided with a first internal end 10A, which is housed inside the cavity of the handle bar 6 and is susceptible of sliding along it, and with a first external end 10B connected to the lateral abutment element 22 or to the upper margin 22A of the section which forms such lateral abutment element 22 in accordance with the embodiment of the enclosed figures.

[0062] The lower guide chain 11 is in turn provided with a second internal end 11A, which is housed inside the cavity of the handle bar 6 and is susceptible of sliding along it, and with a second external end 11B connected to the base 21A of the lateral upright 21.

[0063] As can be appreciated from the enclosed figures, the upper guide chain 10 enters into the handle bar 6 by being folded downward, i.e. defining a first concavity 12 directed towards the lateral abutment element 22. In turn, the lower guide chain 11 enters into the handle bar 6, being folded upward with a second concavity 13 directed towards the lateral upright 21.

[0064] The first and the second internal ends 10A, 11A respectively of the upper guide chain 10 and of the lower guide chain 11 are mechanically connected to each other in order to be jointly moved within the handle bar 6 along its cavity.

[0065] Due to the present invention, therefore, the movements of the handle bar 6 occur by maintaining the two terminations 7 and 8 thereof always vertically aligned

given that the two upper and lower guide chain portions, indicated in the drawings with 10' and 11', which are extended above and below the fabric 5, respectively between the upper terminal 7 of the handle bar 6 and the lateral abutment element 22 as well as between the lower terminal 8 of the handle bar 6 and the base of the lateral upright 21, are extended always for the distance that separates the same handle bar 6 respectively from the lateral abutment element 22 and from the lateral upright 21 and are extended in the form of axially rigid linear elements which thus set the constant verticality of the handle bar 6. The horizontal portions 10', 11' of the two guide chains, upper 10 and lower 11, are as stated axially rigid linear elements which prevent the handle bar 6 from being moved away from the verticality.

[0066] The two upper 10 and lower 11 guide chains define, at any one intermediate position of the handle bar 6, a mirrored S progression with respect to a through axis for the handle bar 6, as can be appreciated in figure 1.

[0067] If the lateral abutment element 22 is constituted by a coupling element fixed to the internal lateral wall of the walling opposite that where the lateral upright 21 is mounted, or even if the lateral abutment element 22 is constituted by a coupling element fixed to the end of the upper crosspiece 200 of the frame, it must be intended that such coupling element is substantially comprised within the first concavity 12 directed towards the lateral abutment element 22 .

[0068] Of course, without departing from the protective scope of the present patent, such mirrored S progression can in an entirely equivalent manner be S-shaped, with the first external end 10B of the upper guide chain 10 connected to the upper end of the lateral upright 21 and with the second internal end 11A of the lower guide chain 11 connected to the lateral abutment element 22 at the base of the support frame 2 (for example with a pin 101' of the final ring of the lower guide chain 11 connected to the lateral abutment element 22 constituted by a coupling element. In this case, the first concavity 12 will be directed towards the lateral upright 21 rather than towards the lateral abutment element 22 and the second concavity 13 will be directed towards the lateral abutment element 22.

[0069] In substance, according to the present invention, the first external end 10B of the upper guide chain 10 is connected to one from between the lateral abutment element 22 and the lateral upright 21, and the second external end 11B of the lower guide chain 11 is connected to the other between the lateral abutment element 22 and the lateral upright 21 (i.e. that of such two components opposite that associated with the first external end 10B of the upper guide chain 10).

[0070] Therefore, the second external end 11B of the lower guide chain 11 is connected to the lateral upright 21 when the first external end 10B of the upper guide chain 10 is connected to the lateral abutment element 22; or, the second external end 11B of the lower guide chain 11 is connected to the lateral abutment element 22 when the first external end 10B of the upper guide chain 10 is connected to the lateral upright 21. Advantageously the support structure can also provide for an upper guide crosspiece 200 and a lower guide crosspiece 201. In accordance with the embodiment of the enclosed figures the upper guide crosspiece 200 acts as a guide for the upper termination 7 of the handle bar while the lower guide crosspiece 201 is constituted by a guide of thin thickness for the lower guide chain 11.

[0071] More in detail, the upper guide chain 10 is formed by a plurality of first guide elements 100 mechanically connected to each other in succession by means of a pin 101. In addition, the first guide elements 100 can rotate with respect to each other around the pin 101 in a first rotation sense VI in order to fold the upper guide chain 10 according to aforesaid first concavity 12 starting from an aligned position defined by an abutment portion between at least two parts 102, 103 of the aforesaid first contiguous guide elements 100.

[0072] Analogously, the lower guide chain 11 comprises a plurality of second guide elements 100, which maintain in the drawings the same reference number as the first guide elements 100, since they are preferably identical thereto, and they too are mechanically connected to each other in succession by means of a pin 101. In addition, the second guide elements 100 can rotate with respect to each other around the pin 101 in a second rotation sense V2 in order to fold the lower guide chain 11 according to the aforesaid second concavity 13 starting from an aligned position defined by an abutment portion between at least two parts 102, 103 of the aforesaid second contiguous guide elements 100.

[0073] In other words, the axial rigidity of the horizontal chain portions 10', 11', i.e. of those portions of the guide chains 10, 11 which are horizontally extended, is obtainable in accordance with the preferred embodiment of the present invention, also using known chains, termed with the name carriages in the technical jargon of the field and provided with a single folding sense.

[0074] Advantageously, in accordance with the embodiment illustrated in the enclosed figures, each guide element 100 of the two guide chains 10, 11 is provided with two first shoulders 120, parallel to each other and spaced. Between such first shoulders 120, two first parallel tabs 121 of the contiguous guide element 100 are arranged, which externally carry two first projecting pawls that are aligned with each other. The latter form the relative rotation pin 101 of the contiguous guide elements 100 and for such purpose are inserted in first through holes 122 made on the two first projecting shoulders 120. The pin 101 thus formed and the relative through hole 122 are situated in proximity to an external edge 123 of the guide chains 10, 11 in order to allow a fold with concavity on the opposite parallel internal edge 124.

[0075] Contiguous guide elements 100 of each guide chain 10, 11 define an abutment portion between two parts 102, 103 when the two contiguous guide elements are axially aligned.

[0076] Each guide element 100 is for such purpose provided with two second shoulders 125, between which a second tab 126 is inserted which is made on the contiguous guide element 100.

[0077] The aforesaid second tab 126 is provided with two second pawls 102 which make one of the two parts of the abutment portion. These are externally projecting from the plane of the second tab 126 in opposite directions. They are inserted in elongated openings 129 which each define, at one end, the end stop 103 for the rotation of the contiguous guide elements 100, which attains the second abutment portion.

[0078] Such end stops 103 receive in abutment the two second projecting pawls 102 at the aligned position of the guide elements 100, so as to prevent a further rotation thereof.

[0079] Advantageously, in accordance with the embodiment of the present invention illustrated in the enclosed figures, the portion 10' of the upper guide chain 10 is not superimposed on top of the fabric 5, while the portion 11' of the lower guide chain 11 is arranged below the fabric 5.

[0080] Of course, without departing from the protective scope of the present patent, the guide elements 100 can be differently shaped, so long as they are rotatably engaged with each other in order to rotate in a single rotation sense and preferably between an aligned position and an orthogonal position.

[0081] In accordance with an advantageous characteristic of the invention, the synchronization means 9 comprise adjustable connection means 90, arranged within the handle bar 6 in order to join at variable distance the first and the second internal end 10A, 11A respectively of the upper guide chain 10 and of the lower guide chain 11. Advantageously, the adjustable connection means 90 comprise an elongated element 91 associated with one of the internal ends 10A, 11A and an engagement element 92 associated with the other of the internal ends 11A, 10A and joinable to the elongated element 91 along the extension of the same elongated element 91, in a position which is determined by a fixing element 93.

[0082] More in detail, in accordance with the embodiment of figure 3, the elongated element 91 comprises two rods 91' which define a groove 91" between them and which are inserted between two guide ribs 94 of the engagement element 92, between which a threaded hole 95 is provided for the fixing element 93 constituted by a screw, in accordance with this embodiment,.

[0083] In operation, it is possible to make the elongated element 91 slide between the two guide ribs 94 of the engagement element 92 until the relative position thereof is defined by rigidly fixing the screw 93 with the head which is engaged at the two rods 91' of the guide element 91 and the stem which is engaged via screwing in the threaded hole 95. The moving-closer and moving-away adjustment of the internal ends 10A, 11A of the two guide chains 10 and 11 allows advantageously adapting the blind to the requirements of the specific application during installation, at the site of installation. More in detail, since the pitch of the elements of the two guide chains 10 and 11 is fixed, the sum of the two upper and lower guide portions 10' and 11' (i.e. of those portions which are extended between the upper terminal 7 of the handle bar 6 and the lateral abutment element 22 as well as between the lower terminal of the handle bar 6 and the base of the lateral upright 21) and of the fixed width of the handle bar 6 is not always a multiple of said pitch. The adjustment allowed by the present invention allows carrying out continuous adjustments which would not be made possible by the pitch of the elements of the guide chains 10, 11.

[0084] Preferably, in accordance with the embodiment of figures 6 and 7, the upper guide chain 10 comprises an upper terminal guide element 100A, which is connected to the lateral abutment element 22 by means of at least one third pin 101'.

[0085] In particular, the lateral abutment element 22 comprises a retention seat 220 provided with access opening 221 (illustrated on the bottom in the enclosed figures, but it could be on the top), which is engaged by the third pin 101' of the upper terminal guide element 100A of the upper guide chain 10.

[0086] The retention seat 220 of the lateral abutment element 22 is advantageously removably engaged by the third pin 101', and for such purpose has at least one elastically pliable portion which the third pin 101' can go beyond during its insertion in the retention seat 220 through the access opening 221. In this manner, with a force adapted to make the third pin 101' overcome the elasticity of the elastically pliable portion of the retention seat 220, it is possible to easily engage and disengage the first external end 10B of the upper guide chain 10 with the upper margin 22A of the lateral abutment element 22.

[0087] Of course, the same removable coupling can be provided for the second external end 11B of the lower guide chain 11 connected to the base 21A of the lateral upright 21.

[0088] It is observed that with the above-reported expression, it must not be intended that the second external end 11B is directly fixed to the "base of the upright", rather it must be also intended that it is connected in proximity thereto, also indirectly, for example being connected to the end of the lower crosspiece 221 of the frame 2.

[0089] Advantageously, the upper and lower terminals 7, 8 of the handle bar 6 have an axial opening 60, aligned with the extension axis Y of the handle bar 6 in order to axially receive the respective upper and lower guide chain 10, 11, and at least one lateral opening 61 transverse to the extension axis Y of the handle bar 6, in order to laterally orient the respective upper and lower guide chain 10, 11 respectively towards the lateral abutment element 22 and towards the base of the lateral upright 21.

[0090] The lower terminal 8 of the handle bar 6 comprises a connector portion 80 with the axial opening 60 obtained thereon aligned with the extension axis Y of the handle bar 6, and a closure portion 81 removably mount-

ed on the connector portion 80 with the lateral opening 61 obtained thereon and susceptible of opening an opening aligned with the axial opening 60 for a facilitated access to the lower guide chain 11 within the handle bar 6.

[0091] The closure portion 81 carries, advantageously mounted thereon, an idle roller 83 in order to better slide on the lower crosspiece 221.

[0092] The same configuration of the terminal in two elements can also be reproduced for the upper terminal 7.

[0093] For the initial steps of fitting the guide chains 10, 11 and their insertion in the axial cavity of the handle bar 6, it may be particularly easy to separate the closure portion 81 from the connector portion 80.

[0094] Also forming the object of the present invention is a method for operating a blind 1 of the above-described type, regarding which the same reference numbers will be maintained hereinbelow for the sake of description simplicity.

[0095] The operating method according to the invention comprises a step of moving the handle bar 6 between the lateral upright 21 and the lateral abutment element 22, in which the upper guide chain portion 10' which is extended between the upper terminal 7 of the handle bar 6 and the lateral abutment element 22 as well as the lower guide portion 11' of the lower guide chain 11, which is extended between the lower terminal of the handle bar 6 and the base of the lateral upright 21, are always extended for the same distance as the handle bar 6 respectively from the lateral abutment element 22 and from the lateral upright 21 in the form of axially rigid linear elements which oblige the constant verticality of the handle bar 6.

[0096] In both movements in the two senses of the handle bar 6 which lead to the opening and closing of the opening A by the fabric 5, there is a portion 10', 11' of the two guide chains 10, 11 that exits outward from the handle bar, being extended and elongated at the upper or lower crosspiece 200, 201 and a portion 10', 11' of the two guide chains 10, 11 which returns into the handle bar 6, being shortened. Such portions 10', 11' can sustain compression or traction stresses which in any case will not lead them to vary their length, given the presence of the pins which axially join them in succession, nor to vary the angle between the single guide elements 100 since it is impossible for them to rotate outside the sections entering into the handle bar 6.

[0097] Therefore, the handle bar 6 can also be gripped in non-median position with respect to its height, in particular in the case of blinds of high height, without this being moved and without risking the movement of the fabric 5 outside the provided upper and lower guides that are made facing on the upper and lower crosspieces of the support frame 2. The fabric roller blind 1 and its operating method thus conceived therefore attain the pre-established objects.

Claims

1. Fabric roller blind (1), which comprises:

- a support frame (2) comprising at least one lateral upright (21), intended to be fixed to a load-bearing structure at an opening (A) thereof,
- at least one lateral abutment element (22), opposite said lateral upright (21);
- a take-up roller (4) having a substantially vertical rotation axis (X), mechanically associated with the lateral upright (21) of said support frame (2);
- a fabric (5) extended between a first lateral edge thereof, fixed to said take-up roller (4) and a second lateral edge thereof opposite said first lateral edge;
- a handle bar (6), which is fixed to the second lateral edge of said fabric (5), and which is provided with an axial cavity, is extended along an extension axis (Z) substantially parallel to the rotation axis (X) of said take-up roller (4) between a lower termination (7) and an upper termination (8) and is movable between:

  - an open position, in which said handle bar (6) is placed in a position side-by-side said lateral upright (21), freeing said opening (4) of said fabric (5),
  - a closed position, in which said handle bar (6) is placed in a distal position with respect to said lateral upright (21) and in abutment against said lateral abutment element (22) to cover said opening (A) with said fabric (5);

- synchronization means (9) for synchronizing the advancement of the terminations (7, 8) of said handle bar (6) during its movement between the open position and the closed position;

wherein said synchronization means (9) comprise:

- an upper guide chain (10), susceptible of being extended at the top of said opening (A) and provided with a first internal end (10A) housed inside said handle bar (6) and slidable therein, and with a first external end (10B) connected to said lateral abutment element (22) or to said lateral upright (21);
- a lower guide chain (11) susceptible of being extended at the lower part of said opening (A) and provided with a second internal end (11A) housed inside said handle bar (6) and slidable therein, and with a second external end (11B) connected to said lateral abutment element (22) or to said lateral upright (21);

said blind (1) being **characterized in that** said second external end (11B) is connected

- either to said lateral upright (21), with said first external end (10B) connected to said lateral abutment element (22),
- or to said lateral abutment element (22), with said first external end (10B) connected to said lateral upright (21);

the first and the second internal ends (10A, 11A), respectively of said upper guide chain (10) and of said lower guide chain (11), being mechanically connected to each other in order to be jointly moved within said handle bar (6).

2. Blind (1) according to claim 1, **characterized in that** the first external end (10B) of said upper guide chain (10) and the second external end (11B) of said lower guide chain are extended outside said handle bar (6) in parallel directions and in opposite senses.

3. Blind (1) according to claim 1 or 2, **characterized in that** said upper (10) and lower (11) guide chains define, in any one intermediate position of said handle bar (6) between said closed and open positions, an "S" or mirrored "S" shaped progression.

4. Blind (1) according to claim 1, **characterized in that**:

- the first external end (10B) of said upper guide chain (10) is connected to said lateral abutment element (22); said upper guide chain (10) entering into the cavity of said handle bar (6) with a first concavity (12) directed towards said lateral abutment element (22);
- the second external end (11B) of said lower guide chain (11) is connected to the base of said lateral upright (21); said lower guide chain (11) entering into the cavity of said handle bar (6) with a second concavity (13) directed towards said lateral upright (21).

5. Blind (1) according to claim 1, **characterized in that**:

- the first external end (10B) of said upper guide chain (10) is connected to said lateral upright (21); said upper guide chain (10) entering into the cavity of said handle bar (6) with a first concavity (12) directed towards said lateral upright (21);
- the second external end (11B) of said lower guide chain (11) is connected to said lateral abutment element (22) at the base of said support frame (2); said lower guide chain (11) defining a second concavity (13) directed towards said lateral abutment element (22).

6. Blind (1) according to one or more of the preceding claims, **characterized in that** said upper guide chain (10) comprises a plurality of first guide elements (100) mechanically connected to each other in succession by means of at least one pin (101); said first guide elements (100) being able to rotate with respect to each other around said pin (101) in a first rotation sense (VI) starting from an aligned position defined by an abutment portion between at least two parts (102, 103) of said first contiguous guide elements (100).

7. Blind (1) according to one or more of the preceding claims, **characterized in that** said lower guide chain (11) comprises a plurality of second guide elements (100) mechanically connected to each other in succession by means of at least one pin (101); said second guide elements (100) being able to rotate with respect to each other around said pin (101) in a second rotation sense (V2) starting from an aligned position defined by an abutment portion between at least two parts (102, 103) of said second contiguous elements (100).

8. Blind (1) according to one or more of the preceding claims, **characterized in that** said synchronization means (9) comprise adjustable connection means (90), arranged within said handle bar (6) in order to join, at variable distance, the first and the second internal ends (10A, 11A) respectively of said upper guide chain (10) and of said lower guide chain (11).

9. Blind (1) according to claim 8, **characterized in that** said adjustable connection means (90) comprise an elongated element (91) associated with one of said internal ends (10A, 11A) and an engagement element (92) associated with the other of said internal ends (11A, 10A) and joinable to said elongated element (91) along said elongated element (91) in a position determined by at least one fixing element.

10. Blind (1) according to claim 5, **characterized in that** said upper guide chain (11) comprises an upper terminal guide element (100A), which is connected to said lateral abutment element (22) by means of at least one third pin (101').

11. Blind (1) according to claim 10, **characterized in that** said lateral abutment element (22) comprises a retention seat (220) provided with access opening (221) and engaged by the third pin (101') of the upper terminal guide element (100A) of said upper guide chain (10).

12. Blind (1) according to claim 11, **characterized in that** the retention seat (220) of said lateral abutment element (22) is removably engaged by said third pin (101') and has at least one elastically pliable portion that said third pin (101') can go beyond for the insertion in said retention seat (220) through said access opening (221).

13. Method for operating a blind (1) according to claim 1, **characterized in that** it comprises a step of moving said handle bar (6) between said lateral upright (21) and said lateral abutment element (22), wherein the portion of upper guide chain (10') which is extended between the upper terminal (7) of said handle bar (6) and said lateral abutment element (22), and the lower guide portion (11') of said lower guide chain (11) which is extended between the lower terminal (8) of said handle bar (6) and the base of said lateral upright (21), form axially rigid linear elements.

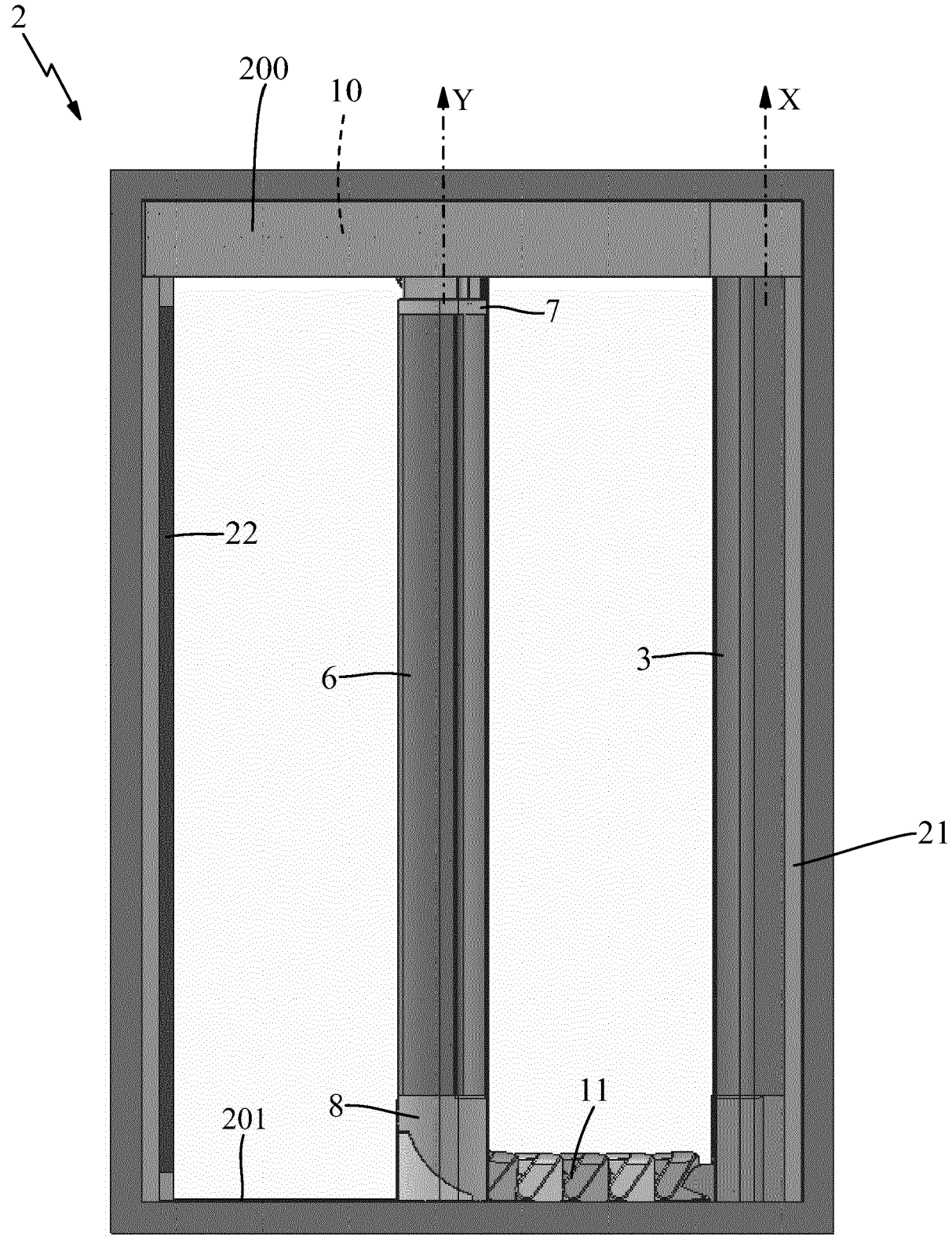


Fig. 1A

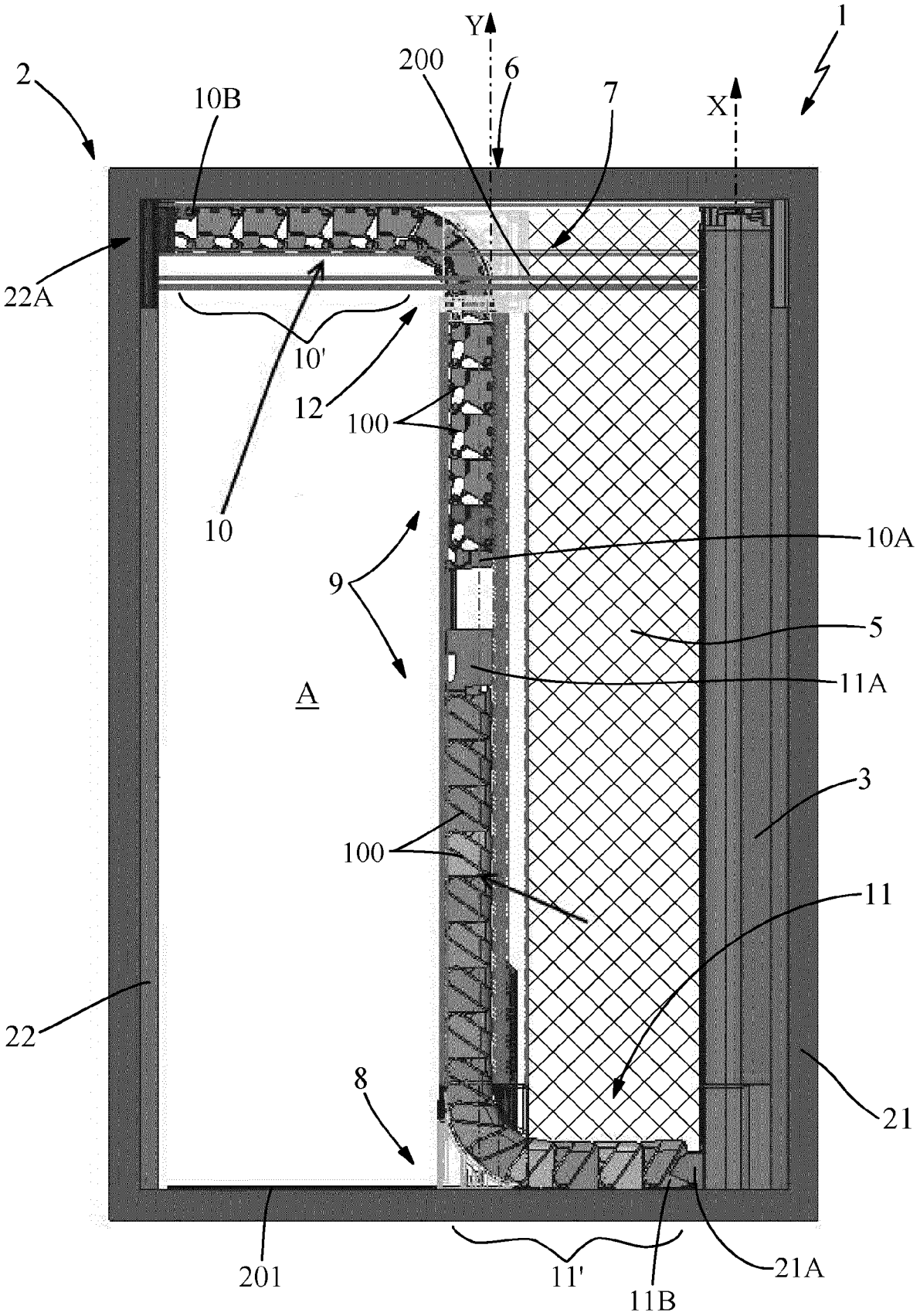

Y
200
6
1
2
10B
7
X
22A
10'
12
100
10
10A
9
5
A
11A
3
100
11
22
8
21
201
11'
11B
21A

Fig. 1B

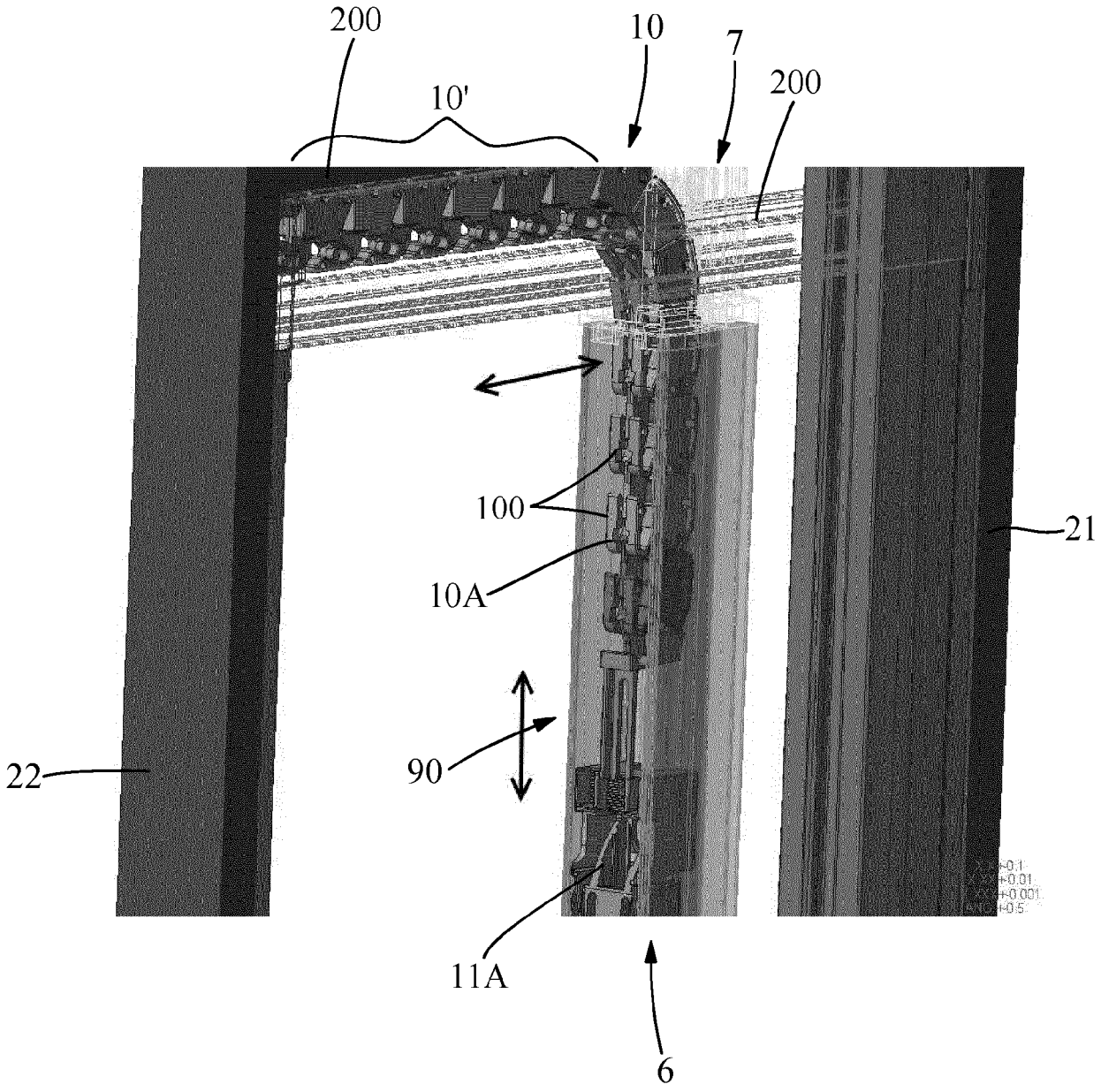


Fig. 2

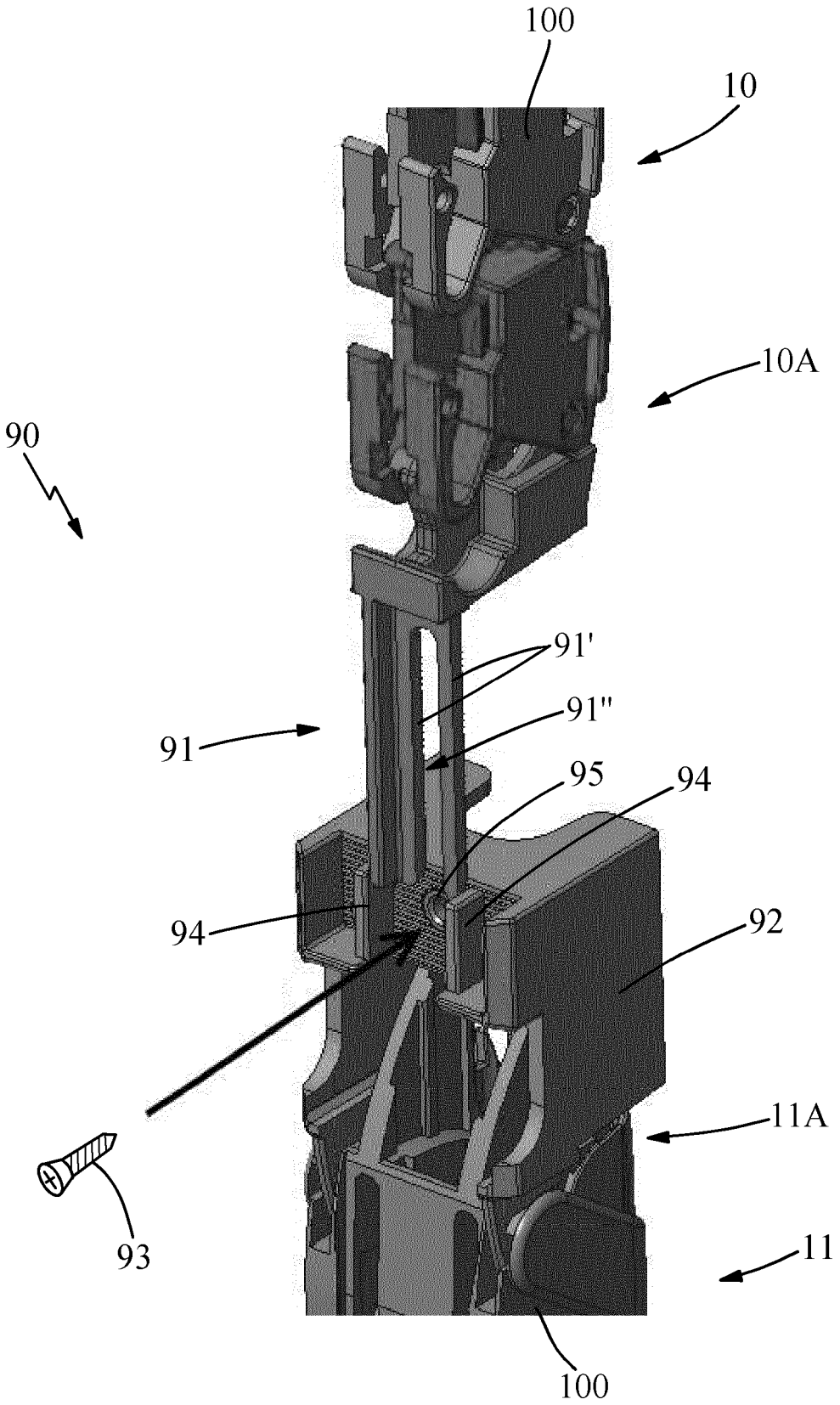


Fig. 3

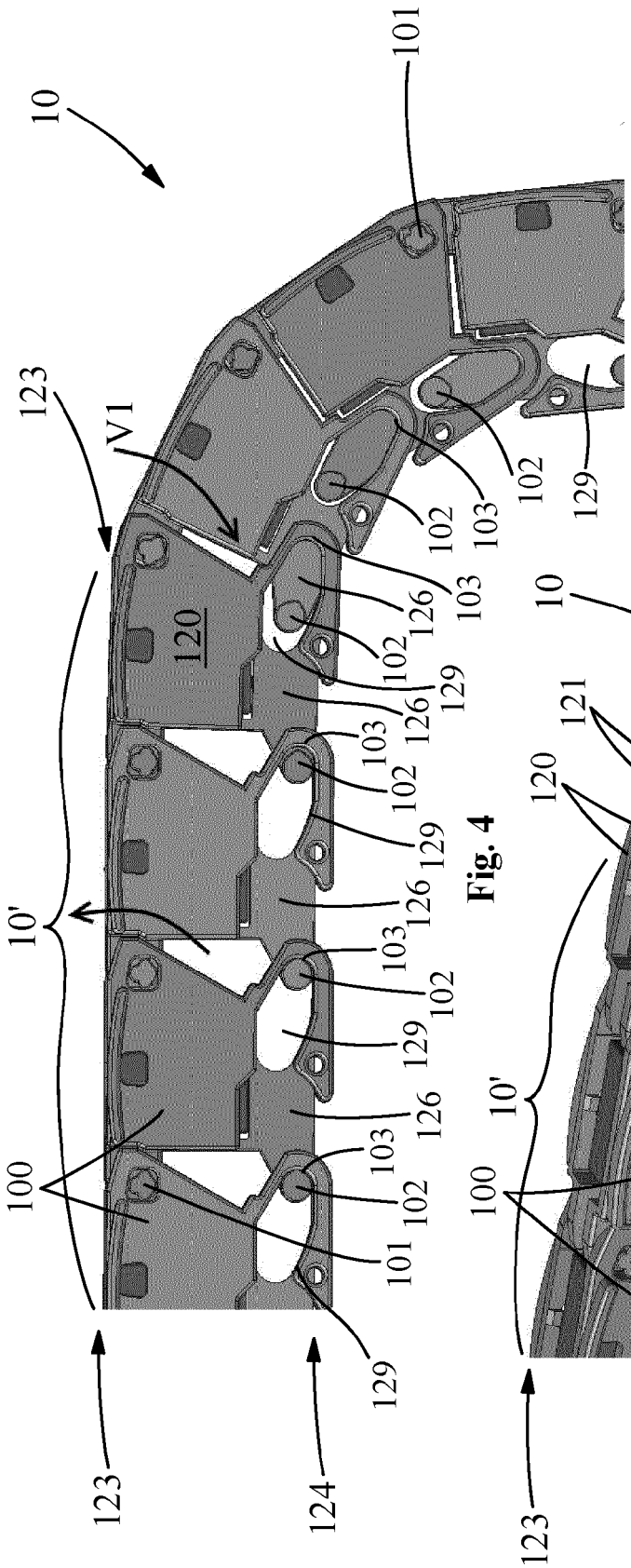
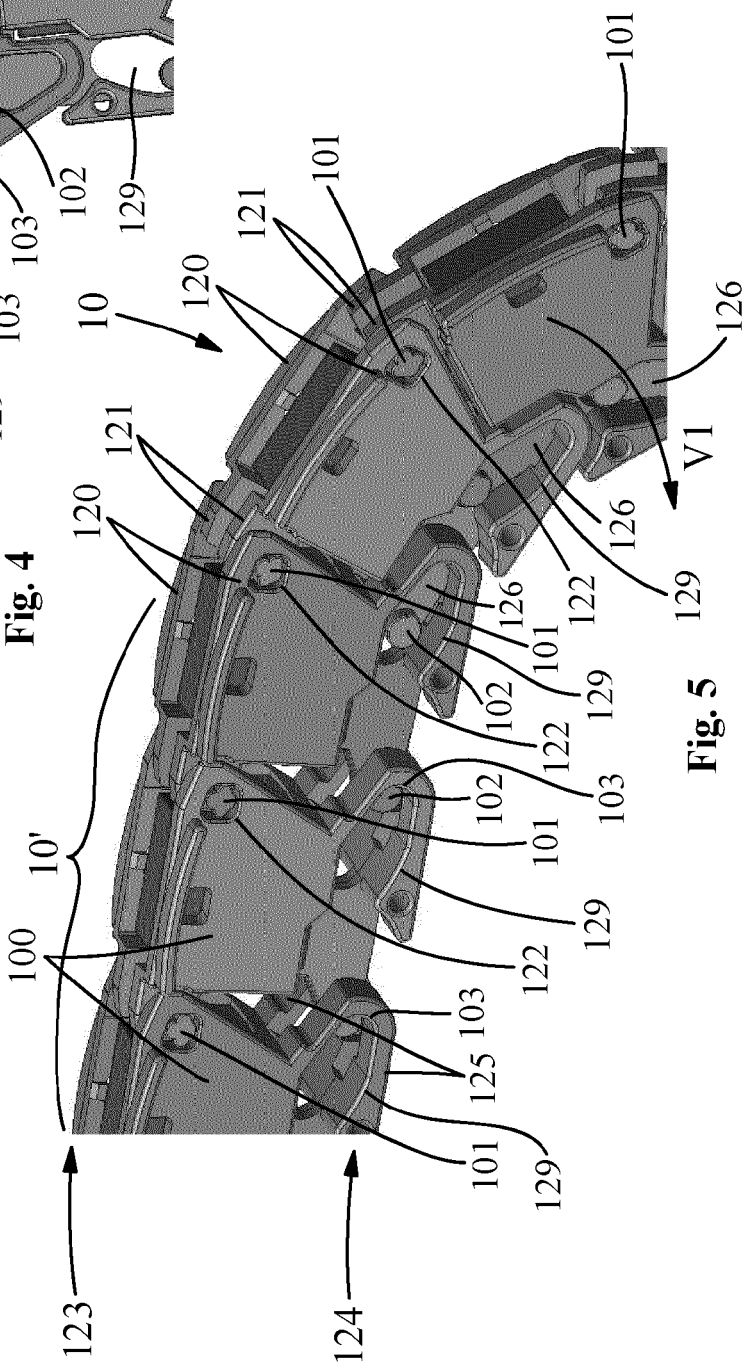

10
101
123
V1
120
102
103
126
129
10'
100
124

Fig. 4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120
121
101
126
V1
122
129
10'
100
102
103
125
123
124

Fig. 5

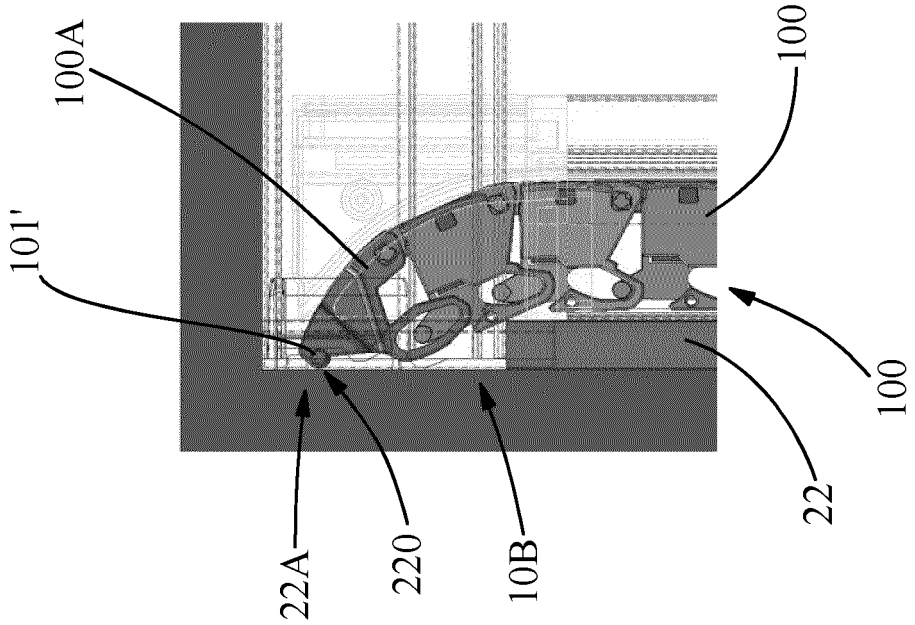
100A
101'
100
100
22
22A
220
10B

Fig. 7

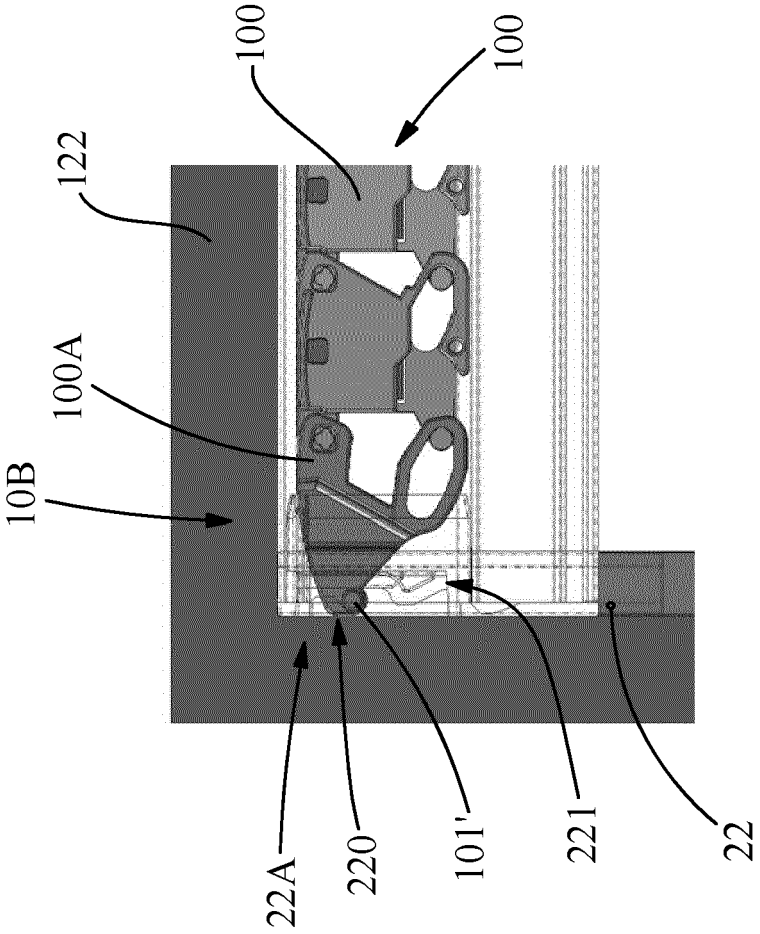
100
100
122
100A
10B
22A
220
101'
221
22

Fig. 6

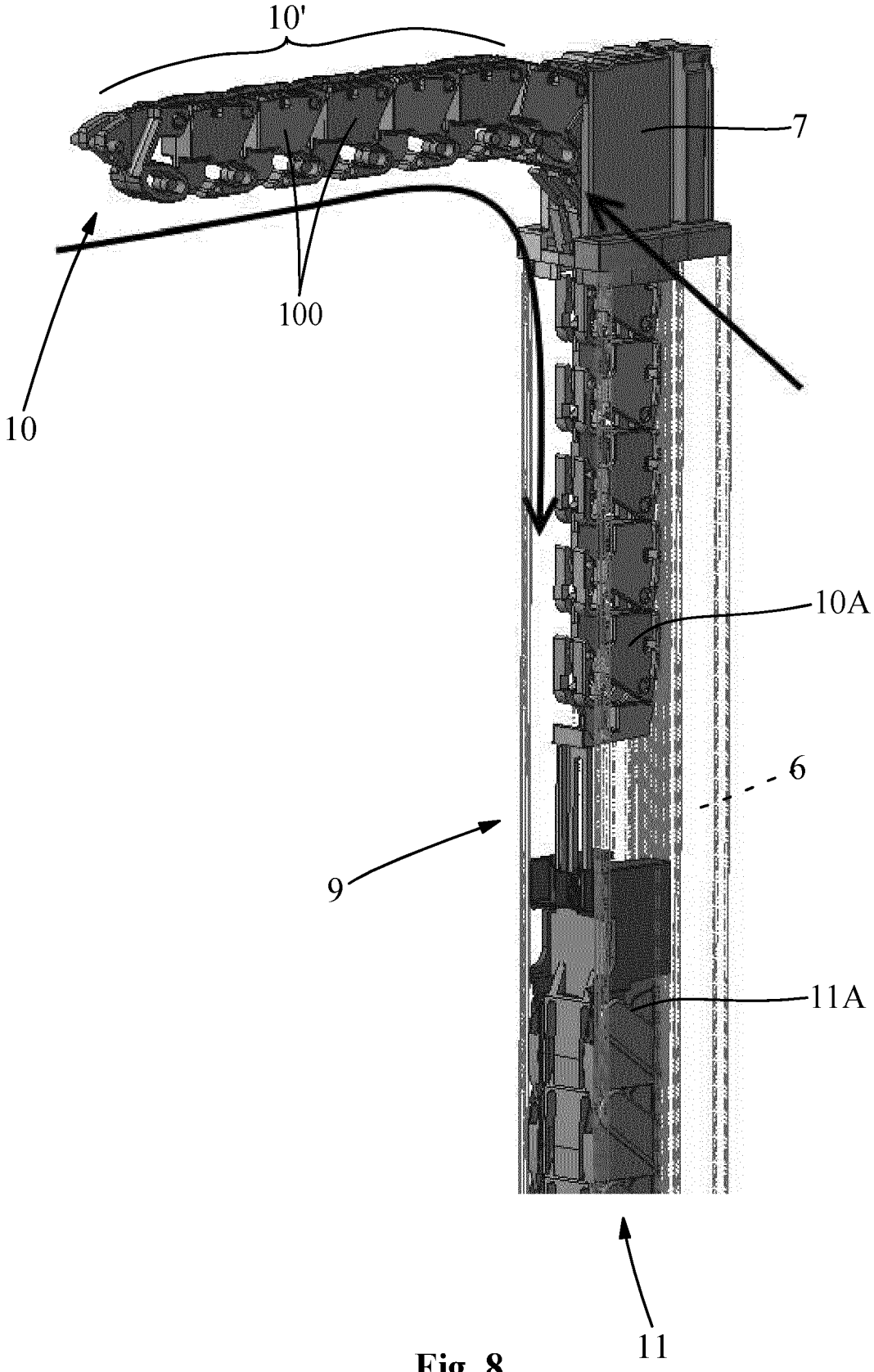

Fig. 8

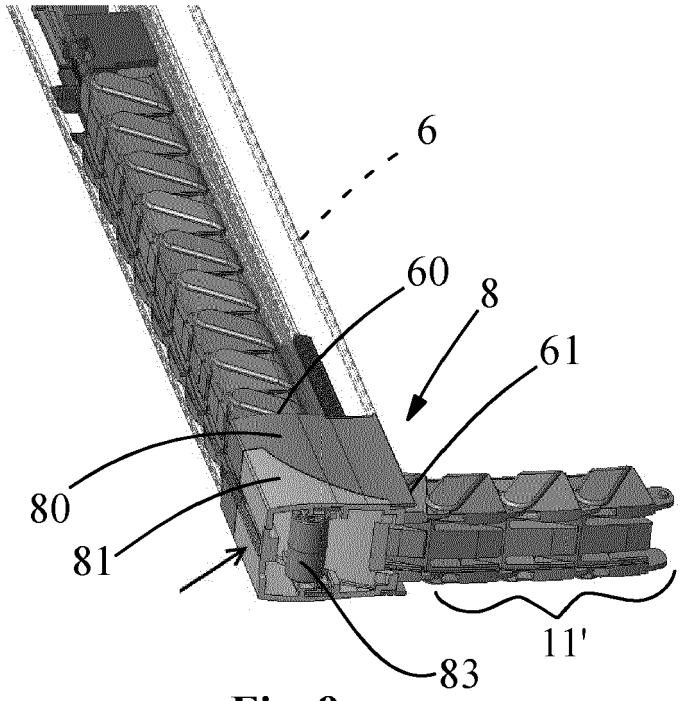

Fig. 9

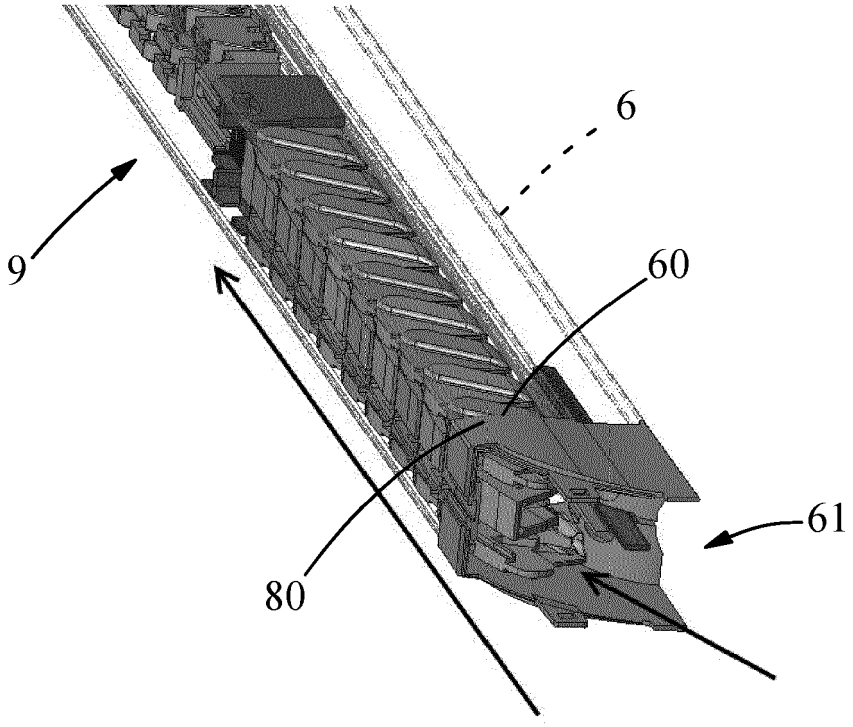

Fig. 10

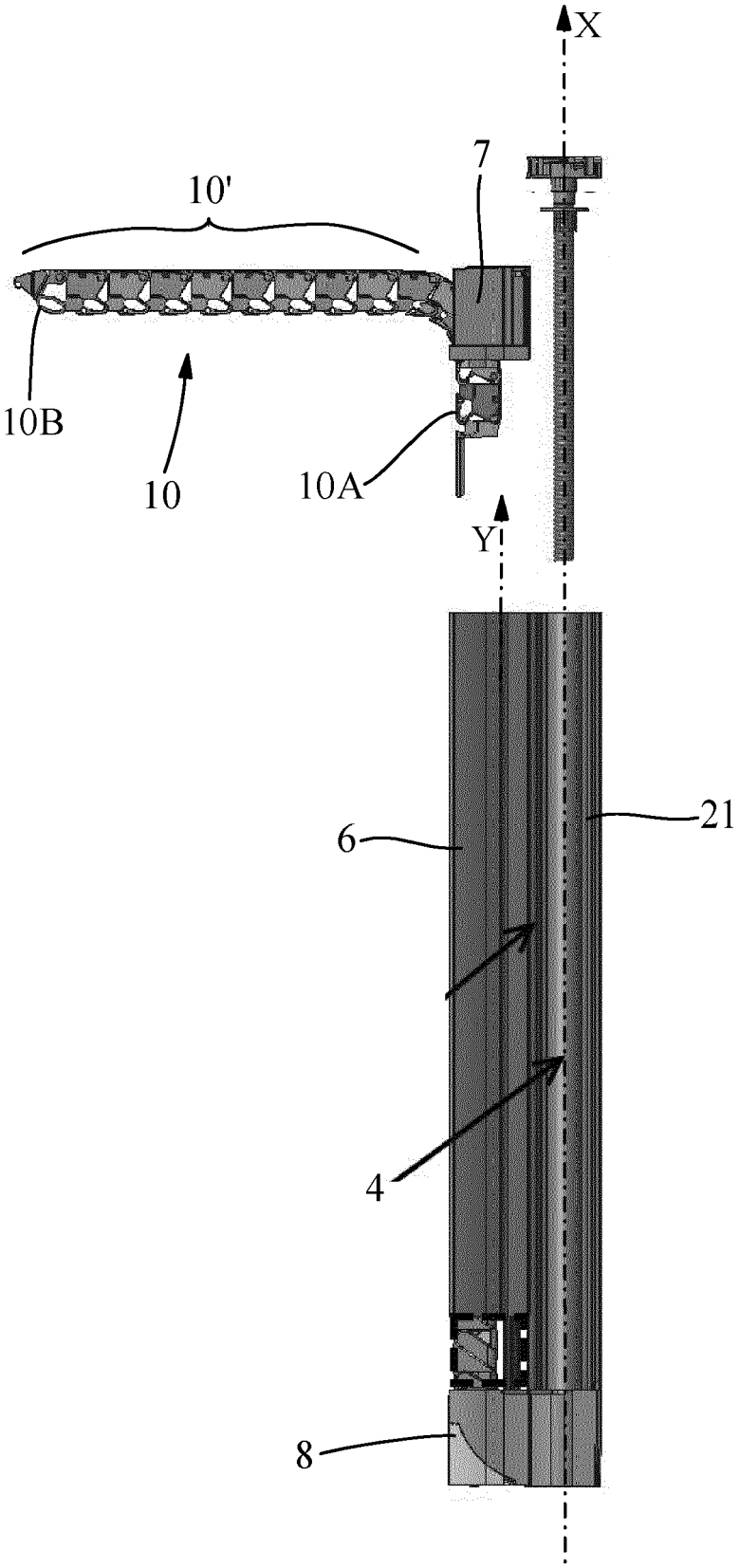

Fig. 11

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Application Number
EP 19 21 6657

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	15 April 2020	Altamura, Alessandra

CATEGORY OF CITED DOCUMENTS

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