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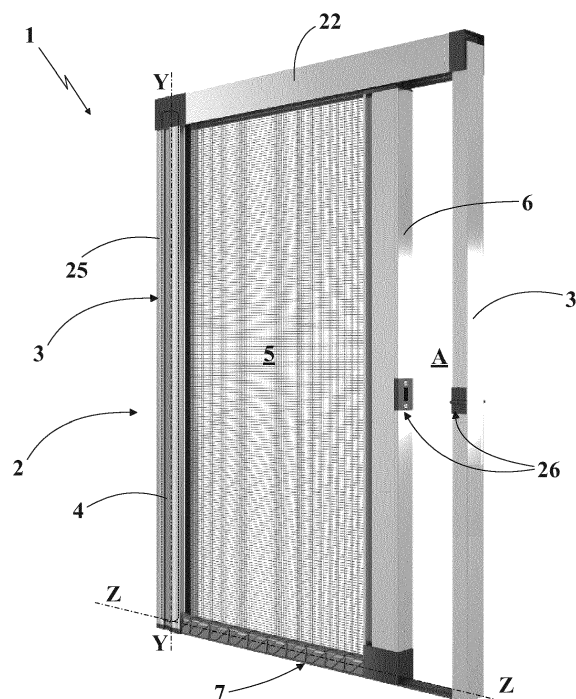
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(54) **FABRIC ROLLER BLIND AND GUIDE CHAIN FOR FABRIC ROLLER**

(57) Fabric roller blind, which comprises at least one handle bar (6), slidably movable between two lateral up-rights (3, 3') and an extensible fabric (5) associated with the handle bar (6), at least one guide chain (7) placed to connect between the first lateral upright (3) and the handle bar (6) comprising a plurality of guide elements (8) linked together along an extension line (Z); the handle bar is movable between an open position, in which the guide chain (7) is in an extended position and a closed position, in which the guide chain (7) is in a retracted position within the handle bar (6); between the retracted position and the extended position, an intermediate position is provided, in which the guide elements (8) are tilted with respect to each other; each guide element (8) of the guide chain (10) comprises at least one shaped pin (11) provided with a width (14) thereof greater than a height (15) thereof, at least one groove (12) made on at least one of the side walls (9) which remains defined between at least two sides (23), is extended starting from an inlet opening (16) made on a perimeter edge (24) of the at least one side wall (9) of the guide element (8), houses the shaped pin (11) of a contiguous guide element (8), the shaped pin (11) is stopped against the sides (23) with the guide chain (7) in the retracted and extended positions and defines a mechanical maneuvering distance with the sides (23) with the guide chain (7) in the intermediate position.



**Fig. 1**

## Description

### Field of application

**[0001]** The present invention regards a fabric roller blind and a guide chain for a fabric roller blind, according to the preamble of the respective independent claims.

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

**[0003]** The guide chain, object of the present invention, is intended to be advantageously employed for unwinding, in a guided manner, a screening fabric of a fabric roller blind.

**[0004]** The blind and the guide chain, object of the present invention, are therefore inserted in the industrial field of production of doors/windows/shutters or even in the field of production of blinds with fabrics for sun protection, in the mosquito netting field, in the field of production of replacement parts for blinds or similar applications.

### State of the art

**[0005]** Blinds for closing openings of doors/windows/shutters (such as windows, doors or French doors) are known on the market, and are provided with a rolling-shutter box, which is fixed to a building wall or to an upright that is lateral with respect to the opening to be closed and houses a roller therein on which a flexible covering 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 susceptible of being gripped by a user and 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 comprises an aluminum section closed at the upper and lower ends by two terminations slidably coupled to the respective horizontal guides.

**[0009]** The handle bar is movable by a user between an open position, in which it faces 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 faces the opposite side 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 completely

cover the opening.

**[0011]** Known from the patent EP 0999335 is an example of a fabric roller blind, which comprises a guide chain 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 direction so as to attain when extended, in an extended position and aligned in succession, a rigid member in the opposite rotation direction, susceptible of making a guide for the fabric. Such elements are housed, in a retracted configuration, 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 at the other end it is slidably inserted within the vertical seat of the handle bar.

**[0012]** When the blind is moved from the open position to the closed position, the guide chain is driven outside of the vertical seat of the handle bar, being set on the lower wall (usually the floor or a windowsill) which delimits the opening to be screened, thus acting as a lower guide for the fabric.

**[0013]** 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.

**[0014]** More in detail, each element of the guide chain has elongated form along a main direction extended between a first and a second end opposite with respect to the first end along the aforesaid main direction.

**[0015]** Each guide element is provided with two facing side walls parallel to the main direction and connected by a transverse bridge portion. On the side walls of each guide element, two projecting pins are also provided in proximity to the first end and two through holes are also provided that are made in the same side walls in proximity to the second end.

**[0016]** The through holes made on the side walls are engaged by two corresponding pins of a contiguous element of the chain, allowing a relative rotation between the two elements themselves during the movement of the chain between the extended position and the retracted position within the handle bar.

**[0017]** A further example of a fabric roller blind of known type described up to now is described in the document EP 2915944. The blind described therein is provided with a guide chain, in which each guide element comprises two projecting pins. Each of the projecting pins is provided with a smoothed portion for facilitating its insertion within a corresponding hole made in the adjacent guide element.

**[0018]** The blind of known type briefly described up to now has in practice shown that it does not lack drawbacks.

**[0019]** A first drawback of the blind of known type lies in the fact that, if the blind does not provide for the presence of a lower guide body on which the guide chain is mechanically associated, the guide chain itself does not

have sufficient rigidity in the extended position and therefore in the case of stresses transverse to the extension direction of the blind - e.g. due to accidental impact for example due to a foot of a user or to stresses exerted by the wind on the fabric - these can lead to the separation of the guide elements.

**[0020]** Indeed, in the case of strong wind or strong accidental stresses, a transverse force is formed that is imparted to each element constituting the guide chain. In this situation, the lateral pins of each element of the chain might at least partially exit outward from the through holes made in the contiguous element. On the other hand, such blind of known type requires a certain clearance between the pins and the through holes on the guide elements in order to allow a facilitated rotation without friction in the movement between the two retracted and extended positions of the guide chain.

**[0021]** A further drawback lies in the fact that the pins and the corresponding through holes are visible when the chain is in the extended position and make for an unaesthetic appearance.

#### Presentation of the invention

**[0022]** In this situation, the problem underlying the present invention is to provide a fabric roller blind, which allows a quick and facilitated movement of the guide chain between the retracted position and the extended position.

**[0023]** A further object of the present invention is to provide a fabric roller blind, which is mechanically stable with the fabric spread out or at least partially spread out in particular for resisting the transverse stresses exerted by accidental impacts or by the wind on the fabric of the blind, without including a lower guide body for the guide chain.

**[0024]** A further object of the present invention is to provide a fabric roller blind, which is entirely reliable in operation.

**[0025]** A further object of the present invention is to provide a fabric roller blind that is structurally simple and inexpensive to make and install and which therefore involves limited production and installation costs.

**[0026]** A further object of the present invention is to provide a fabric roller blind provided with a guide chain with fine aesthetic appearance.

**[0027]** A further object of the present invention is to provide a guide chain for a fabric roller blind which allows a quick and easy movement between the retracted position and the extended position.

**[0028]** These objects are all attained by the fabric roller blind, object of the present invention.

#### Brief description of the drawings

**[0029]** The technical characteristics of the invention, according to the aforesaid objects, can be clearly found in the contents of the below-reported claims and the ad-

vantages 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 1 shows a front perspective view of the fabric roller blind, object of the present invention;
- figure 2 shows a front perspective view of a detail of the fabric roller blind, object of the present invention, relative to a guide chain;
- figure 3 shows a detail of the guide chain of the fabric roller blind, object of the present invention, in its movement between a retracted position and an extended position;
- figure 4 shows a perspective view of a detail of the guide chain of the blind illustrated in figure 2, relative to a guide element of the guide chain itself;
- figure 5 shows a perspective view of a detail of the guide chain of the blind illustrated in figure 4, relative to the guide element constituting the guide chain itself, transparent in order to show the parts thereof that are otherwise hidden to view;
- figure 6 shows a front view of an enlargement of a detail of the guide element of figure 4, relative to a shaped pin thereof;
- figure 7 shows a top plan view of a detail of the guide chain of the blind illustrated in figure 4, relative to the guide element constituting the guide chain;
- figure 8 shows a sectional view of the detail of the fabric roller blind, object of the present invention, relative to a guide element, made along the trace VII-VII of figure 6;
- figure 9 shows a bottom perspective view of a detail of the guide chain of the blind illustrated in figure 4, relative to the guide element constituting the guide chain itself, transparent in order to show parts thereof that are otherwise hidden to view;
- figure 10 shows a sectional view of a detail of the fabric roller blind, object of the present invention, relative to a guide element, made along the trace IX-IX of figure 6;
- figure 11 shows a front view of a detail of the fabric roller blind, object of the present invention, relative to guide elements of the guide chain placed to form a curve;
- figure 12 shows front view of the detail of the fabric roller blind, object of the present invention, relative to guide elements of the guide chain placed in the intermediate position, with some parts transparent in order to better illustrate other parts;
- figure 13 shows front view of the detail of the fabric roller blind, object of the present invention, relative to guide elements of the guide chain placed in the extended position, with some parts transparent in order to better illustrate other parts.

# Detailed description of a preferred embodiment

**[0030]** With reference to the enclosed drawings, and with particular reference to the enclosed figure 1, reference number 1 overall indicates the fabric roller blind, object of the present invention.

**[0031]** The blind 1 is operatively employable for adjustably closing an opening A of a door/window/shutter, for example of a window, of a door or of a French door, made in a load-bearing structure such as the building wall of a building.

**[0032]** The fabric roller blind, object of the present invention, comprises a support frame 2, which is provided with at least two lateral uprights 3, 3' and with an upper crosspiece 22 to delimit the opening A to be screened.

**[0033]** The support frame 2 can for example be fixed to the load-bearing structure at the opening, by embedding it within the building or wood section or fixing it with frontal mounting on the internal or external face of the building wall in which the opening is made.

**[0034]** Preferably, a first lateral upright 3 of the two lateral uprights 3, 3' of the support frame 2 comprises a rolling-shutter box 25 intended to be laterally positioned with respect to the opening A to be screened.

**[0035]** Advantageously, the rolling-shutter box 25 is made by means of a hollow tubular body, in particular obtained with an aluminum extrusion, which is extended with axis substantially vertical between two opposite upper and lower ends.

**[0036]** The blind 1 also comprises preferably at least one take-up roller 4 having a substantially vertical rotation axis Y. Such take-up roller 4 is rotatably connected to the first lateral upright 3 of the support frame 2 and preferably housed within the rolling-shutter box 25. The blind 1 comprises at least one handle bar 6, which is extended parallel to the lateral uprights 3, 3' and is slidably movable between said lateral uprights 3, 3'.

**[0037]** Advantageously, the handle bar 6 is made with a hollow tubular body, in particular obtained with an aluminum extrusion.

**[0038]** The blind 1 also comprises at least one extensible fabric 5, which is extended between a first lateral edge thereof associated with a first upright 3 of the lateral uprights 3, 3' and a second lateral edge thereof opposite the first lateral edge associated with the handle bar 6.

**[0039]** The fabric 5 can be intended for making a darkening screen, for example in substitution of a rolling shutter, a brise-soleil screen for filtering the 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 atmospheric conditions of the outside environment.

**[0040]** The fabric 5, as a function of its different applications, can be made of synthetic material fabric and can have the form of a net in order to prevent the entrance of insects, or it can have a continuous surface of dark-

ening, filtering or transparent type.

**[0041]** Preferably, the fabric 5 has substantially rectangular shape and is extended between its first lateral edge advantageously fixed to the take-up roller 4 and its second lateral edge opposite the first lateral edge.

**[0042]** More in detail, the fabric 5 is susceptible of being wound around the take-up roller 4.

**[0043]** The fabric 5 wound around the take-up roller 4, advantageously passes through a vertical slit which is made on a side wall of the rolling-shutter box 25, which is directed towards a second upright 3' of the two lateral uprights 3, 3'.

**[0044]** The blind 1, object of the present invention, also comprises at least one guide chain 7 placed to connect between the first lateral upright 3 and the handle bar 6 comprising a plurality of guide elements 8 linked together along an extension line Z.

**[0045]** The handle bar 6 is advantageously internally provided with at least one vertical seat, in particular made within the aluminum extrusion, which is extended substantially vertically starting from a lower terminal of the handle bar 6 itself.

**[0046]** Each guide element 8 which forms the guide chain 7 comprises two facing side walls 9 substantially parallel to the extension line Z and connected by at least one central body 10.

**[0047]** Advantageously, the central body 10 of each guide element 8 of the guide chain 7 internally defines a groove 29 open on the upper part, which houses a lower flap of the fabric 5 with the handle bar 6 in the closed position.

**[0048]** More in detail, the groove 29 of the central body 10 is advantageously laterally defined by the side walls 9 and on the lower part defined by a guide wall 30, while it longitudinally passes along the extension line Z and aligned with the grooves of the adjacent guide elements 8, in order to allow the passage of the lower flap of the fabric 5. Preferably, each guide element 8 comprises two upper walls 31 mechanically connected to the side walls 9 facing the guide wall 30.

**[0049]** More in detail, the upper walls 31 are facing and each upper wall 31 is provided with an internal edge 33 side-by-side the internal edge 33 of the adjacent upper wall.

**[0050]** Advantageously, between the two internal edges 33 of the upper walls 31, a passage opening 34 is defined for the insertion of the lower flap of the fabric 5, which is placed to at least partially cover the opening A, with the handle bar 6 in closed position.

**[0051]** Advantageously, the lower flap of the fabric 5 is provided with retention brushes, which are housed within the groove 29 and susceptible of abutting against the upper walls 31, which act as undercut portions, locking the lower flap of the fabric 5 to the guide chain 7.

**[0052]** In this manner, the fabric 5 is released from the rolling-shutter box 25 and in particular is unrolled from the take-up roller 4 in a guided manner on the lower part, since its lower flap is advantageously inserted in the plu-

rality of grooves 29 aligned along the extension line Z of the plurality of guide elements 8 of the guide chain 7.

**[0053]** The handle bar 6 of the blind 1 is movable between at least one open position and a closed position.

**[0054]** According to the invention, in the open position the handle bar 6 is placed in proximal position with respect to the first lateral upright 3 and the guide chain 7 is in a retracted position, in which the guide elements 8 are at least partially housed within the handle bar 6 aligned substantially horizontally.

**[0055]** In addition, in the closed position the handle bar 6 is placed in distal position with respect to the first lateral upright 3 and the guide chain 7 is in an extended position, in which the guide elements 8 of the guide chain 7 are at least partially extended aligned below the fabric 5 substantially horizontally.

**[0056]** More in detail, when the handle bar 6 is in the open position, it is placed in a position substantially proximal to the take-up roller 4, around which the fabric 5 is wound, at least partially freeing the opening A from the fabric 5, for example freeing such opening A from a mosquito netting in order to allow the passage of a user there-through.

**[0057]** In such a manner, with the handle bar 6 in the closed position, the latter is placed in distal position with respect to the take-up roller 4, with the fabric at least partially unwound from the take-up roller 4 itself, to at least partially cover the opening A, for example screening the opening A by means of a mosquito netting in order to prevent the entrance of insects within a building, on which the opening A to be screened is obtained.

**[0058]** With the handle bar 6 in the closed position, the latter is preferably mechanically associated with the second lateral upright 3' in order to completely screen the opening A with the fabric 5.

**[0059]** The second lateral upright 3' advantageously also has anchorage means 26 for stopping the handle bar 6 in closed position or for releasing it so as to allow the return thereof into open position.

**[0060]** Between the retracted position and the extended position of the guide chain 7, an intermediate position is provided, in which the extension line Z forms at least one curve, in which the guide elements 8 are tilted with respect to each other.

**[0061]** More in detail, the guide elements 8 are moved between the extended position, in which they are aligned substantially horizontally on a floor, defining the opening A on the lower part, and the retracted position, in which they are aligned substantially horizontally within the handle bar 6, in particular within the vertical seat made within the handle bar 6 itself.

**[0062]** Advantageously, the guide chain 7 is extended between a first terminal 27 thereof connected to the first lateral upright 3 and a second terminal 28 thereof slidably inserted within the vertical seat (not illustrated in the enclosed figures) made in the handle bar 6. The extension line Z, along which the guide chain 7 is extended, defines a curve at the lower terminal of the handle bar, in which

a traversing channel is provided for the guide chain 7 itself.

**[0063]** More in detail, the handle bar 6 comprises a guide profile placed at its lower terminal shaped for accompanying the guide chain 7 during its entering and exiting movement into/out from the vertical seat made in the handle bar 6 itself.

**[0064]** According to the idea underlying the present invention, each guide element 8 of the guide chain 10 comprises at least one shaped pin 11 provided on at least one of the side walls 9, projecting in a transverse direction X with respect to the extension line Z and provided with a transverse section which has a width 14, extended substantially parallel to the extension line Z, greater than a height 15 thereof extended substantially orthogonal to the extension line Z.

**[0065]** According to the idea underlying the present invention, each guide element 8 of the guide chain 10 also comprises at least one groove 12, which is made on at least one of the side walls 9 and remains defined between at least two sides 23.

**[0066]** With the term "sides", it must be intended hereinbelow at least two containment walls adapted to define the width of the groove 12, whether they are for example made in a depression on the side wall 9 of each guide element 8, or for example provided projectingly on the side wall 9 of each guide element 8.

**[0067]** The aforesaid groove 12 is extended starting from an inlet opening 16 made on a perimeter edge 24 of the at least one side wall 9 of the guide element 8 and houses the shaped pin 11 of a contiguous said guide element 8.

**[0068]** According to the invention, the shaped pin 11 is susceptible of being stopped against the sides 23 with the guide chain 7 in the retracted position and in the extended position and of defining a maneuvering distance with the sides 23 with the guide chain 7 in the intermediate position.

**[0069]** The latter is for example comprised between 0.2 and 3 mm when the chain is in the intermediate position.

**[0070]** Advantageously, the sides 23 define an extension of the groove 12 parallel to the extension direction Z substantially equal to the width 14 of the transverse section of the shaped pin 11.

**[0071]** Preferably, the extension of the groove 12 defined by the sides 23 is constant starting from the inlet opening 16 up to the bottom wall 19.

**[0072]** More in detail, the width 14 of the shaped pin 11 is extended between two opposite ends along the extension line Z. Such opposite ends are susceptible of being mechanically engaged with the corresponding sides 23 that delimit the groove 12, with the guide chain 7 in the extended position or in the retracted position, integrally locking the guide elements to each other along the extension line Z.

**[0073]** In this manner, the guide chain is rigid and mechanically capable of resisting the transverse stresses.

**[0074]** With the guide chain 7 in the intermediate position, the guide elements 8 of the guide chain 7 at the traversing channel provided in the handle bar 6 are at least partially tilted with respect to each other. In this position, the shaped pins 11 of each guide element 8 are spaced by the aforesaid maneuvering distance from the sides 23 which delimit the groove 12 of the contiguous guide element to which the guide element 8 is rotatably connected, so as to allow the pins to freely rotate without friction.

**[0075]** The idea underlying the invention, i.e. being able to provide the transverse section of each shaped pin 11 with a width 14 along the extension line Z greater than the height 15 orthogonal to the extension line Z, allows locking the shaped pin 11 itself against the sides 23 of the groove 12 while the height 15 lower than the height 14 allows defining the aforesaid maneuvering distance with the guide chain in the intermediate position, so as to allow an easy rotation of the guide elements 8 and an easier movement of the guide chain 7 between the retracted position and the extended position.

**[0076]** The intermediate position of the guide chain 7, in which the maneuvering distance remains defined between the opposite ends of each shaped pin 11 of each guide element 8 and the sides 23 of the groove 12 of the contiguous guide element 8, is in particular depicted in the enclosed figure 12, in which a guide element 8 of the guide chain 7 is depicted transparent so to be able to easily appreciate the relative position between the shaped pin 11 and the groove 12.

**[0077]** In accordance with the preferred embodiment illustrated in the enclosed figures, the ratio between the width 14 and the height 15 of the transverse section of the shaped pin 11 of each guide element 8 of the guide chain 7 is comprised in the interval 1.1 - 1.5 and in particular is comprised in the interval 1.2 - 1.4.

**[0078]** Preferably, each guide element 8 of the guide chain 7 comprises two shaped pins 11, each provided on one of the two side walls 9 and two grooves 12, each also provided on a corresponding side wall 9 of the two facing side walls 9.

**[0079]** The two shaped pins 11 are advantageously aligned along the transverse direction X and the two grooves 12 have the concavities directed internally towards the central body 10 and facing, also substantially aligned along a second transverse direction parallel to the transverse direction X of the shaped pins 11, in order to allow the housing therein of two corresponding shaped pins 11 of the contiguous guide element 8.

**[0080]** In accordance with the particular preferred embodiment illustrated in the enclosed figures, the side walls 9 comprise two corresponding convexities 17 which project outside the side walls 9 parallel to the transverse direction X.

**[0081]** The aforesaid at least one groove 12 is advantageously made on at least one of the convexities 17 and is provided with concavity directed towards the central body 10 and in particular two grooves 12 are provided,

each made on the corresponding convexity 17.

**[0082]** In accordance with the preferred embodiment illustrated in the enclosed figures, the depth of the shaped pins 11 (projectingly provided on the side walls 9) along the transverse direction X is equal to the depth of the grooves 12 (made on the convexities 17).

**[0083]** In operation, so as to mount the guide chain 7 during installation of the blind 1, it is sufficient to insert the shaped pins 11 in the grooves 12 through the inlet openings 16. Advantageously, each side wall 9 of each guide element 8 of the guide chain 7 comprises two projecting portions 18 which extend facing and parallel to the extension direction Z.

**[0084]** Each guide element 8 comprises advantageously two aforesaid shaped pins 11, each provided on a corresponding projecting portion 18 of the projecting portions 18 of the side walls 9 and externally projecting with respect to the central body 10, preferably aligned along the transverse direction X.

**[0085]** Each guide element 8 also comprises advantageously two aforesaid grooves 12, each made on a corresponding convexity 17 with concavity directed towards the central body 10 and extended between the inlet opening 16 and a bottom wall 19 opposite the inlet opening 16 and susceptible of receiving, in abutment, the corresponding shaped pin 11 of the contiguous guide element 8.

**[0086]** More in detail, the inlet openings 16 of the grooves 12 are also vertically provided towards the bottom when the guide chain 7 is in extended position, so as to avoid the risk that the shaped pins 11 escape from the grooves 12.

**[0087]** As anticipated above, the inlet openings 16 of the grooves 12 allow inserting the shaped pins 11 during the mounting step of the blind 1, object of the present invention, so as to limit the elastic stress impressed on the side walls 9 during the insertion of the pins 11. In accordance with the preferred embodiment illustrated in the enclosed figures, and with particular reference to the enclosed figure 6, the shaped pin 11 of each guide element 8 is provided with substantially oval transverse section, and with a tooth 13 radially projecting along the direction substantially orthogonal with respect to the transverse direction X, such tooth susceptible of abutting against the bottom wall 19 of the corresponding groove 12 with the handle bar 6 in the extended and retracted positions.

**[0088]** More in detail, the tooth 13 of the shaped pin 11 of each guide element 8 of the guide chain 7 is provided projecting substantially orthogonal both with respect to the transverse direction X and to the extension line Z.

**[0089]** In particular, in accordance with the embodiment illustrated in the enclosed figures, the tooth 13 of the shaped pin 11 projects substantially vertically upward with the guide chain in the extended position.

**[0090]** According to an advantageous aspect of the present invention, each guide element 8 of the guide

chain 7 comprises stopping means 20 placed to mechanically interfere with a corresponding guide element 8 contiguous with the guide chain 7 in the extended position, in order to stop the relative rotation of the guide elements 8 themselves.

**[0091]** In this manner, once the guide chain 7 is extended on the floor that delimits the opening A to be screened, the guide elements 8 are aligned and stopped in their rotation by the stopping means 20, so as to ensure the linearity of the guide chain 7 and prevent an erroneous outward exit of the shaped pins 11 from the corresponding grooves 12 through the outlet openings 16.

**[0092]** More in detail, the stopping means 20 of each guide element 8 comprise at least one rib 21 projecting parallel to the extension direction Z and at least one cavity 32 made in the central body 10 defined by an abutment wall 35 that is counter-shaped with respect to the rib 21 and susceptible of receiving, in abutment, the at least one rib 21 itself of a contiguous guide element 8.

**[0093]** Advantageously, each of the cavities 32 is laterally defined by two facing guide walls 36 that are substantially transverse to the transverse direction X.

**[0094]** The guide walls 36 thus defined of each guide element 8 are adapted to limit the movement of the ribs 21 of the contiguous guide element 8 with respect to stresses parallel to the transverse direction X.

**[0095]** The ribs 21 of the stopping means 20 of each guide element 8 indeed remain advantageously housed in the corresponding cavities 32 of the contiguous guide element 8, conferring rigidity to the guide chain 7, with respect to the aforesaid transverse stresses, due for example to accidental impact.

**[0096]** Given that the ribs 21 of the stopping means 20 mutually engage the cavities 32 of the contiguous guide elements 8 of the chain 7, the pins and the relative grooves described above can be substituted by non-shaped pins, e.g. cylindrical, and by grooves constituted by holes corresponding to the pins (not illustrated in the enclosed figures).

**[0097]** More clearly, the contiguous elements will be connected to each other by means of at least one transverse pin of each guide element 8 rotatably inserted in a relative corresponding hole, in particular perimetrically closed, of the contiguous guide element 8.

**[0098]** Preferably, the at least one cavity 32 is directed downward and the abutment wall 35 delimits it on the upper part in order to stop the movement of the rib 21 of the contiguous guide element 8.

**[0099]** Preferably, moreover, in accordance with the preferred embodiment illustrated in the enclosed figures, the stopping means 20 comprise two ribs 21 which project parallel to the extension direction Z and are susceptible of abutting against two corresponding abutment walls 35 that on the upper part delimit two corresponding cavities 32 counter-shaped with respect to the ribs 21.

**[0100]** The guide chain 7 of the blind 1, object of the present invention, described up to now is therefore structurally solid and entirely reliable in operation, and more-

over is able to resist shear stresses imparted by the lower flap of the fabric 5, e.g. due to gusts of wind, since the pins 11 housed in the grooves 12 and, preferably, the ribs 21 retained in the cavities 32 of the stopping means 20 confer a high resistance to the aforesaid forces.

**[0101]** Also forming the object of the present invention is a guide chain intended to be installed in a fabric roller blind of the type described herein up to now, regarding which the numeric references will be maintained for the sake of description simplicity.

**[0102]** The guide chain 7 for a fabric roller blind 1, object of the present invention, is intended to be placed to connect between the lateral upright 3 and the handle bar 6 below the fabric 5 of the blind 1.

**[0103]** The guide chain 7 according to the invention comprises a plurality of guide elements 8 linked together along an extension line Z and susceptible of being moved between an extended position, in which the guide elements 8 are at least partially extended substantially horizontally and aligned below the fabric 5, and a retracted position, in which the guide elements 8 are at least partially housed within the handle bar 6 aligned substantially horizontally.

**[0104]** The guide chain 7 is also susceptible of being moved, between the retracted position and the extended position, into an intermediate position in which the extension line Z forms at least one curve, in which the guide elements 8 are tilted with respect to each other.

**[0105]** Each guide element 8 of the guide chain 7, object of the present invention, comprises two facing side walls 9 substantially parallel to the extension line Z and connected by at least one central body 10.

**[0106]** According to the idea underlying the present invention, each guide element 8 of the plurality of guide elements 8 of the guide chain 7 comprises at least one shaped pin 11 provided on at least one of the side walls 9, projecting in a transverse direction X with respect to the extension line Z.

**[0107]** Such shaped pin 11 is provided with a transverse section which has a width 14, extended substantially parallel to the extension line Z, greater than a height 15 thereof extended substantially orthogonal to the extension line Z.

**[0108]** More in detail, the ratio between the width 14 and the height 15 of the transverse section of the shaped pin 11 is comprised in the interval 1.1 - 1.5 and more particularly is comprised in the interval 1.2 - 1.4.

**[0109]** According to the idea underlying the present invention, each guide element 8 also comprises at least one groove 12, which is made on at least one of the side walls 9 and remains defined between at least two sides 23, is extended starting from an inlet opening 16 made on a perimeter edge 24 of the at least one side wall 9 of the guide element 8 and houses the shaped pin 11 of a contiguous aforesaid guide element 8.

**[0110]** In addition, the shaped pin 11 is susceptible of being stopped against the sides 23 with the guide chain 7 in the retracted position and in the extended position

and of defining a maneuvering distance with the sides 23 with the guide chain 7 in the intermediate position.

**[0111]** Preferably, the sides 23 of the groove 12 define an extension of the groove 12 itself, parallel to the extension direction Z, substantially equal to the width 14 of the transverse section of the shaped pin 11.

**[0112]** In this manner, with the guide chain 7 in the extended position and in the retracted position, the opposite ends with respect to the extension line Z which define the width 14 of each shaped pin 11 are in contact with the sides 23 of the groove 12, locking together the guide elements with respect to the extension line Z.

**[0113]** The finding thus conceived therefore attains the pre-established objects.

**[0114]** In particular, the blind 1 with windable fabric, object of the present invention, allows moving the guide chain 7 between the retracted position and the extended position in a quick and easy manner, since the shaped pins 11 define the maneuvering distance with the grooves 12 in which they are housed, with the guide chain 7 in the intermediate position.

**[0115]** In addition, the guide chain 7 is structurally solid and entirely reliable in operation since the shaped pins 11 are locked in the grooves 12 with respect both to movements along the extension direction Z - since the pins 11 are locked to size in the corresponding grooves 12 with the guide chain in the extended and retracted positions - and with respect to transverse movements (parallel to the transverse direction X) due to the pins 11 housed in the grooves 12 and, preferably, due to the ribs 21 housed in the cavities 32 of the stopping means 20.

## Claims

### 1. Fabric roller blind, which comprises:

- a support frame (2) which is provided with at least two lateral uprights (3, 3') and with an upper crosspiece (22) to delimit an opening (A) to be screened,
- at least one handle bar (6), which is extended parallel to said lateral uprights (3, 3') and is slidably movable between said lateral uprights (3, 3');
- at least one extensible fabric (5), which is extended between a first lateral edge thereof associated with a first upright (3) of said lateral uprights (3, 3') and a second lateral edge thereof opposite said first lateral edge associated with said handle bar (6);
- at least one guide chain (7) placed to connect between said first lateral upright (3) and said handle bar (6) comprising a plurality of guide elements (8) linked together along an extension line (Z);
- each said guide element (8) comprising two facing side walls (9) substantially parallel to said

extension line (Z), connected by at least one central body (10);

- said handle bar (6) being movable between:

- at least one open position, in which said handle bar (6) is placed in a proximal position with respect to said first lateral upright (3) and in which said guide chain (7) is in a retracted position, in which said guide elements (8) are at least partially housed within said handle bar (6) aligned substantially horizontally,
- at least one closed position, in which said handle bar (6) is placed in a distal position with respect to said first lateral upright (3) and in which said guide chain (7) is in an extended position, in which said guide elements (8) of said guide chain (7) are at least partially extended aligned below said fabric (5) substantially horizontally;

between said retracted position and said extended position of said guide chain (7), an intermediate position being provided in which said extension line (Z) forms at least one curve, in which said guide elements (8) are tilted with respect to each other; said blind being **characterized in that** each guide element (8) of said guide chain (10) comprises:

- at least one shaped pin (11) provided on at least one of said side walls (9), projecting in a transverse direction (X) with respect to said extension line (Z) and provided with a transverse section which has a width (14), extended substantially parallel to said extension line (Z), greater than a height (15) thereof extended substantially orthogonal to said extension line (Z);
- at least one groove (12), which:
  - is made on at least one of said side walls (9) and remains defined between at least two sides (23);
  - is extended starting from an inlet opening (16) made on a perimeter edge (24) of said at least one side wall (9) of said guide element (8);
  - houses the shaped pin (11) of a contiguous said guide element (8);

said shaped pin (11) being susceptible of being stopped against said sides (23) with said guide chain (7) in the retracted position and in the extended position and of defining a maneuvering distance with said sides (23) with the guide chain (7) in said intermediate position.

### 2. Fabric roller blind according to claim 1, **characterized in that** each said guide element (8) comprises



stopping means (20) placed to mechanically interfere with one said guide element (8) contiguous with said guide chain (7) in the extended position, in order to stop the relative rotation of said guide elements (8).

3. Fabric roller blind according to claim 2, **characterized in that** said stopping means (20) of each said guide element (8) comprise:

- at least one rib (21) projecting parallel to said extension direction (Z);
- at least one cavity (32) made in said central body (10) defined by an abutment wall (35) susceptible of receiving, in abutment, said at least one rib (21) of a contiguous said guide element (8).

4. Fabric roller blind according to any one of the preceding claims, **characterized in that** said sides (23) define an extension of said groove (12) parallel to the extension direction (Z) substantially equal to said width (14) of the transverse section of said shaped pin (11).

5. Fabric roller blind according to any one of the preceding claims, **characterized in that** the ratio between said width (14) and said height (15) of the transverse section of said shaped pin (11) is comprised in the interval 1.1 - 1.5.

6. Fabric roller blind according to any one of the preceding claims, **characterized in that** said side walls (9) comprise two corresponding convexities (17) which project outside said side walls (9) parallel to said transverse direction (X); said at least one groove (12) being made on at least one of said convexities (17) and being provided with concavity directed towards said central body (10).

7. Fabric roller blind according to claim 6, **characterized in that** each side wall (9) of each said guide element (8) of said guide chain (7) comprises two projecting portions (18), extended facing each other and parallel to said extension direction (Z); said guide element (8) comprising:

- two said shaped pins (11), each provided on a corresponding said projecting portion (18) of said side walls (9) and externally projecting with respect to said central body (10);
- two said grooves (12), each made on a corresponding said convexity (17) with concavity directed towards said central body (10) and extended between said inlet opening (16) and a bottom wall (19) opposite said inlet opening (16) and susceptible of receiving, in abutment, a corresponding said shaped pin (11) of a contiguous

said guide element (8).

8. Fabric roller blind according to claim 7, **characterized in that** said shaped pin (11) of each said guide element (8) is provided with:

- substantially oval transverse section, and
- with a tooth (13) radially projecting along a direction substantially orthogonal with respect to said transverse direction (X), susceptible of abutting against said bottom wall (19) with said handle bar (6) in the extended and retracted positions.

9. Guide chain for a fabric roller blind, intended to be placed to connect between a lateral upright (3) and a handle bar (6) below a fabric (5) of said blind, comprising a plurality of guide elements (8) linked together along an extension line (Z) and susceptible of being moved between:

- an extended position, in which said guide elements (8) are at least partially extended, aligned below said fabric (5) substantially horizontally;
- a retracted position, in which said guide elements (8) are at least partially housed within said handle bar (6) and aligned substantially vertically;

between said retracted position and said extended position, an intermediate position being provided in which said extension line (Z) forms at least one curve, in which said guide elements (8) are tilted with respect to each other;

each said guide element (8) comprising two facing side walls (9) substantially parallel to said extension line (Z) and connected by at least one central body (10);

said guide chain being **characterized in that** each guide element (8) of said plurality of guide elements (8) comprises:

- at least one shaped pin (11) provided on at least one of said side walls (9), projecting in a transverse direction (X) with respect to said extension line (Z) and provided with a transverse section which has a width (14), extended substantially parallel to said extension line (Z), greater than a height (15) thereof extended substantially orthogonal to said extension line (Z);
- at least one groove (12), which:

- is made on at least one of said side walls (9) and remains defined between at least two sides (23);
- is extended starting from an inlet opening (16) made on a perimeter edge (24) of said at least one side wall (9) of said guide ele-

ment (8);  
- houses the shaped pin (11) of a contiguous  
said guide element (8);

said shaped pin (11) being susceptible of being 5  
stopped against said sides (23) with said guide chain  
(7) in the retracted position and in the extended po-  
sition and of defining a maneuvering distance with  
said sides (23) with the guide chain (7) in said inter-  
mediate position 10

10. Guide chain according to claim 9, **characterized in**  
**that** said sides (23) of said groove (12) define an  
extension of said groove (12), parallel to the exten- 15  
sion direction (Z), substantially equal to said width  
(14) of said transverse section of said shaped pin  
(11).

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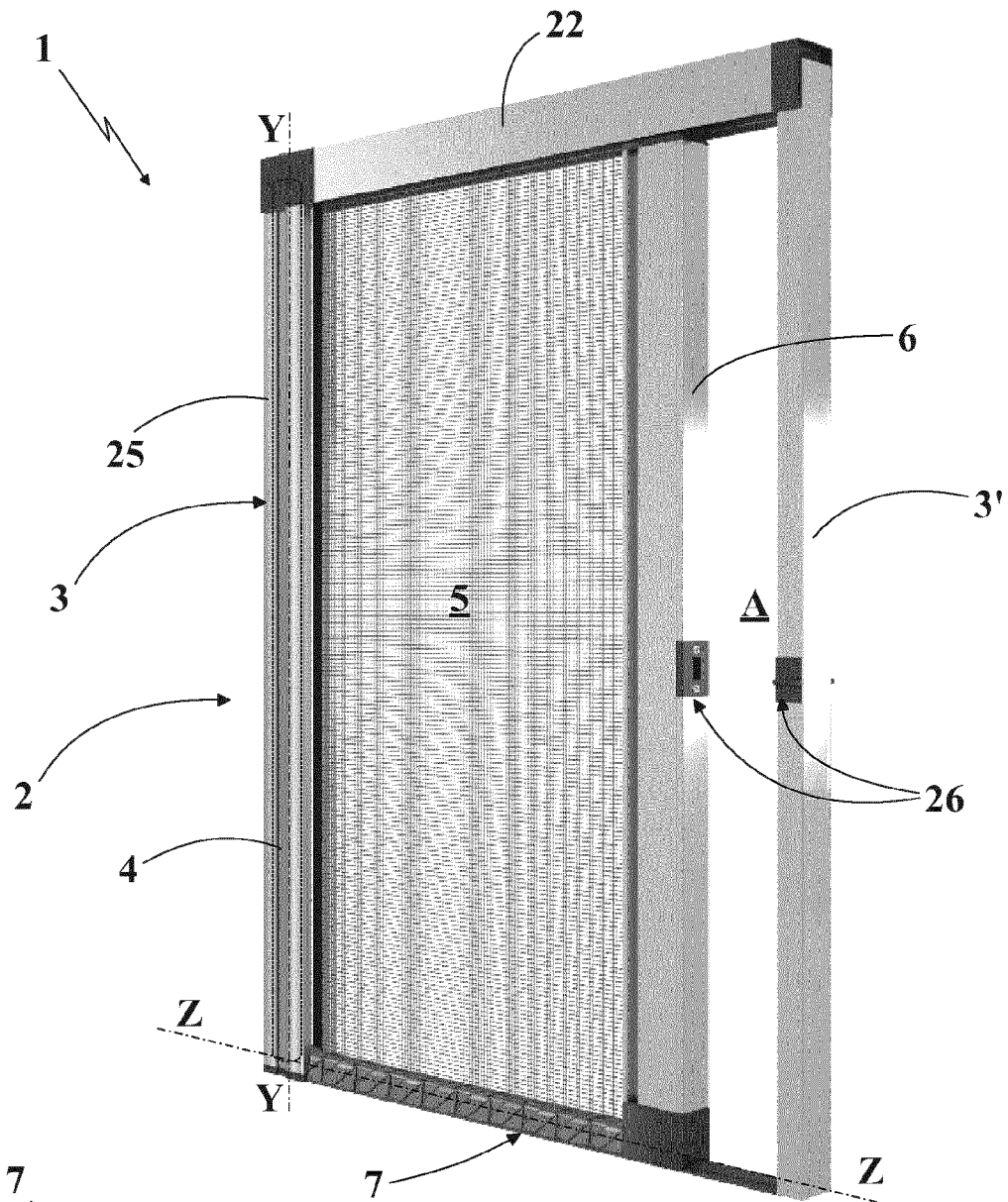


Fig. 1

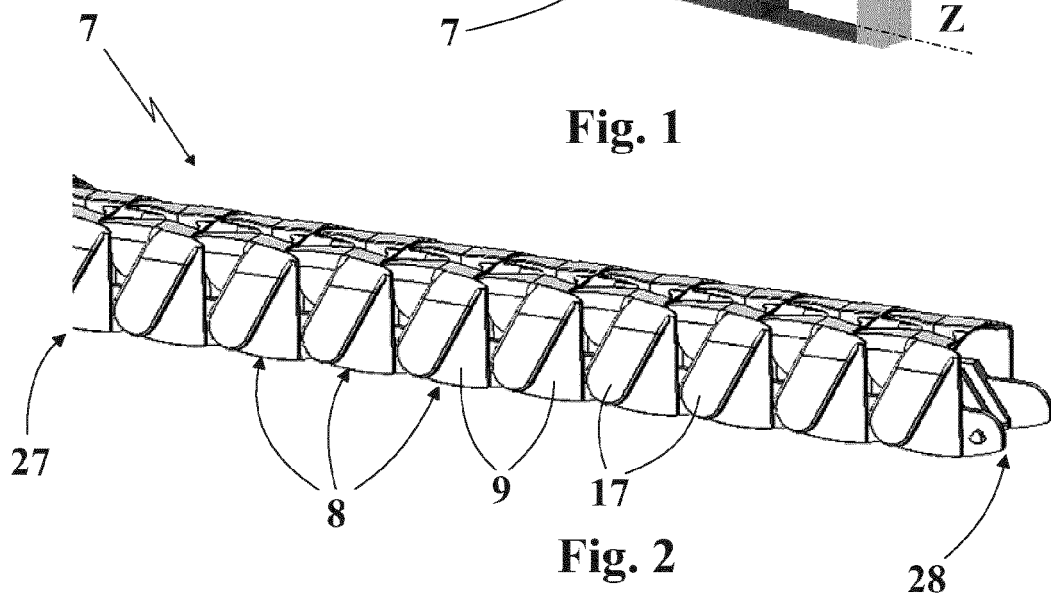


Fig. 2

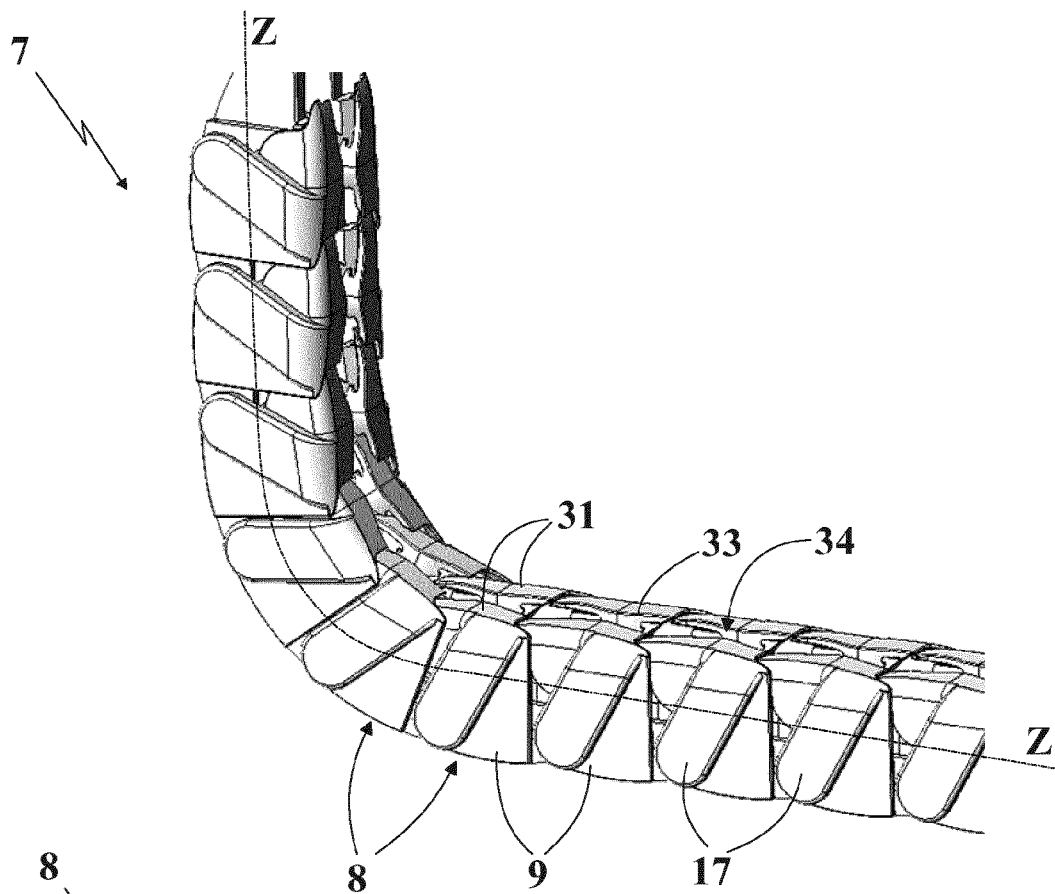


Fig. 3

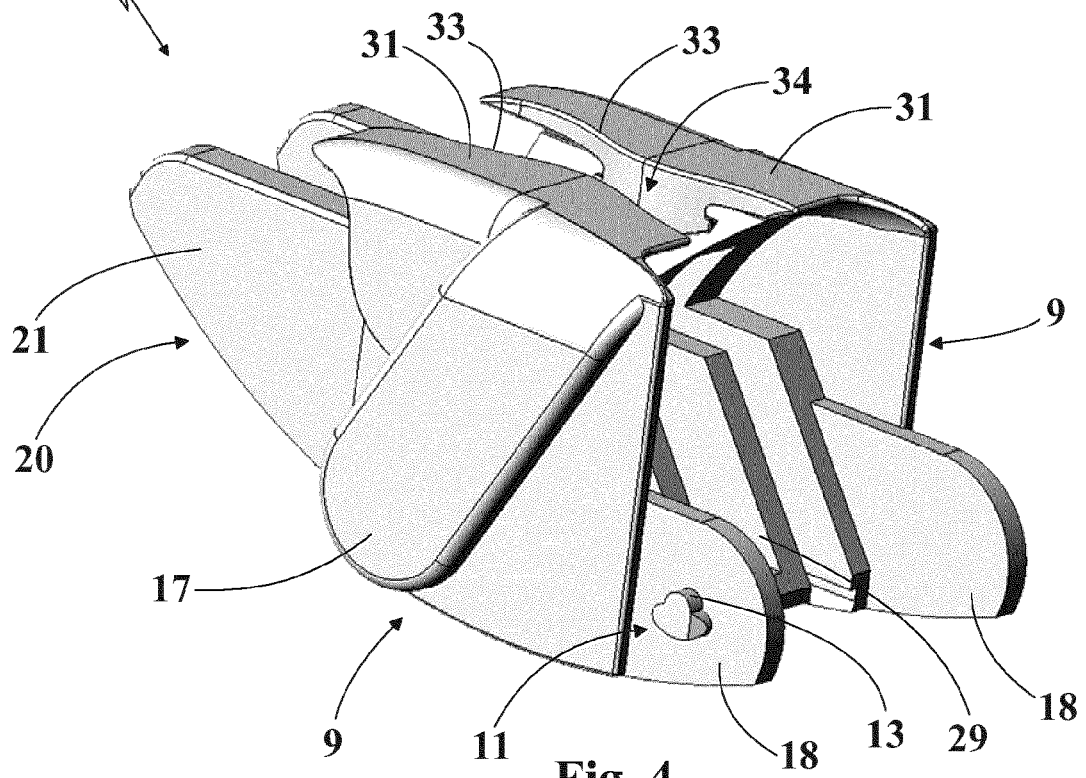
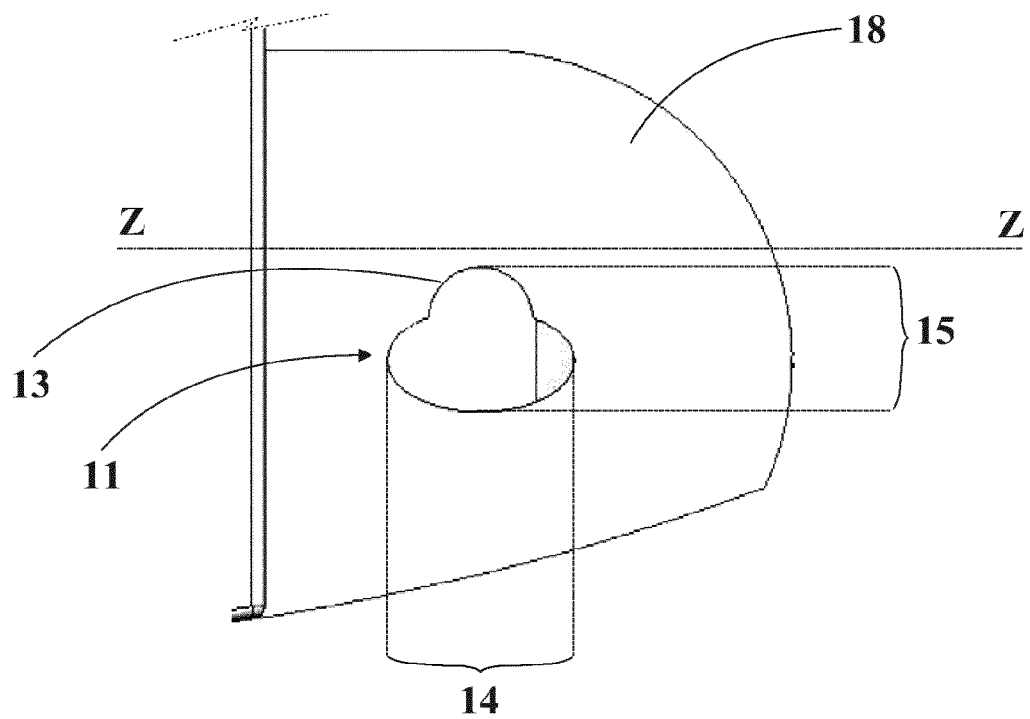
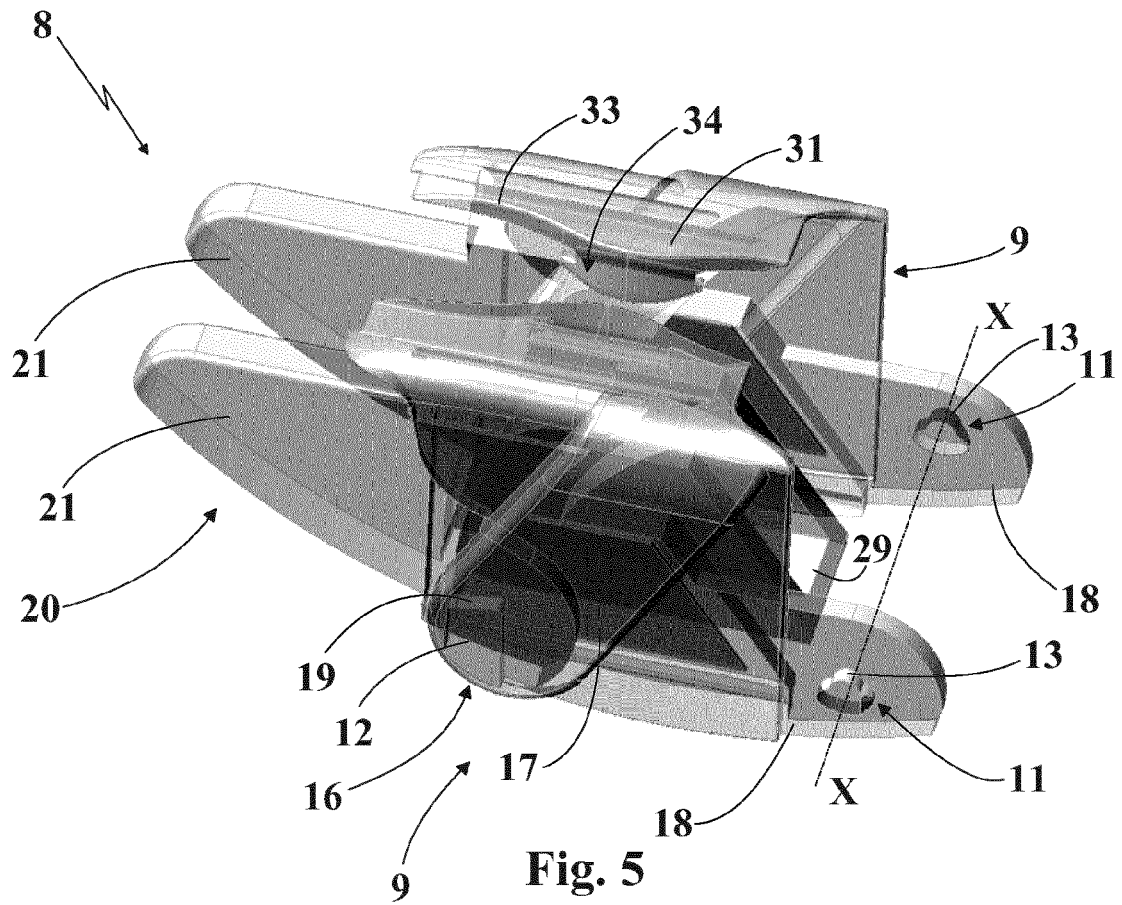


Fig. 4



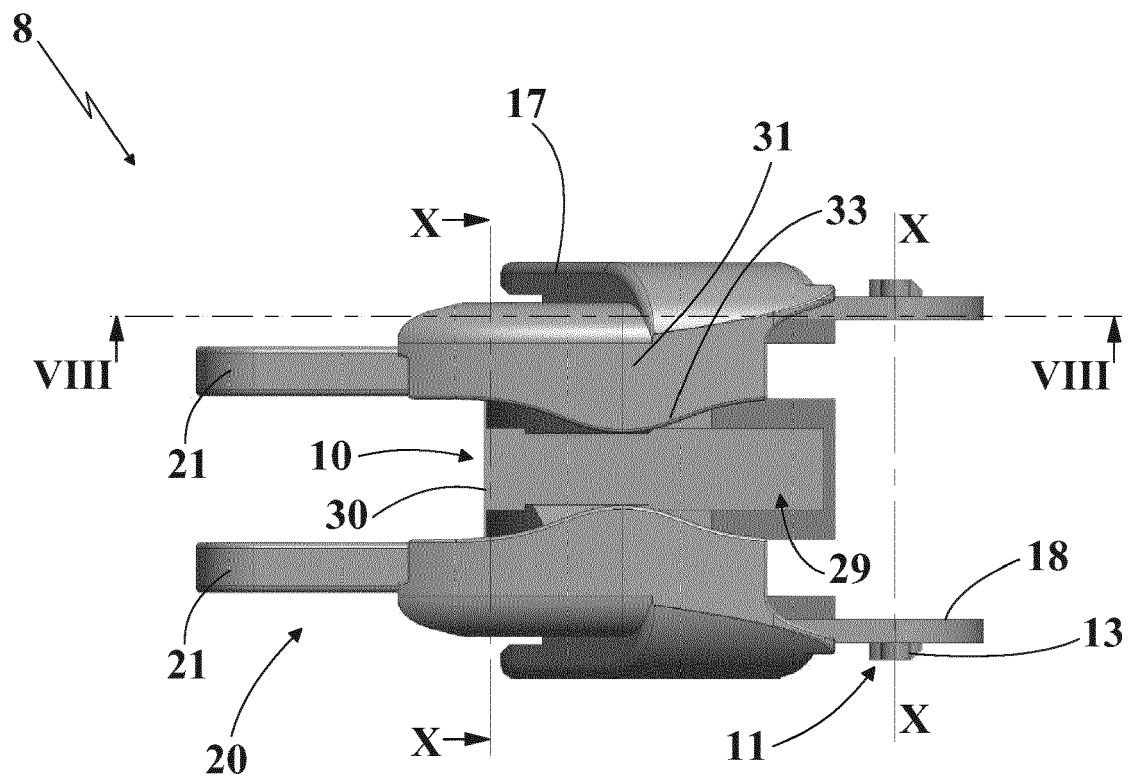


Fig. 7

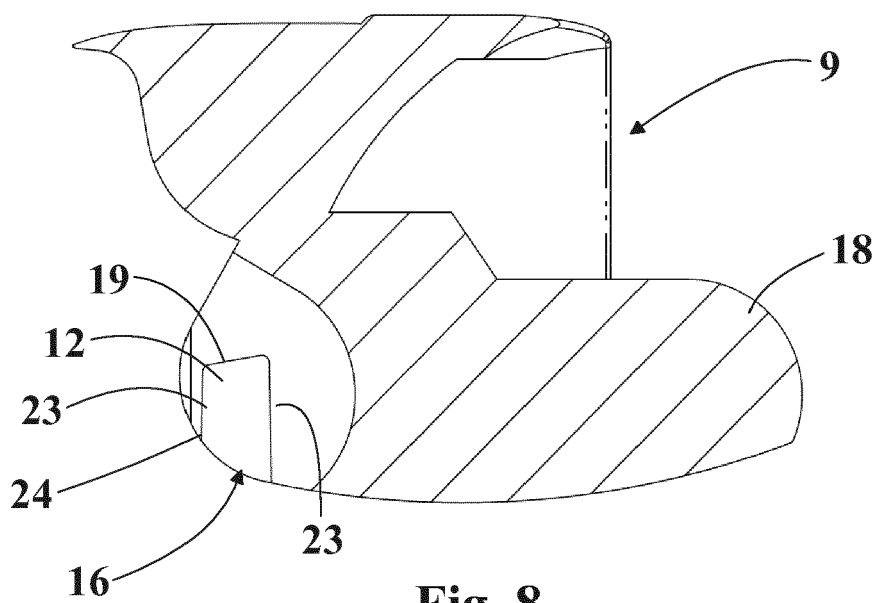
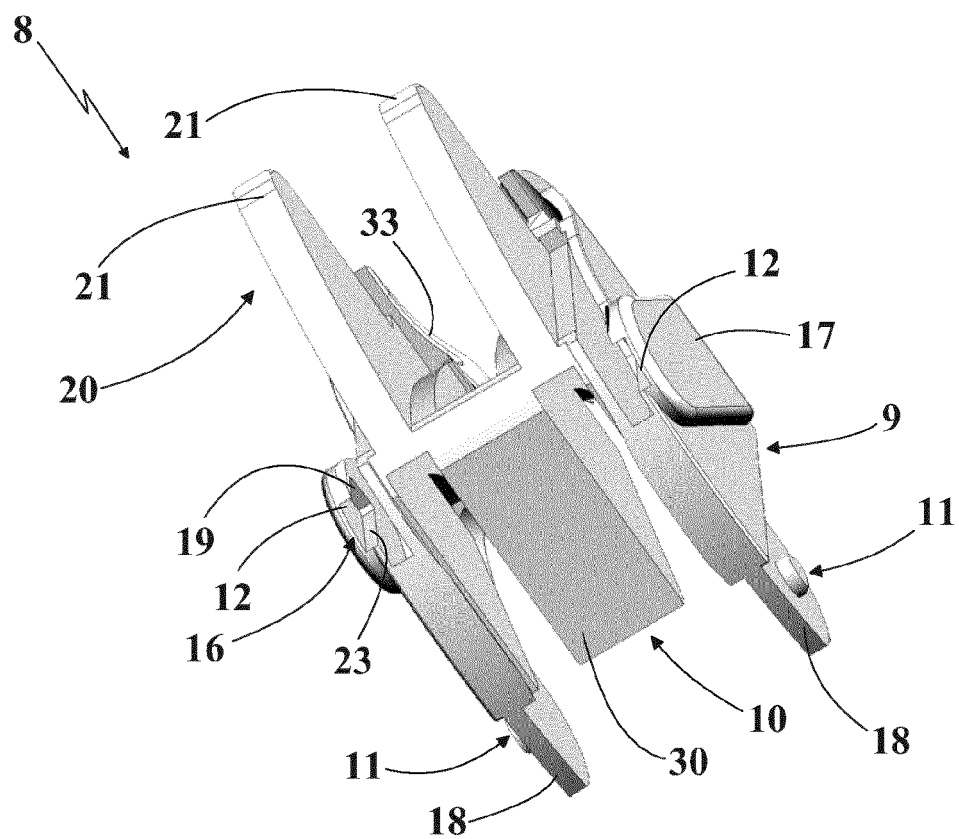
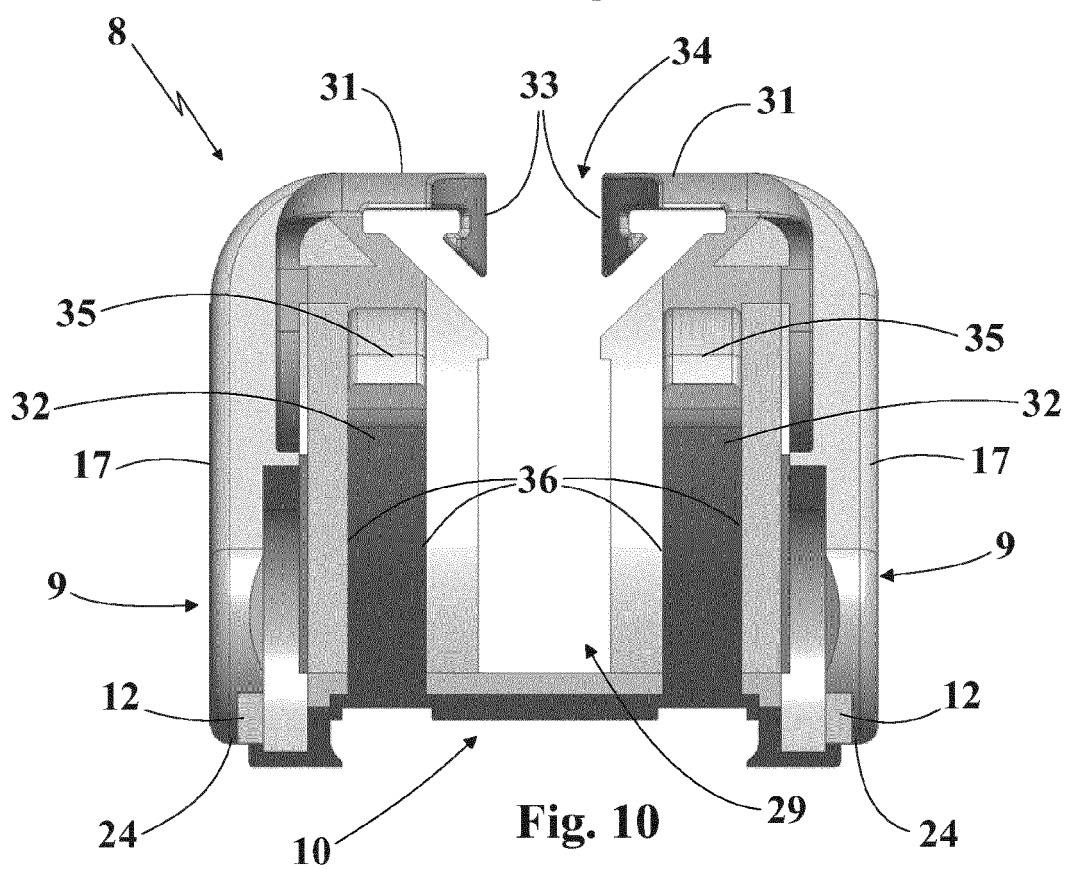


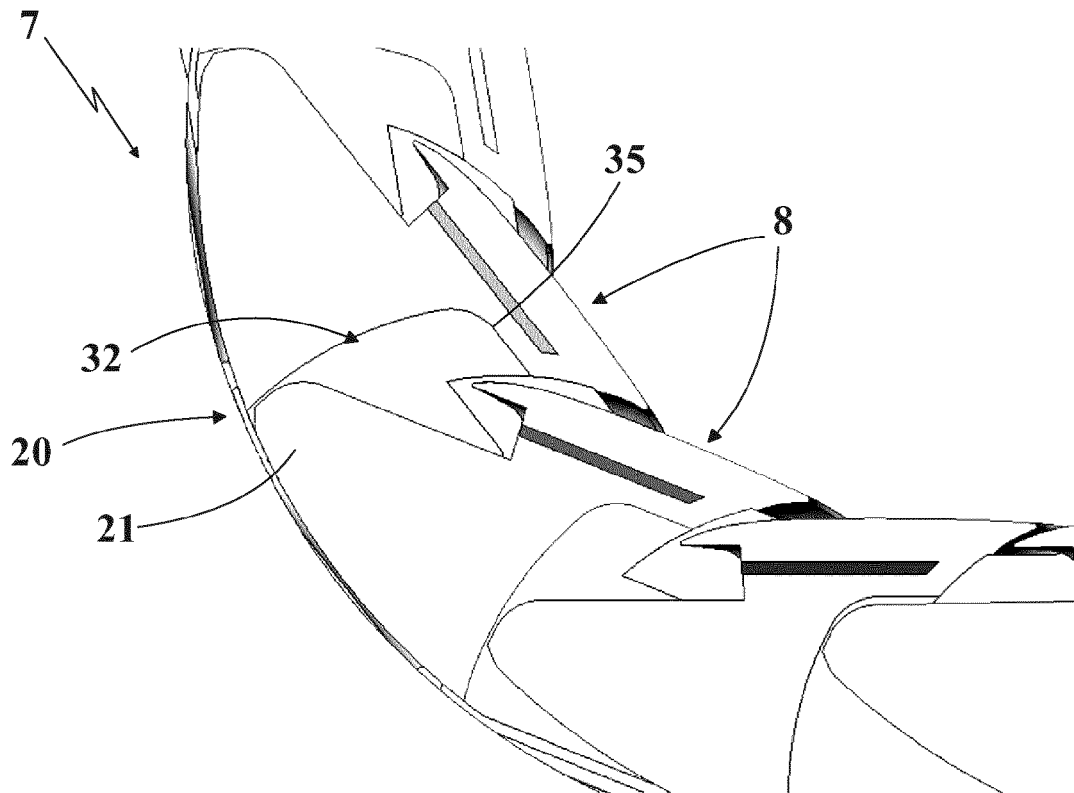
Fig. 8



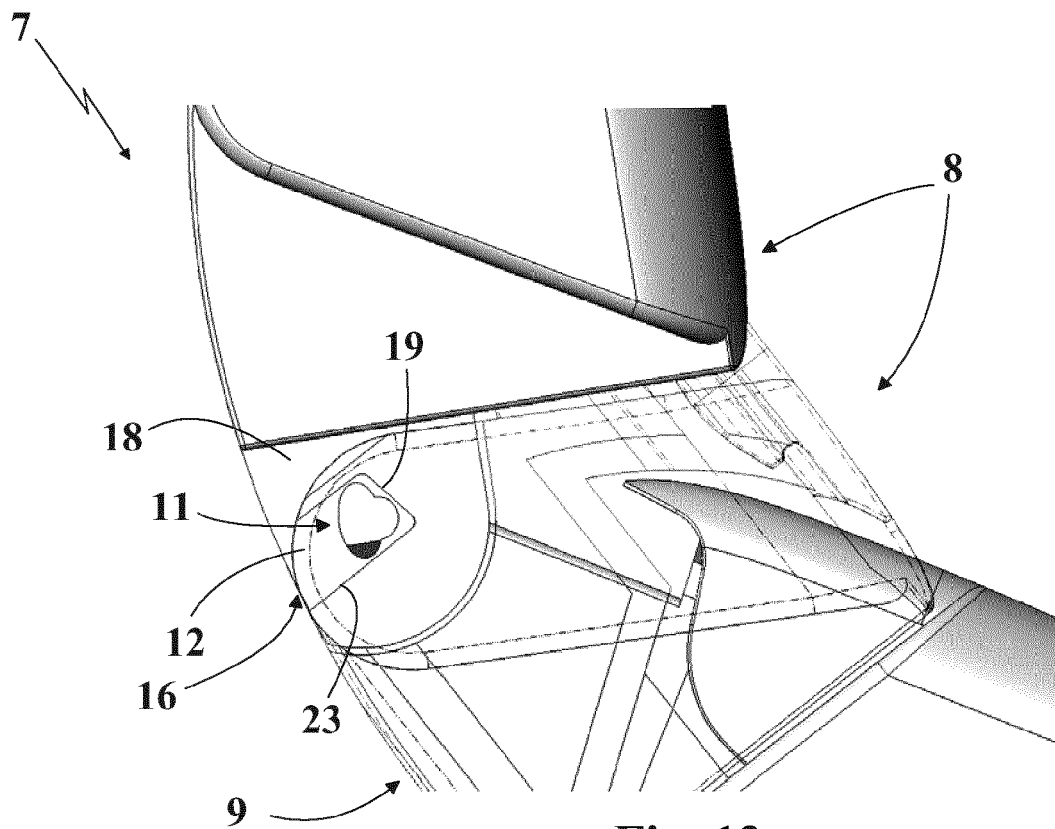
**Fig. 9**



**Fig. 10**



**Fig. 11**



**Fig. 12**



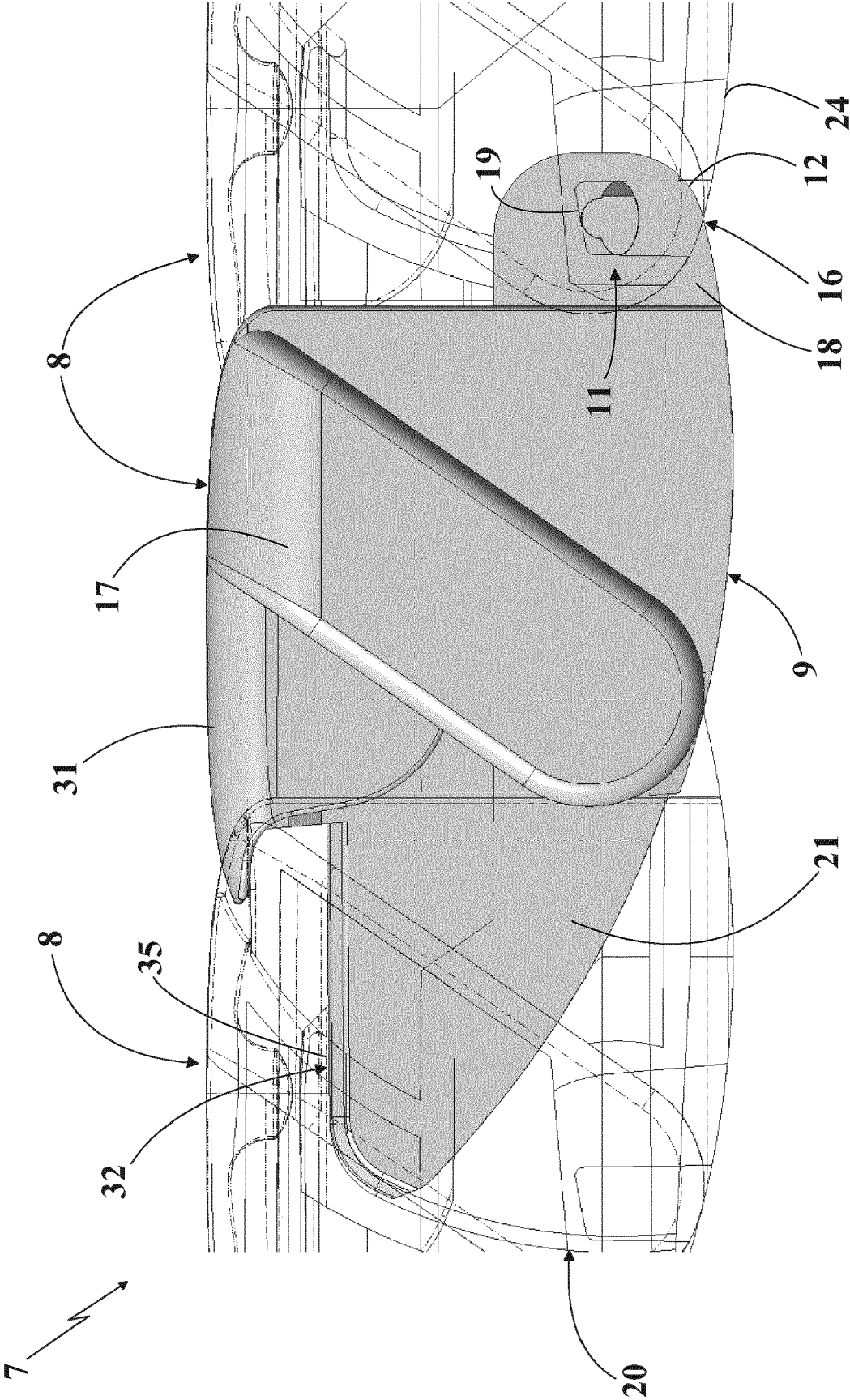


Fig. 13



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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                              |                                                              |                                         |
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| Place of search<br><b>Munich</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                              | Date of completion of the search<br><b>27 September 2019</b> | Examiner<br><b>Bourgoin, J</b>          |
| CATEGORY OF CITED DOCUMENTS<br>X : particularly relevant if taken alone<br>Y : particularly relevant if combined with another document of the same category<br>A : technological background<br>O : non-written disclosure<br>P : intermediate document<br>T : theory or principle underlying the invention<br>E : earlier patent document, but published on, or after the filing date<br>D : document cited in the application<br>L : document cited for other reasons<br>& : member of the same patent family, corresponding document |                                                                                                                                              |                                                              |                                         |

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