



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**15.04.2020 Bulletin 2020/16**

(51) Int Cl.:  
**E06B 9/86 (2006.01)** **E06B 9/42 (2006.01)**  
**E06B 9/80 (2006.01)**

(21) Application number: **19202076.6**

(22) Date of filing: **08.10.2019**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB  
GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO  
PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**  
Designated Validation States:  
**KH MA MD TN**

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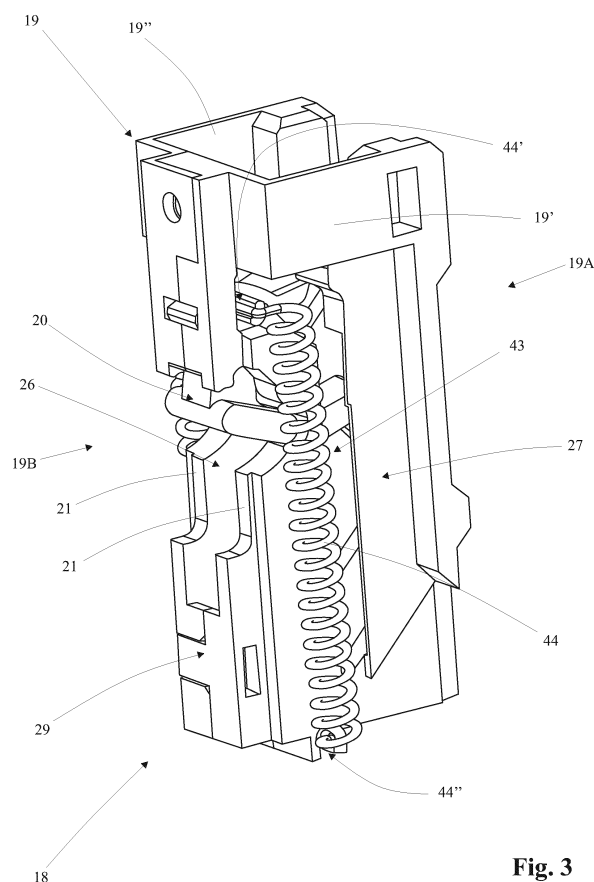
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(30) Priority: **08.10.2018 IT 201800009261**

(54) **FABRIC ROLLER BLIND**

(57) Fabric roller blind, which comprises: a take-up roller (4) around which a fabric (5) is windable; two lateral guideways (7) parallel to one another and side-by-side each other; a bottom bar (6) fixed to the lower edge of the fabric (5) and provided with two lateral terminations (14) slidably engaged with the respective lateral guideways (7) and provided with two corresponding engagement elements (15); two locking elements (18), each of which is fixed to a corresponding lateral guideway (7) and is arranged for constraining the corresponding engagement element (15) when the fabric (5) in extended position. More in detail, each locking element (18) comprises a support body (19) provided with a cam guide profile (21), and a retention element (20) provided with a follower portion (22) engaged with the guide profile (21) of the support body (19), in a manner such to allow at least one operating rotational-translation travel of the retention element (20) between a non-interference position and an interference position wherein the retention element (20) acts against the corresponding engagement element (15) in order to lock the bottom bar (6), maintaining the fabric (5) under tension in extended position.



**Fig. 3**

## 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 particular of windows, of doors, of French windows, of skylights and similar windows/doors/shutters.

**[0003]** The blind, object of the present invention, is therefore inserted in the industrial field of production of windows/doors/shutters, or also in the field of production of fabrics for protecting from the sun, in the field of mosquito netting or similar applications.

### State of the art

**[0004]** Blinds for closing openings of windows/doors/shutters (such as windows, doors or French windows) are known on the market, and are provided with a rolling-shutter box which is fixed to a building wall or to a ceiling above the opening to be closed and houses a roller therein on which a flexible fabric is susceptible of being wound and unwound.

**[0005]** The fabric usually has rectangular shape and is provided with an upper edge fixed to the roller and with a lower edge fixed to a bottom bar aimed to stretch the fabric itself.

**[0006]** In addition, the blind comprises two lateral guideways vertically arranged along the corresponding sides of the opening and with which the bottom bar is slidably constrained.

**[0007]** In particular, the bottom bar comprises an aluminum section closed at the lateral ends by two lateral terminations slidably coupled to the respective lateral guideways.

**[0008]** Each lateral guideway is obtained with a corresponding aluminum profile with rectangular section, internally hollow and provided with an internal side (facing the internal side of the other lateral guideway) on which a longitudinal slit is made in which the corresponding lateral termination of the bottom bar is slidably inserted.

**[0009]** In addition, each lateral guideway is longitudinally extended between an upper end, fixed to the rolling-shutter box, and a lower end closed by a base terminal fixed to the floor at the lower edge of the opening.

**[0010]** In operation, the roller of the blind is actuatable, typically by a motor, to rotate in order to move the fabric between a collected position, in which the fabric is wound around the roller with the bottom bar arranged in abutment against the rolling-shutter box, and an extended position, in which the fabric is unwound from the roller to close the opening and the bottom bar is arranged at the base terminals placed at the lower ends of the lateral guideways.

**[0011]** In particular, blinds are known on the market that are provided with a locking mechanism adapted to automatically lock the bottom bar to the base terminals when the fabric is brought into the extended position, and to unlock the bottom bar from the base terminals when it is necessary to re-wind the fabric around the roller in order to bring the fabric into the collected position.

**[0012]** One example of such locking mechanism of known type comprises a pair of coupling levers mounted on the corresponding lateral terminations of the bottom bar and intended to slide within the respective lateral guideways during the movement of the bottom bar. Each coupling lever is hinged by means of a central pin to the corresponding lateral termination in a manner such to be able to idly rotate with respect to a rotation axis parallel to the bottom bar.

**[0013]** The base terminal of each lateral guideway is internally provided with a shaped retention seat, in which the corresponding coupling lever is susceptible of being locked when the bottom bar is brought to the base terminal itself.

**[0014]** A first drawback of the blind of known type described briefly above is due to the fact that it requires arranging specific lateral guideways of increased width in order to allow the coupling levers to rotate within the base terminals of the guideways themselves, with consequent increases of the blind production costs.

**[0015]** Furthermore, the coupling levers must have relatively large sizes since, when the bottom bar is locked to the base terminal, such levers must sustain the traction force exerted by the motor which pulls the bottom bar upward, with consequent further need to employ lateral guideways of increased size.

**[0016]** For the purpose of resolving the abovementioned problems, a fabric roller blind was developed, described for example in the patent EP3000958 in the name of the applicant of the present patent.

**[0017]** More in detail, this blind of known type comprises two sliders, each of which slidably constrained to the bottom bar and provided with an engagement portion slidably engaged with the corresponding lateral guideway and with a separate guide portion. In addition, two locking elements are provided, each of which fixed to the respective lateral guideway and provided with a shaped channel within which the guide portion of the corresponding slider is slidably inserted when the fabric is in the extended position.

**[0018]** In operation, the bottom bar is actuated by the motor of the blind to slide downward until it reaches the locking elements, at which the guide portion of each slider enters into the shaped channel of the corresponding locking element through an inlet opening of the channel and slides within the latter up to reaching a first lower end stop portion of the shaped channel itself. Then, the motor drives the bottom bar to ascend until the guide portion of each slider reaches an abutment portion of the corresponding shaped channel, which stops the ascending of the bottom bar so as to lock the fabric in the extended

position.

**[0019]** In order to bring the fabric back into the collected position, the motor actuates the bottom bar to descend in a manner such that the guide portion of each slider slides in the shaped channel of the corresponding locking element up to reaching a second lower end stop of the shaped channel. Then, the motor drives the bottom bar to ascend in a manner such to carry the guide portion of the slider towards an outlet end of the shaped channel, so as to release the slider from the corresponding locking element, allowing the bottom bar to continue the ascent towards the rolling-shutter box of the blind.

**[0020]** Also the latter solution of known type, however, has several aspects which can be optimized.

**[0021]** A first drawback is tied to the fact that the motor which moves the fabric, and thus the bottom bar, is technologically complex and, consequently, quite costly since it must be set with multiple internal end stops which allow the guide element to slide within the shaped channel of the locking element, in particular in order to lock the motor at the first lower end stop portion, at the abutment portion and at the second end stop portion of the shaped channel.

**[0022]** A second drawback is due to the fact that the vertical distance between the abutment portion and the first lower end stop portion of the shaped channel of the locking element is relatively large and, consequently, when the fabric is in the extended position the bottom bar is spaced from the base of the opening by a relatively wide slit, which is closed by fixing a very thick balloon-like seal to the bottom bar, which among other things deteriorates the appearance of the blind.

**[0023]** A further drawback is due to the fact that, if one couples the locking element to only one of the lateral terminations of the bottom bar, in the subsequent movement attempts of the latter one releases the locking element on the lateral termination that was previously coupled and one couples the locking element on the other lateral termination that was not coupled before. This implies that often the user tries to couple the locking element that he/she did not couple by pressing the bottom bar downward with his/her foot, and this can irreversibly damage the locking mechanism of the blind by breaking, for example, the guide element of the slider.

**[0024]** The Italian patent application 102015000080419 describes a further blind of known type in which each locking element comprises a shaped lever, which is provided with a coupling portion and is actuable by the corresponding lateral termination of the bottom bar to engage and disengage its own coupling portion with/from the lateral termination itself. Also this solution is susceptible of operating and structural optimizations.

#### Presentation of the invention

**[0025]** In this situation, the problem underlying the present invention is to provide a fabric roller blind which is structurally simple and inexpensive to produce, in par-

ticular without requiring the use of complex and costly motors.

**[0026]** Another object of the present invention is to provide a fabric roller blind which prevents the formation of wide slits between the bottom bar and the base of the opening when the fabric is unwound, in particular avoiding the need to employ bulky closure seals on the bottom bar itself. Another object of the present invention is to provide a fabric roller blind which considerably reduces the risk of breakage or damage, in particular in the case of jamming of the locking mechanism.

**[0027]** Another object of the present invention is to provide a fabric roller blind which is entirely efficient functionally and entirely reliable in operation.

#### Brief description of the drawings

**[0028]** The technical characteristics of the invention, according to the aforesaid objects, are 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 1 shows a front perspective view of the fabric roller blind, object of the present invention;
- figure 2 shows a perspective view of a detail of the blind illustrated in figure 1, relative to a lateral guide-way and to the corresponding lateral termination of the bottom bar, with several parts removed or transparent in order to better show other parts;
- figure 3 shows a detail of the present blind relative to a locking element with which the corresponding lateral termination of the bottom bar is susceptible of being engaged;
- figure 4 shows the locking element of the blind with several parts transparent in order to better illustrate other parts;
- figure 5 shows an upper portion of the locking element with a corresponding engagement element of the bottom bar indicated;
- figure 6 shows a perspective view of a retention element of the locking element;
- figure 7 shows a detail of a guide profile of the locking element;
- figure 8 shows a side view of the locking element illustrated in figure 4, in which the retention element is in a non-interference position;
- figure 9 shows a side view of the locking element illustrated in figure 4, in which the retention element is in an interference position;
- figures 10-13 show several positions assumed by the retention element during the descent of the bottom bar, in which figures 10a, 11a, 12a, 13a show the complete locking element and figures 10b, 11b, 12b, 13b show the locking element without a lateral portion;

- figures 14, 15 and 16 show several positions assumed by the retention element during the ascending of the bottom bar;
- figures 17a-17d show several positions of the engagement element of the bottom bar during the operations of restoration in the locking element.

#### Detailed description of a preferred embodiment

**[0029]** With reference to the enclosed drawings, reference number 1 indicates the fabric roller blind, object of the present invention.

**[0030]** The blind is operatively employable for adjustably closing an opening A of a window/door/shutter, for example of a window, of a door or of a French window, made in a load-bearing element such as the wall of a building or the load-bearing structure of any one building.

**[0031]** In accordance with the embodiment illustrated in figure 1, the blind 1 comprises a support frame 2 intended to be fixed to the load-bearing element, in which the opening A is obtained, and preferably comprising a rolling-shutter box 3 intended to be positioned above the opening A itself.

**[0032]** Advantageously, the rolling-shutter box 3 comprises a hollow tubular body, in particular obtained with an aluminum extrusion, which is extended with substantially horizontal axis between two opposite ends closed by two lateral caps in particular made of plastic material. The blind 1 also comprises a take-up roller 4 rotatably constrained to the support frame 2, advantageously housed within the rolling-shutter box 3, and provided with a substantially horizontal rotation axis X.

**[0033]** Around the take-up roller 4, a flexible fabric 5 is susceptible of being wound and unwound, which preferably passes through a lower slit of the rolling-shutter box 3.

**[0034]** The fabric 5 can be intended for attaining a darkening screen, e.g. in substitution of a rolling shutter, a brise-soleil screen for filtering sunlight or in the form of a mesh for making mosquito netting.

**[0035]** The fabric 5 has a preferably rectangular form and is provided, in a manner per se known to the man skilled in the art, with an upper edge fixed to the take-up roller and with a lower edge fixed to a bottom bar 6 arranged parallel to the take-up roller 4 and aimed to stretch the fabric 5.

**[0036]** The blind 1 also comprises two lateral guideways 7 extended parallel to one another and side-by-side each other, and between which the fabric 5 is susceptible of sliding following its winding and unwinding around the take-up roller 4.

**[0037]** More in detail, each lateral guideway 7 is longitudinally extended according to a respective first extension direction Y, preferably vertical and substantially orthogonal to the rotation axis X of the take-up roller 4, between an upper end 8 thereof, arranged preferably at the rolling-shutter box 3, and an opposite lower end 9 intended to be arranged at the lower edge of the opening

A, for example on a floor or on a window sill.

**[0038]** The two lateral guideways 7 are intended to be arranged along corresponding sides of the opening A and to be fixed to the load-bearing element (in which the opening A itself is made) for example by means of anchorage screws.

**[0039]** Advantageously, with reference to the embodiment illustrated in figure 2, each lateral guideway 7 is preferably obtained by means of extruded metal sections, in particular made of aluminum, and is provided with a cross section with substantially "C" form.

**[0040]** In particular, each lateral guideway 7 is provided with an open side 10, arranged facing the open side 10 of the other lateral guideway 7, and on which a longitudinal slit 11 is made in which the bottom bar 6 is slidably constrained.

**[0041]** The bottom bar 6 of the blind 1, fixed to the lower edge of the fabric 5, is longitudinally extended along a second extension direction Z parallel to the rotation axis X of the take-up roller 4, between two lateral terminations 14 thereof that are slidably engaged with the respective lateral guideways 7.

**[0042]** In particular, the bottom bar 6 is internally hollow and preferably comprises a metallic section 6', e.g. made of extruded aluminum.

**[0043]** The lateral terminations 14 of the bottom bar 6 are preferably made of plastic material, they are placed to laterally close the metallic section 6' of the bottom bar 6 and they are fixed to the latter by means of connection screws, for example.

**[0044]** In particular, each lateral termination 14 of the bottom bar 6 is provided with an enlarged base portion 12, preferably fixed to the metallic section 6', and a connection portion 13 extended projectingly from the base portion 12 towards the corresponding lateral guideway 7 and slidably inserted in the longitudinal slit 11 of the latter.

**[0045]** The blind 1 also comprises movement means (not illustrated in the enclosed figures) mechanically connected to the take-up roller 4 and adapted to rotate the latter in order to move the fabric 5 between a collected position, in which the fabric 5 is wound around the take-up roller 4, and an extended position, in which the fabric 5 is unwound from the take-up roller 4 to at least partially close the opening A.

**[0046]** In particular, when the fabric 5 is in the collected position, the bottom bar 6 is preferably placed in abutment against the rolling-shutter box 3 and, when the fabric 5 is in the extended position, the bottom bar 6 is placed at the lower ends 9 of the lateral guideways 7 with the fabric 5 unwound to substantially totally close the opening A.

**[0047]** The fabric 5 is therefore completely guided in its winding and unwinding following the rotation of the take-up roller 4, with its lateral edges engaged in rails placed within the lateral guideways 7, and with the lower edge fixed to the bottom bar 6 in turn engaged in the lateral guideways 7 themselves.

**[0048]** In particular, the bottom bar 6, during the move-

ment of the fabric 5, keeps the fabric 5 itself extended and it is moved, remaining horizontal, with its lateral terminations 14 engaged with the lateral guideways 7.

**[0049]** Preferably, the aforesaid movement means comprise, in a per se entirely conventional manner, a motor (not illustrated) housed inside the take-up roller 4 advantageously at an end thereof. Although for the purpose of the present invention the movement means can also be of manual type, and for example obtained by means of an articulated drive rod, the motorized embodiment must be intended as advantageous and absolutely preferable.

**[0050]** According to the present invention, the blind 1 comprises two engagement elements 15 mounted on the bottom bar 6, each positioned at a respective lateral termination 14 of the bottom bar 6 itself.

**[0051]** Advantageously, each engagement element 15 comprises a slider 16 slidably constrained to the bottom bar 6 and movable according to the aforesaid second extension direction Z of the latter.

**[0052]** Preferably, each slider 16 is slidably inserted in a through hole 17 of the corresponding lateral termination 14 of the bottom bar 6. In particular, each slider 16 has elongated form extended along the second extension direction Z between a rear end, preferably arranged within the bottom bar 6, and a front end inserted in the longitudinal slit 11 of the corresponding lateral guideway 7.

**[0053]** According to the present invention, the blind 1 comprises two locking elements 18, each of which is fixed to the corresponding lateral guideway 7 preferably in proximity to the lower end 9 of the latter, and is arranged for constraining the corresponding engagement element 15 when the fabric 5 is in extended position.

**[0054]** More in detail, each locking element 18 comprises a support body 19 fixed to the corresponding lateral guideway 7 and preferably arranged within the latter.

**[0055]** Each locking element 18 also comprises a retention element 20 constrained to the corresponding support body 19 by means of a rotational-translation connection which allows one such retention element 20 to execute an operating rotational-translation travel between a non-interference position (illustrated in figure 8) and an interference position (illustrated in figure 9) in which the retention element 20 engages the engagement element 15 in order to retain the lateral termination 14 of the bottom bar 6 constrained to the corresponding locking element 18. More in detail, the support body 19 is provided with a cam guide profile 21, which is shaped in a manner such to guide the aforesaid operating rotational-translation travel of the retention element 20. For such purpose, the latter comprises a follower portion 22 engaged with the guide profile 21 of the support body 19 and susceptible of following such guide profile 21 in a manner such to define the aforesaid operating rotational-translation travel of the retention element 20. In particular, the follower portion 22 of the retention element 20 is configured in a manner such to be engaged, during the aforesaid operating travel, with specific sections of the

guide profile 21 which cause at least one movement of the follower portion 22 (and hence of the retention element 20) having at least one rotation component and at least one translation component.

**[0056]** The retention element 20 also comprises an actuation portion 23 which, when the retention element 20 is in the non-interference position, is susceptible of interfering against the engagement element 15 (during the descent of the bottom bar 6) in order to force the retention element 20 to be moved towards the interference position according to the aforesaid operating rotational-translation travel.

**[0057]** In addition, the retention element 20 comprises a coupling portion 24 which, when the retention element 20 itself is in interference position, acts in abutment against the corresponding engagement element 15 in order to constrain the bottom bar 6 to the locking element 18 so as to maintain the fabric 5 taut in the extended position.

**[0058]** Advantageously, with reference in particular to the embodiment of figure 6, the retention element 20 of each locking element 18 comprises a rigid material body (e.g. plastic) which is shaped substantially with "C" form with two arms that define the aforesaid actuation 23 and coupling 24 portions. The retention element 20 is preferably provided with two lateral faces 25 (parallel to the lying plane of the blind 1) from which two corresponding aforesaid follower portions 22 are projectingly extended.

**[0059]** Advantageously, the coupling portion 24 of the retention element 20 comprises an internal side 24', which abuts, preferably from above, against the engagement element 15 when the retention element 20 is in interference position, and an external side 24" directed opposite the internal side 24'.

**[0060]** Preferably, the engagement element 15 is provided with an upper portion 50 against which the coupling portion 24 (in particular with its internal side 24') of the retention element 20 acts in abutment in interference position, so as to push the bottom bar 6 downward in order to retain the latter and maintain the fabric 5 taut in extended position.

**[0061]** With reference to the embodiment of figures 3 and 4, the support body 19 of each locking element 18 is advantageously provided with a seat 26 in which the corresponding retention element 20 is housed.

**[0062]** In particular, the support body 19 is provided with two lateral walls 27 (parallel to the lying plane of the blind 1) between which the aforesaid seat 26 is delimited.

**[0063]** Preferably, each lateral wall 27 is provided with a corresponding aforesaid guide profile 21, with which the corresponding follower portion 22 of the retention element 20 is engaged.

**[0064]** In particular, the two lateral walls 27 are extended from a front side 19A of the support body 19, placed at the open side 10 of the corresponding lateral guideway 7, to an opposite rear side 19B preferably fixed to the bottom of the lateral guideway 7 itself.

**[0065]** Preferably, the lateral walls 27 have, at the front

side 19A, a longitudinal opening 28 in order to allow the passage of the engagement element 15 of the corresponding lateral termination 14, and, on the opposite rear side 19B they are connected to each other by a rear wall 29 suitably provided with a rear opening at the seat 26.

**[0066]** In particular, the support body 19 comprises two half-shells 19', 19'', each of which defining a corresponding lateral wall 27 and a corresponding rear wall portion 29, at which they are connected together (e.g. by means of a connection screw).

**[0067]** Advantageously, the support body 19 is provided with a shaped path 30, along which the engagement element 15 slides when it encounters the locking element 18. For such purpose, preferably the engagement element 15 is provided with at least one guide portion 31 which is susceptible of being slidably engaged with the shaped path 30 of the support body 19.

**[0068]** In accordance with the particular embodiment illustrated in the enclosed figures, the shaped path 30 is obtained with two tracks made on the internal faces of the two lateral walls 27 of the support body 19 and the guide portion 31 of the engagement element 15 is provided with two ends (extended in opposite directions) intended to be inserted in such tracks when the engagement element 15 encounters the locking element 18.

**[0069]** Preferably, the guide portion 31 of the engagement element 15 is fixed to the slider 16 of the latter and for example comprises a rod-like body which is extended transversely to the second extension direction Z of the bottom bar 6 and transversely to the first extension direction Y of the lateral guideways 7.

**[0070]** Preferably, the shaped path 30 is provided with an inlet section 32 provided with an introduction portion 33 adapted to intercept the guide portion 31 of the engagement element 15 following the descent movement of the bottom bar 6. The shaped path 30 is also provided with a first tilted section 34 which is extended towards the rear side 19B of the support body 19, in a manner such to guide the guide portion 31 (and the corresponding slider 16) to slide along the second extension direction Z away from the center of the blind 1 (as indicated in the embodiment of figures 10a, 10b).

**[0071]** Advantageously, when the retention element 20 is in the non-interference position, its actuation portion 23 intercepts the shaped path 30 of the support body 19, in a manner such to intercept the engagement element 15, which consequently moves the actuation portion 23 in order to cause the operating travel of the retention element 20 from the non-interference position to the interference position (as illustrated in the embodiment of figures 11a, 11b). In the non-interference position, the coupling portion 24 of the retention element 20 is outside the shaped path 30 so as to not obstruct the movement of the engagement element 15 and, hence, of the bottom bar 6, downward.

**[0072]** Advantageously, when the retention element 20 is in the interference position, the coupling portion 24 of the retention element 20 intercepts the shaped path 30

in order to act on the engagement element 15, while preferably the actuation portion 23 is outside the shaped path 30. Advantageously, the guide profile 21 of the support body 19 comprises a rotation section 35 provided at least with a curved segment and configured for causing at least one rotation (and in particular a rotation-translation) of the follower portion 22. In particular, with reference to the embodiment of figures 11a, 11b, such rotation is caused by the action of the engagement element 15 against the actuation portion 23 of the retention element 20 during the descent of the bottom bar 6. Following such rotation, the coupling portion 24 of the retention element 20 is moved, up to intercepting the shaped path 30 of the support body 19 and abuts, in particular from above, against the engagement element 15.

**[0073]** Advantageously, the guide profile 21 of the support body 19 is provided with a translation section 36, which is extended (preferably starting from the rotation section 35) linearly according to a slide direction having at least one component parallel to the first extension direction Y of the lateral guideway 7 and, in particular, parallel to the latter.

**[0074]** Such translation section 36 guides the follower portion 22 of the retention element 20 to execute a translation movement along the aforesaid slide direction, in particular parallel to the first extension direction Y of the lateral guideway 7.

**[0075]** In detail, in the downward movement of the bottom bar 6 in order to unwind the fabric 5, the aforesaid translation movement of the retention element 20 (along the translation section 36 of the guide profile 21) occurs after the rotation movement (caused by the rotation section 35 of the guide profile 21) and is directed downward, in a manner such that the coupling portion 24 of the retention element 20 acts on the engagement element 15 by pushing it downward, so as to lock the bottom bar 6 and maintain the fabric 5 taut (as in the embodiment of figures 13a, 13b). For such purpose, advantageously, the translation section 36 of the guide profile 21 is placed at a height lower than the rotation section 35.

**[0076]** Preferably, with reference to the embodiment illustrated in the enclosed figures, the follower portion 22 of the retention element 20 has elongated form (preferably rectilinear) between a first and a second end 22A, 22B, in particular rounded, connected by two sides 22C, preferably parallel to each other.

**[0077]** Preferably, with reference to the embodiment of figure 7, the rotation section 35 of the guide profile 21 of the support body 19 is extended, starting from the rear side 19B of the support body 19, with a first concave segment 37 directed downward, and then with a second concave segment 38 (having at least one curved portion) placed at a greater height and deeper than the first concave segment 37. The rotation section 35 continues downward with a convex segment 39, preferably curved, and hence with a third concave segment 40 directed towards the rear side 19B of the support body 19. Then, a fourth concave segment 41 is provided, not as deep as

the third 40, placed at a lower height than the latter and directed in part upward and in part towards the rear side 19B of the support body 19.

**[0078]** From the latter fourth concave segment 41, the translation section 36 of the guide profile 21 is extended, which is extended downward (preferably vertically) to a terminal portion 42 placed at the rear side 19B of the support body 19 and directed towards the first concave segment 37 of the rotation section 35.

**[0079]** The above-described embodiments of the shapes of the guide profile 21 and of the follower portion 22 allow, following the movement of the actuation portion 23 of the retention element 20 by the engagement element 15, executing the operating rotational-translation travel of the retention element 20 between the non-interference position and the interference position, as described in detail hereinbelow.

**[0080]** Of course, the guide profile 21 and the follower portion 22 can be attained with shapes different from the above-described embodiment, even if allowing the obtainment of the operating rotational-translation travel of the retention element 20. For example, the follower portion 22 can comprise two separate bodies, one intended to be engaged with the rotation section 35 and the other with the translation section 36 of the guide profile 21, whose aforesaid sections 35, 36 can also be separated from each other and/or arranged in different zones of the support body 19. Advantageously, each locking element 18 comprises tensioning means 43 acting against the corresponding retention element 20 in order to force, at least in the interference position, its coupling portion 24 against the engagement element 15, in particular with a force directed downward so as to maintain the fabric 5 of the blind 1 under tension when it is in extended position.

**[0081]** Advantageously, the tensioning means 43 comprise at least one elastic element 44 mechanically connected to the retention element 20 and loaded for moving the latter, at least in an actuation section TA of the operating travel of the retention element 20, towards the interference position. In particular, with reference to the embodiments illustrated in the enclosed figures, the tensioning means 43 comprise two elastic elements 44, each passing along the corresponding lateral face 25 of the retention element 20.

**[0082]** Preferably, each elastic element 44, for example obtained with a spring, comprises a first end 44' constrained to the retention element 20 and a second end 44'' constrained to the support body 19.

**[0083]** Advantageously, the elastic element 44 is configured for exerting an elastic force FE on the retention element 20 at a specific point of application PA of the retention element 20, defined for example by a first point of constraint in which the first end 44' of the elastic element 44 is constrained to the retention element 20.

**[0084]** Following the operating rotational-translation travel of the retention element 20, the point of application PA of the elastic force FE exerted by the elastic element 44 is moved between a positioning section TP, in which

the elastic force FE is adapted to move the retention element 20 towards the non-interference position (as illustrated in the embodiment of figure 8), and the aforesaid actuation section TA of the operating travel, in which the elastic force FE is adapted to move the retention element 20 towards the interference position (as illustrated in the embodiment of figure 9).

**[0085]** In particular, as discussed in detail hereinbelow, when the engagement element 15 intercepts the actuation portion 23 of the retention element 20, it moves the latter from the non-interference position by overcoming the action of the elastic force FE of the elastic element 44 up to bringing the point of application PA of such elastic force FE from the positioning section of the operating travel to the actuation section, in which the point of application PA of the elastic force FE is such that the latter moves the retention element 20 towards the interference position.

**[0086]** In particular, when the point of application PA of the elastic force FE is in the positioning section of the operating travel, the aforesaid elastic force FE determines a first moment on the retention element 20 able to rotate the latter towards the non-interference position, while when the point of application PA of the elastic force FE is in the actuation section of the operating travel, the elastic force FE determines a second moment on the retention element 20 (with sense opposite the first) able to rotate the retention element 20 towards the interference position. More in detail, when the follower portion 22 of the retention element 20 is engaged with the rotation section 35 of the guide profile 21, the follower portion 22 abuts against the rotation section 35 in at least one instantaneous engagement point, around which the rotary component of the movement of the retention element 20 occurs instant by instant. Of course, such engagement point of the rotation section 35 is susceptible of changing during the movement of the follower portion 22 on the guide profile 21.

**[0087]** Following the operating travel of the retention element 20, the point of application PA of the elastic force FE exerted by the elastic element 44 is moved from one side to the other side of the aforesaid engagement point, in which such sides are defined by a line parallel to the first extension direction Y (in particular vertical) and passing through the engagement point.

**[0088]** More in detail, in the actuation section TA of the operating travel, the point of application PA is on a first side of the engagement point (in particular directed towards the rear side 19B of the support body 19) in a manner such that the elastic force FE determines the aforesaid first moment able to rotate the retention element 20 in a first rotation sense R1 towards the interference position.

**[0089]** In the positioning section of the operating travel, the point of application PA is on a second side of said engagement point (in particular directed towards the front side 19A of the support body 19), opposite the first side, in a manner such that the elastic force FE determines

the second moment able to rotate the retention element 20 in a second rotation sense R2, opposite the aforesaid first rotation sense R1, towards the non-interference position.

**[0090]** In particular, when the point of application PA is on the aforesaid first side, the corresponding arm of the elastic force FE is extended on such first side, determining the first moment which pushes the retention element 20 to rotate in the first rotation sense R1. When the point of application PA is on the aforesaid second side, the corresponding arm of the elastic force FE is extended on such second side, determining the second moment which pushes the retention element 20 to rotate in the second rotation sense R2.

**[0091]** In particular, with reference to the embodiments of the enclosed figures, the point of passage between the positioning section TP and the actuation section TA of the operating travel is identified by the point of the operating travel vertically aligned with the instantaneous engagement point of the follower portion 22 on the guide profile 21.

**[0092]** Advantageously, the retention element 20 of each locking element 18 comprises an abutment portion 45 which, when the retention element 20 is in the non-interference position, is in abutment against an abutment portion 46 of the support body 19, so as to stop the retention element 20 in such position, in particular by blocking a further advancement thereof in the second rotation sense R2.

**[0093]** Advantageously, the support body 19 is provided with a guide track 48 which is extended starting from the abutment portion 46 and in which the constraining portion 45 is slidably inserted in order to allow the movement of the retention element 20 between the non-interference position and the interference position. In particular, such guide track 48 comprises a rectilinear section, parallel to the first extension direction Y of the corresponding lateral guideway 7, and a connection section, preferably curved, placed to connect between the abutment portion 46 and the aforesaid rectilinear section.

**[0094]** In operation, with reference to figures 10a, 10b, when the retention element 20 is in the non-interference position, the first end 22A of the follower portion 22 abuts against the third concave segment 40 of the rotation section 35 of the guide profile 21. In addition, the point of application PA of the retention element 20 is on the first side (on the left in the embodiment of figures 10a, 10b) of the instantaneous engagement point of the first end 22A of the follower portion 22 on the rotation section 35 of the guide profile 21, in a manner such to force the retention element 20 to remain in the non-interference position (in particular pushing it in the second rotation sense R2 in abutment against the abutment portion 46 of the support body 19). Following the descent of the bottom bar 6 downward (in order to unwind the fabric 5), the engagement element 15 enters into the shaped path 30 of the support body 19 and is guided (through its guide portion 31) to pass between the coupling portion 24 (with-

out interfering with the latter) and the actuation portion 23 of the retention element 20 up to encountering such actuation portion 23.

**[0095]** As illustrated in the embodiment of figures 11a, 11b, the abutment of the engagement element 15 against the actuation portion 23 of the retention element 20 rotates the latter in the first rotation sense R1 (clockwise in figures 11a, 11b), whose movement is guided by the sliding of the first end 22A of the follower portion 22 on the third concave segment 40 of the rotation section 35 of the guide profile 21 and by the abutment of the side 22C of the follower portion 22 against the convex segment 39 of the rotation section 35.

**[0096]** In particular, the action of the engagement element 15 determines a moment on the retention element 20 which overcomes the first moment determined by the elastic element 44, in a manner such to move the point of application PA from the positioning section TP of the operating travel to the actuation section TA, in which the elastic force FE, acting downward, drives the retention element 20 towards the interference position and downward.

**[0097]** More in detail, following the aforesaid rotation, the point of application PA is moved from the positioning section TP of the operating travel to the actuation section TP, passing from the first side (on the left in the enclosed figures) to the second side (on the right in the enclosed figures) of the instantaneous engagement point of the follower portion 22 on the guide profile 21. Consequently, the second moment generated by the elastic force FE also forces the retention element 20 to rotate in the first rotation sense R1 and subsequently downward as described hereinbelow.

**[0098]** With reference to the embodiment of figures 12a, 12b, the rotation-translation of the retention element 20, forced by the elastic elements 44, continues as it is guided by the first end 22A of the follower portion 22 which slides on the fourth concave segment 41 of the rotation section 35 of the guide profile 21, continuing to rotate the retention element 20 in the aforesaid first rotation sense R1 and simultaneously allowing a descent downward thereof, up to bringing the coupling portion 24 in abutment against the engagement element 15.

**[0099]** Hereinbelow, with reference to the embodiment of figures 13a, 13b, the follower portion 22 of the retention element 20 enters into the translation section 36 of the guide profile 21 and slides with a side 22C thereof along such translation section 36 in a manner such to guide the translation movement of the retention element 20 downward, preferably parallel to the first extension direction Y of the lateral guideways 7. In this manner, the retention element 20 reaches the interference position, in which, following the force exerted by the elastic elements 44, it pushes the engagement element 15 (and hence the bottom bar 6) downward, maintaining the fabric 5 under tension in the extended position.

**[0100]** Advantageously, the support body 19 is provided with an end stop portion 52 which receives the reten-

tion element 20 (and in particular its coupling portion 24) in abutment, being opposed to the action of the elastic elements 44, in a manner such to block the descent of the retention element 20 in the interference position.

**[0101]** Advantageously, the engagement of the bottom bar 6 (in accordance with that described above) under tension can be obtained by setting a single end stop of the motor (which actuates the take-up roller 4) at a position in which the engagement element 15 intercepts the actuation portion 23 of the retention element 20, bringing the latter into the interference position. This leads to considerable technological simplification of the motor, with consequent production cost savings.

**[0102]** In addition, since the bottom bar 6 is pulled downward by the retention element 20, it is possible to maintain the bottom bar 6 very close to the base of the opening A, preventing the formation of wide slits and allowing the use of balloon-like gaskets of thin thickness on the bottom bar 6 itself.

**[0103]** When the motor actuates the take-up roller 4 to bring the fabric 5 into collected position, the bottom bar 6 is actuated to be moved upward and, by acting in abutment against the actuation portion 24 of the retention element 20, it pushes the latter upward up to bringing the second end 22B of the follower portion 22 of the retention element 20 in abutment against the first concave segment 37 of the rotation section 35 of the guide profile 21 of the support body 19, as illustrated in the embodiment of figure 14.

**[0104]** Subsequently, with reference to the embodiment of figure 15, the engagement element 15 rotates the retention element 20 in the second rotation sense R2 (counter-clockwise in the embodiment of figure 15), moving the follower portion 22 up to bringing the first end 22A thereof in abutment against the third concave segment 40 of the rotation section 35 of the guide profile 21.

**[0105]** Then, with reference to the embodiment of figure 16, the ascending engagement element 15 rotates the retention element 20 in the second rotation sense R2 up to returning the point of application PA into the positioning section TP of the operating travel. In such positioning section, the elastic element 44 determines the first moment which forces the retention element 20 to rotate for an extra-travel of rotation in the second rotation sense R2 towards the non-interference position, in particular up to bringing the abutment portion 45 of the retention element 20 against the abutment portion 46 of the support body 19.

**[0106]** The engagement element 15, ascending along the shaped path 30 of the support body 19, reaches the first tilted section 34 and then exits from the locking element 18 through the inlet section 32 of the shaped path 30 in a manner such to allow the bottom bar 6 to re-ascend towards the rolling-shutter box 3.

**[0107]** Preferably, the upper portion 50 of the engagement element 15 is on the front part provided with a flared section 50' which, abutting against the internal side 24' of the coupling portion 24 of the retention element 20,

causes the rotation of the latter and simultaneously allows the re-ascending of the engagement element 15 along the first tilted section 34 of the shaped path 30. Advantageously, with reference to the example of figures 17a-17b, when the retention element 20 is in the interference position, the external side 24" of the coupling portion 24, in particular directed towards the front side 19A of the support body 19, delimits a bypass section 49 in the shaped path 30 of width such to be traversed by the engagement element 15 in order to allow the latter to be positioned below the coupling portion 24 of the retention element 20.

**[0108]** If the retention element 20 passes into the interference position before the bottom bar 6 (and hence the engagement element 15) reaches the locking element 18, the aforesaid bypass channel 49 allows a user to force the descent of the bottom bar 6 up to bringing the engagement element 15 below the coupling portion 24 of the retention element 20, without risking damage of any component of the blind 1.

**[0109]** In particular, if the engagement element 15, following the descent of the bottom bar 6, is stopped above the retention element 20 in interference position, as illustrated in the embodiment of figure 17a, the user, by acting for example with a foot on the bottom bar 6, can push the engagement element 15 to continue to descend along the shaped path 30 of the support body 19, passing through the bypass section 49, as illustrated in figures 17b-17d.

**[0110]** Advantageously, the shaped path 30 is provided, below the aforesaid bypass section 49, with a second tilted section 51 which is extended towards the rear side 19B of the support body 19 in a manner so as to guide the guide portion 31 (and the corresponding slider 16) of the engagement element 15 to slide along the second extension direction Z in order to bring the latter below the coupling portion 24 of the retention element 20.

## Claims

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

- a support frame (2) intended to be fixed to a load-bearing element in which an opening (A) is made;
- a take-up roller (4) rotatably constrained to said support frame (2), having a substantially horizontal rotation axis (X), and intended to be positioned above said opening (A);
- two lateral guideways (7) extended parallel to one another and side-by-side each other along respective first extension directions (Y) substantially orthogonal to the rotation axis (X) of said take-up roller (4), and intended to be arranged along respective sides of said opening (A);
- a fabric (5) extended between an upper edge thereof fixed to said take-up roller (4) and a lower

edge thereof, and susceptible of sliding between said lateral guideways (7);

- a bottom bar (6) fixed to the lower edge of said fabric (5) and extended, along a second extension direction (Z) parallel to the rotation axis (X) of said take-up roller (4), between two lateral terminations (14) thereof that are slidably engaged with the corresponding lateral guideways (7);

- movement means mechanically connected to said take-up roller (4) and adapted to rotate said take-up roller (4) in order to move said fabric (5) between a collected position, in which said fabric (5) is wound around said take-up roller (4), and an extended position, in which said fabric (5) is at least partially unwound from said take-up roller (4) extended between said lateral guideways (7) to at least partially cover said opening (A);

- two engagement elements (15) mounted on said bottom bar (6) and each positioned at a respective said lateral termination (14);

- two locking elements (18), each of which is fixed to a corresponding said lateral guideway (7) and is arranged for constraining a corresponding said engagement element (15) when said fabric (5) is in said extended position;

wherein each said locking element (18) comprises:

- a support body (19);  
- a retention element (20) constrained to said support body (19), movable between a non-interference position and an interference position, and comprising a coupling portion (24) which, when said retention element (20) is in said interference position, acts in abutment against said engagement element (15) in order to constrain the corresponding lateral termination (14) of said bottom bar (6) to said locking element (18);

said blind (1) being **characterized in that**:

- said support body (19) is provided with a cam guide profile (21);  
- said retention element (20) comprises:

- a follower portion (22) engaged with said guide profile (21), which defines at least one operating rotational-translation travel of said retention element (20) between said position of non-interference and said position of interference;  
- an actuation portion (23) which, when said retention element (20) is at least in said non-interference position, is susceptible of interfering against said engagement element (15) in order to force said retention element

(20) to be moved towards said interference position according to said operating rotational-translation travel.

5 2. Blind (1) according to claim 1, **characterized in that** said locking element (18) comprises tensioning means (43) acting against said retention element in order to force, at least in said interference position, said coupling portion (24) against said engagement element (15).

10 3. Blind (1) according to claim 2, **characterized in that** said tensioning means (43) comprise at least one elastic element (44) mechanically connected to said retention element (20) and loaded for moving, at least in an actuation section (TA) of said operating travel, said retention element (20) towards said interference position.

15 4. Blind (1) according to claim 3, **characterized in that** said elastic element (44) is configured for exerting, on said retention element (20), an elastic force (FE) at a point of application (PA) of said retention element (20), and such application point (PA) is movable, following said operating travel, between said actuation section (TA) of said operating travel, in which said elastic force (FE) is able to move said retention element (20) towards said interference position, and a positioning section (TP) of said operating travel, in which said elastic force (FE) is able to move said retention element (20) towards said non-interference position.

20 5. Blind (1) according to any one of the preceding claims, **characterized in that** said guide profile (21) comprises:

- a rotation section (35) provided at least with a curved segment and configured for determining at least one rotation of said follower portion (22);  
- a translation section (36) which is linearly extended according to a slide direction having at least one component parallel to said first extension direction (Y) in order to cause at least one sliding of said follower portion (22) along said slide direction.

25 6. Blind (1) according to claims 4 and 5, **characterized in that** said follower portion (22) is susceptible of being engaged with the rotation section (35) of said guide profile (21) in at least one instantaneous engagement point of said rotation section (35); in which said point of application (PA) in said actuation section (TA) is positioned on a first side of said instantaneous engagement point, so that said elastic force (FE) determines a first moment able to rotate said retention element (20) in a first rotation sense (R1) towards said interference position;

wherein said point of application (PA) in said positioning section (TP) is positioned on a second side of said instantaneous engagement point, opposite said first side, so that said elastic force (FE) determines a second moment able to rotate said retention element (20) in a second rotation sense (R2), opposite said first rotation sense (R1), towards said non-interference position. 5

7. Blind (1) according to claim 5 or 6, **characterized in that** said translation section (36) is placed at a lower height than said rotation section (35). 10

8. Blind (1) according to any one of the preceding claims 5 to 7, **characterized in that** the slide direction of said translation section (36) is substantially parallel to said first extension direction (Y). 15

9. Blind (1) according to any one of the preceding claims, **characterized in that** said engagement element (15) is provided with an upper portion (50) against which the coupling portion (24) of said retention element (20) abuts in said interference position in order to push said bottom bar (6) downward. 20

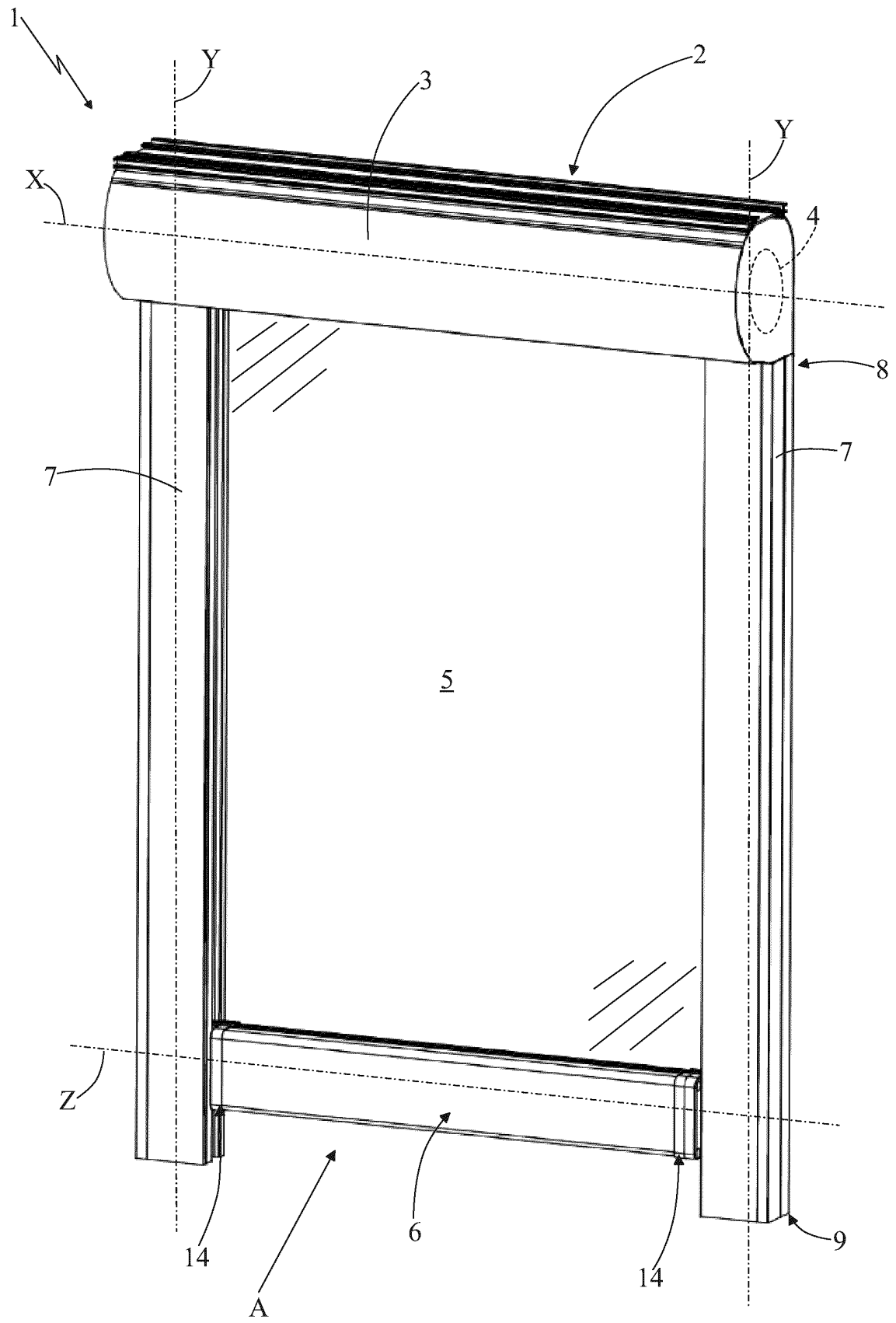
10. Blind (1) according to any one of the preceding claims, **characterized in that** said support body (19) is provided with a shaped path (30) in which said engagement element (15) is susceptible of passing; wherein the coupling portion (24) of said retention element (20) is provided with an external side (24") which, in said interference position, delimits a bypass section (49) of said shaped path (30) having width such to be traversed by said engagement element (15) in order to allow said engagement element (15) to be positioned below the coupling portion (24) of said retention element (20). 25 30 35

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**Fig. 1**

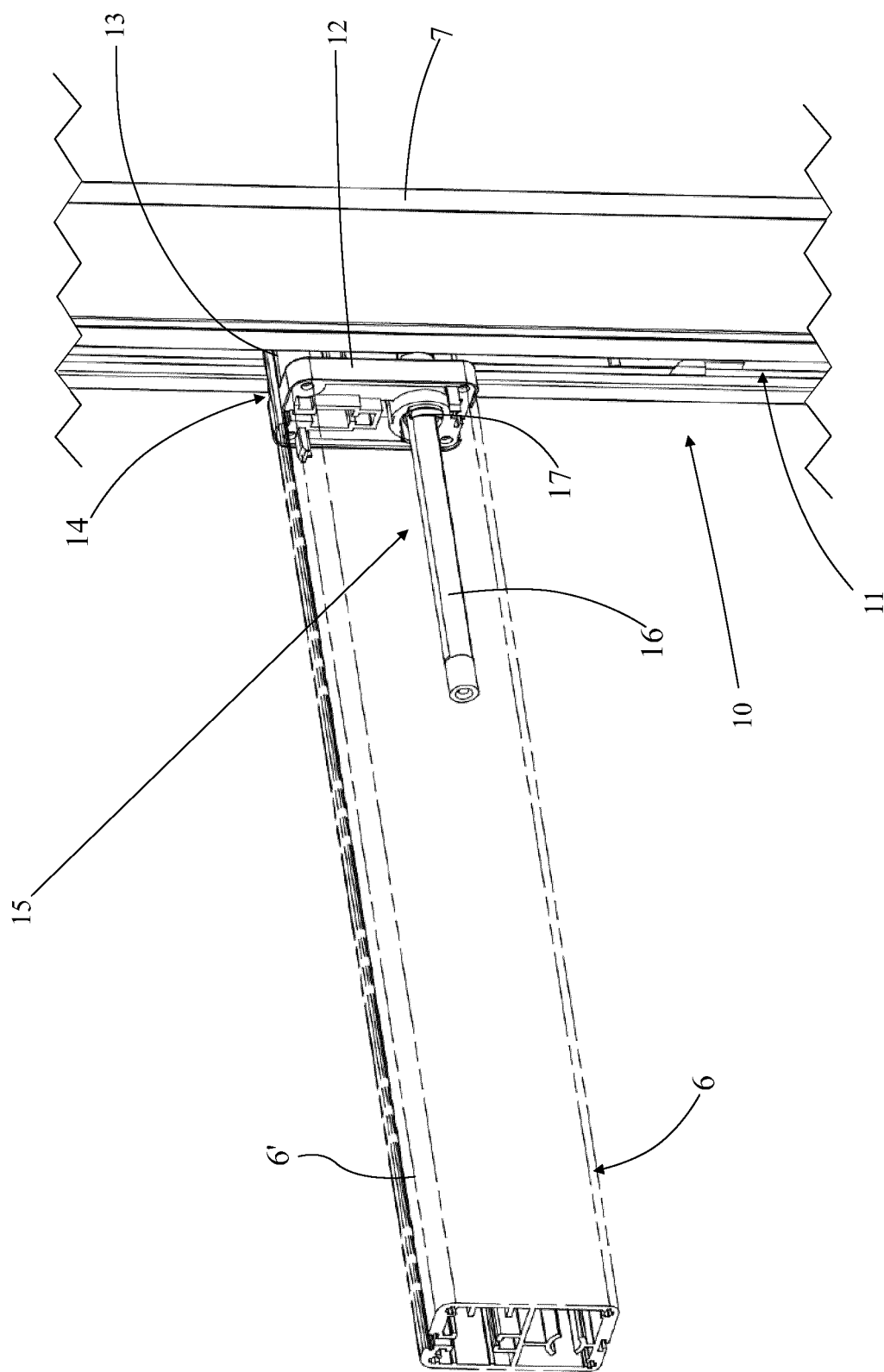
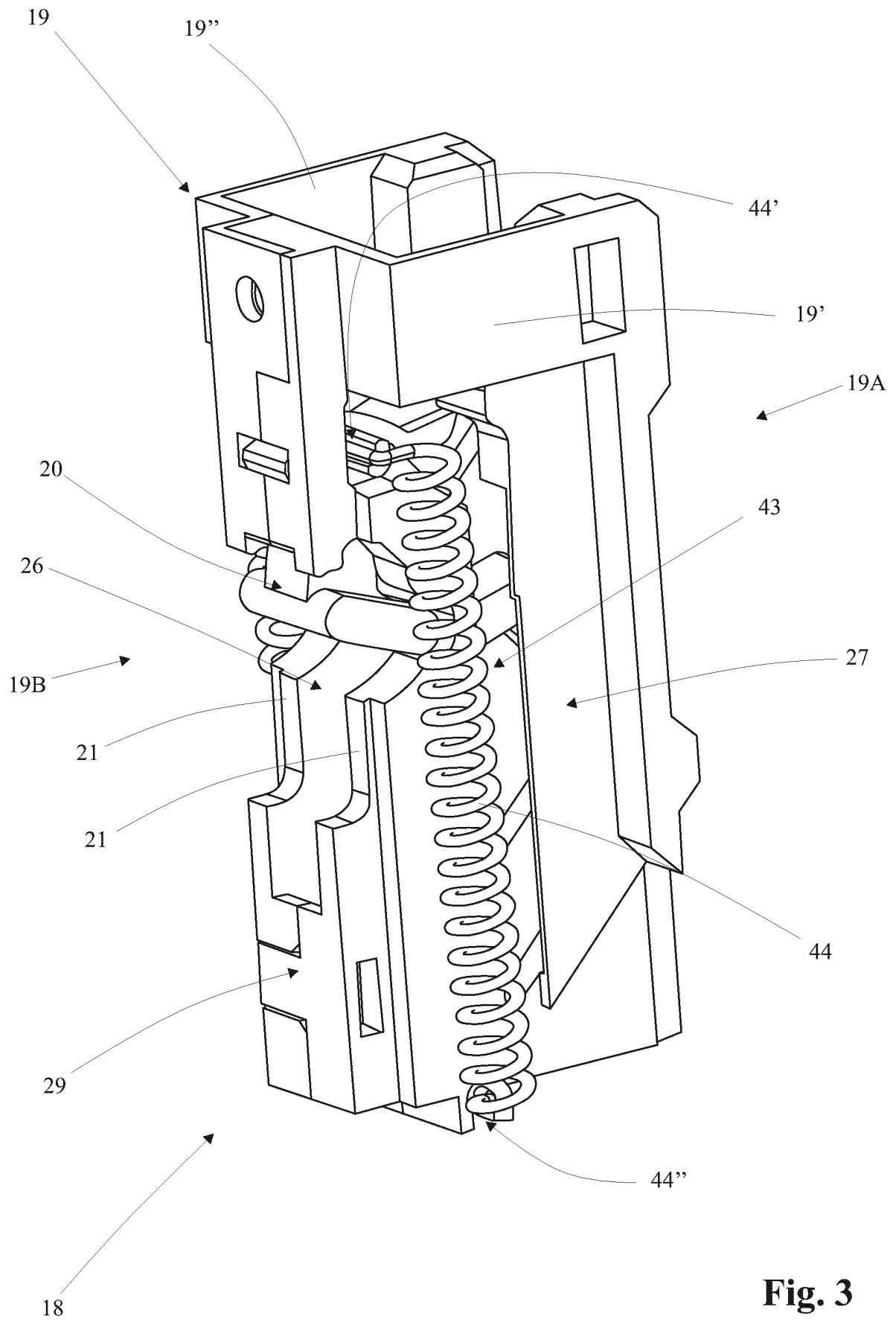
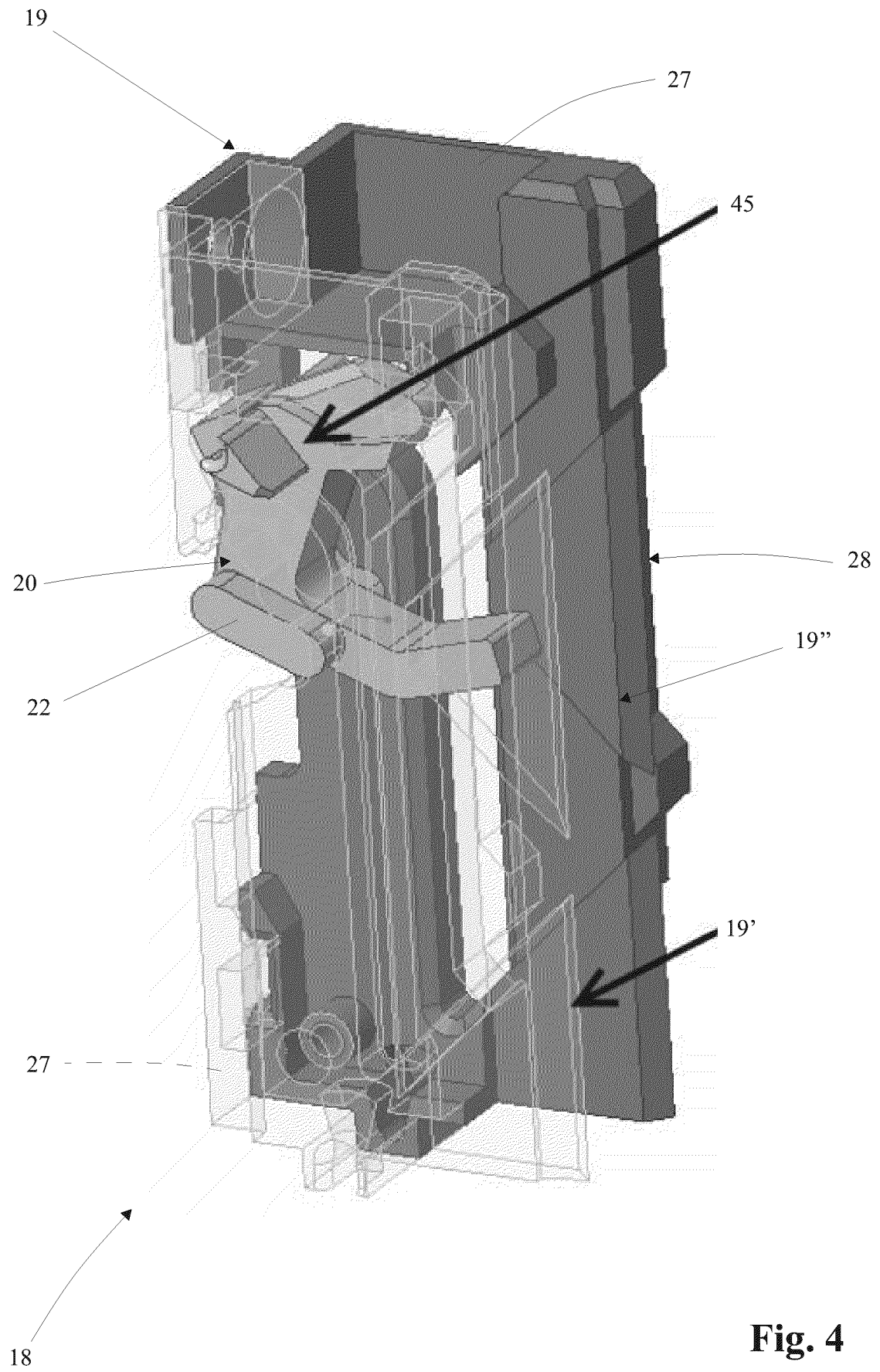
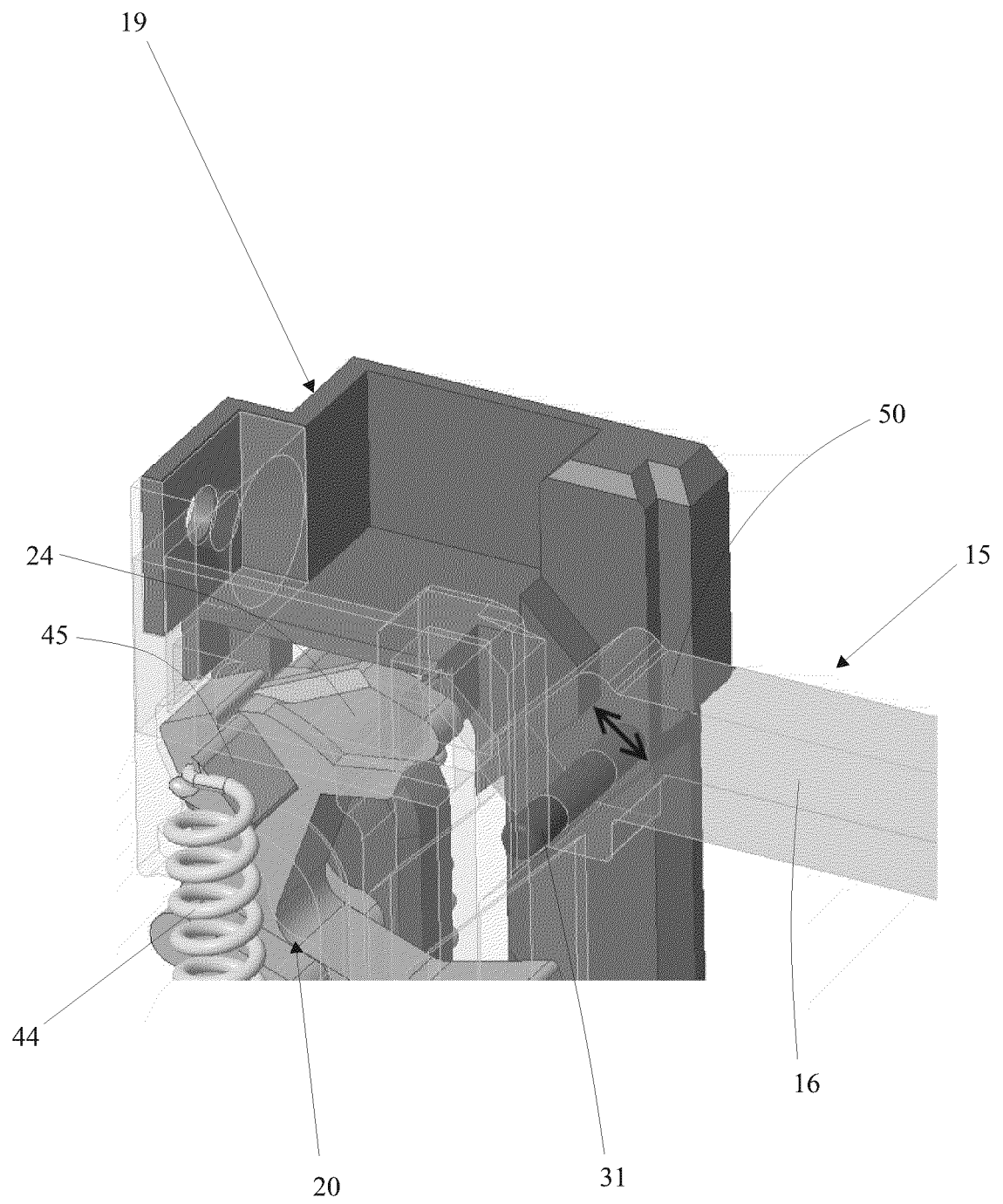


Fig. 2

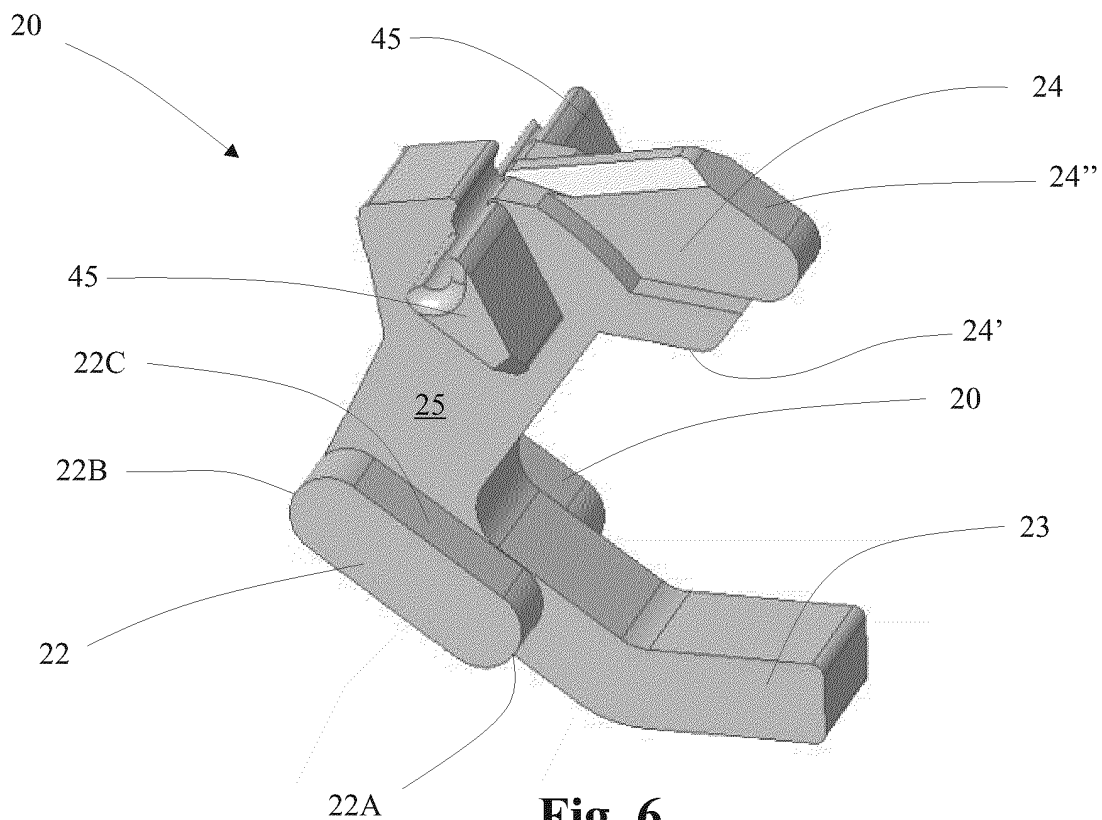


**Fig. 3**

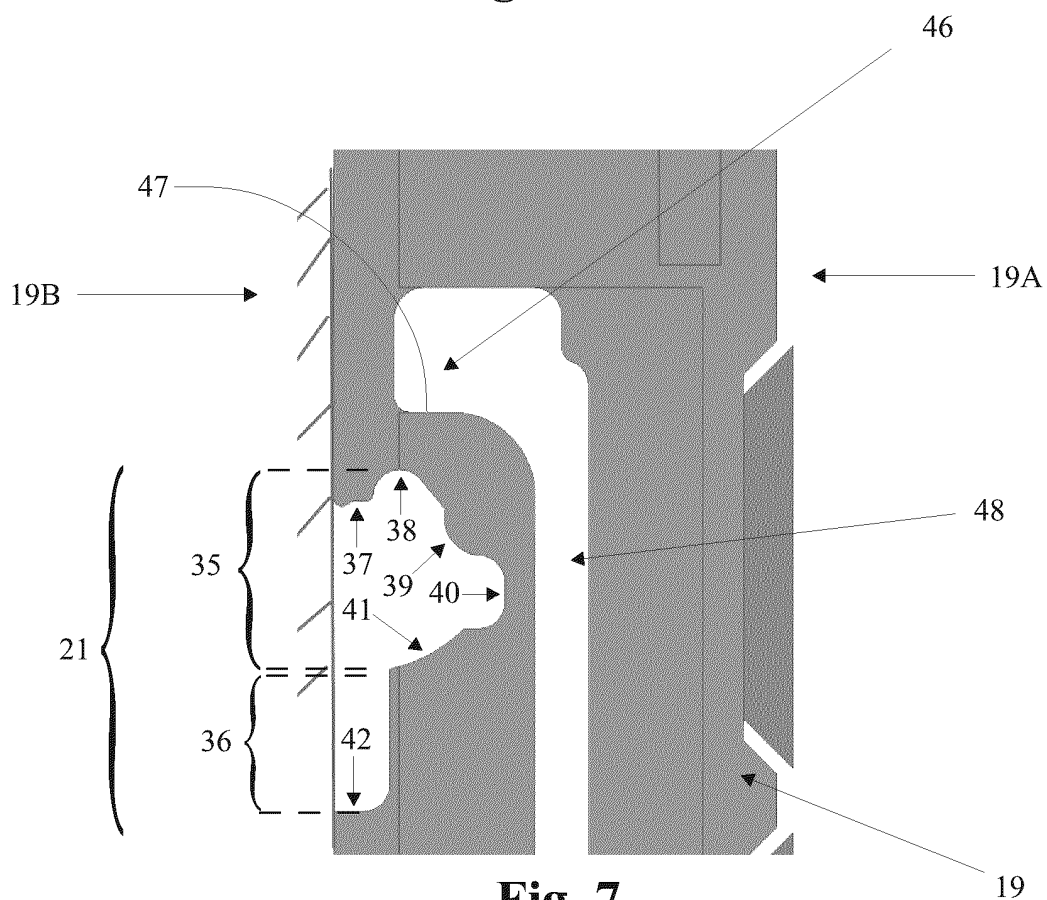




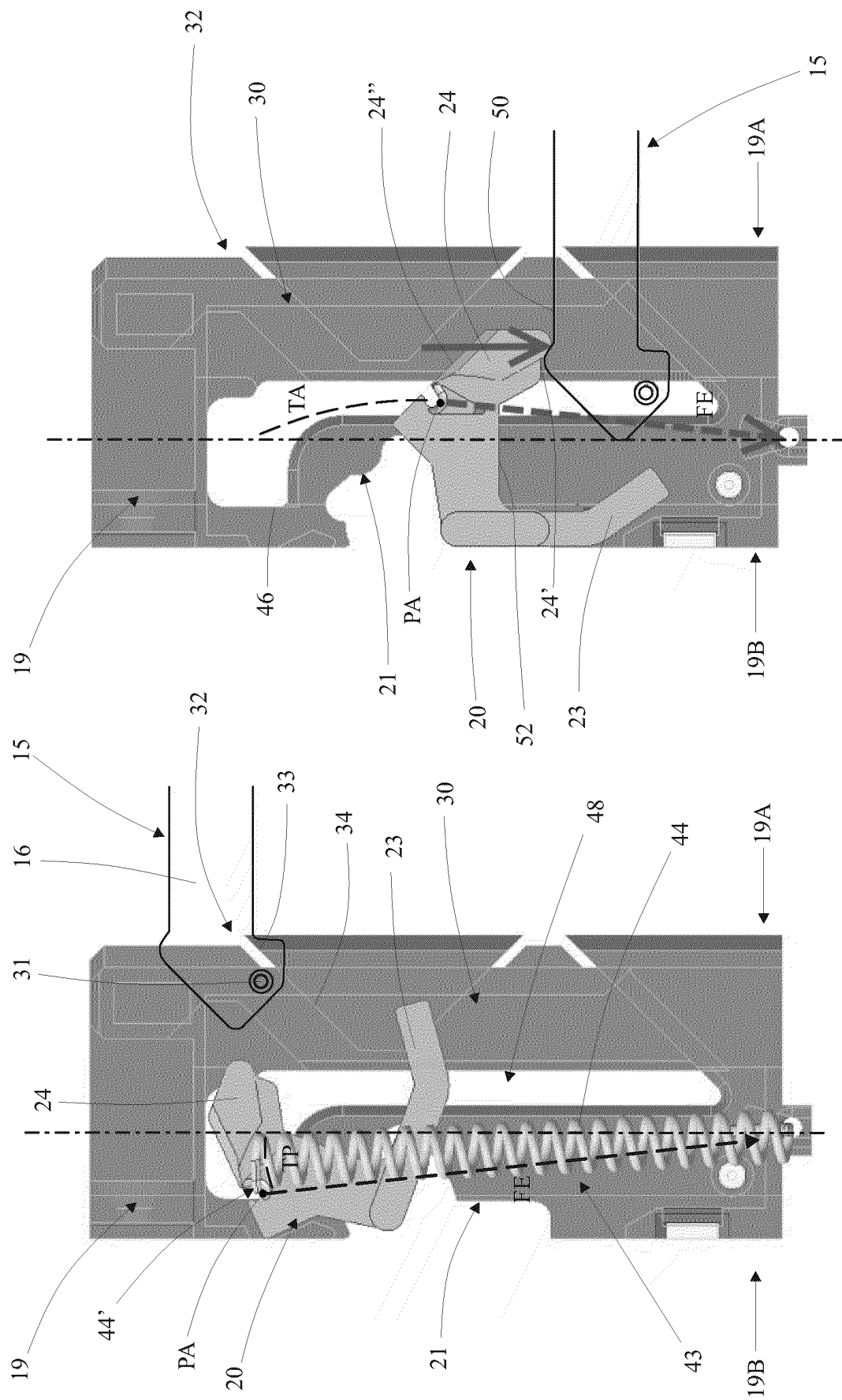
**Fig. 5**



**Fig. 6**

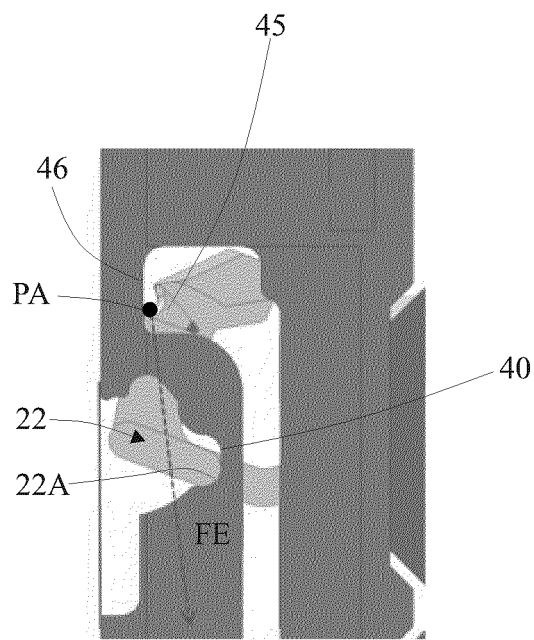


**Fig. 7**

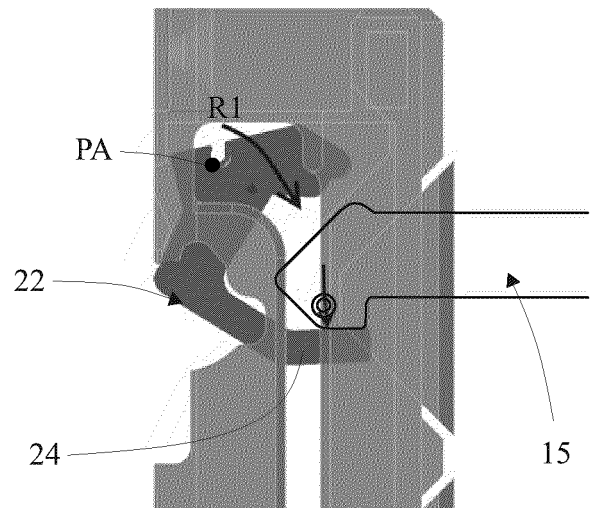


Fi. 9

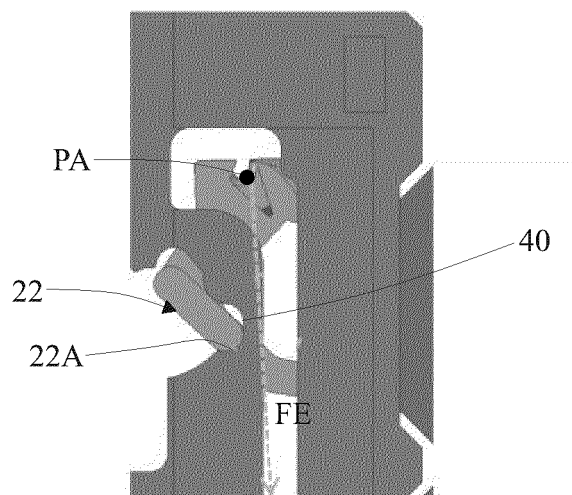
**Fi. 8**



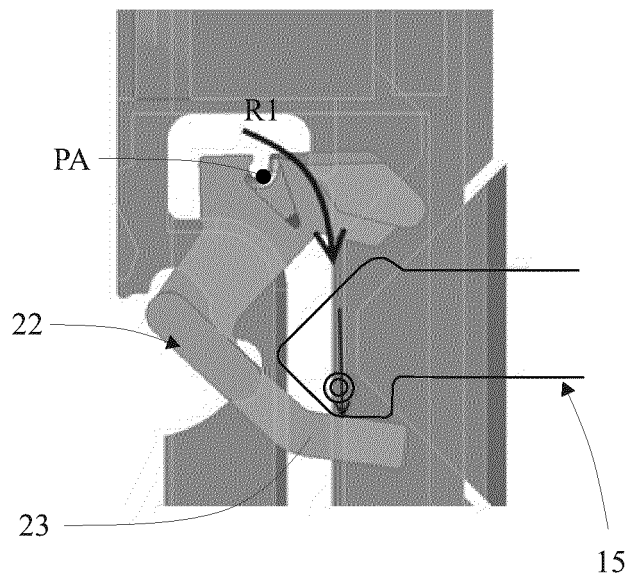
**Fig. 10a**



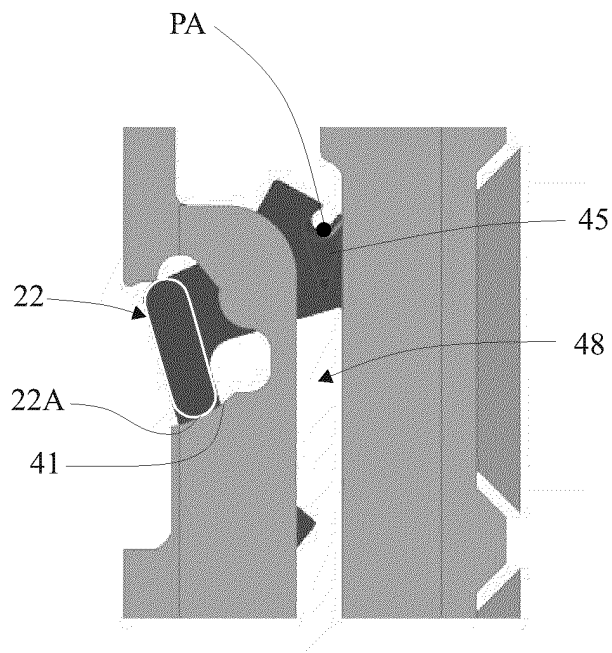
**Fig. 10b**



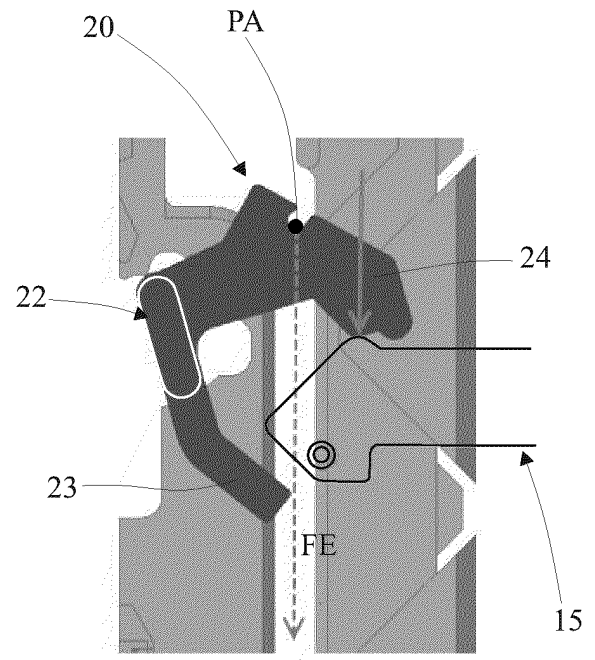
**Fig. 11a**



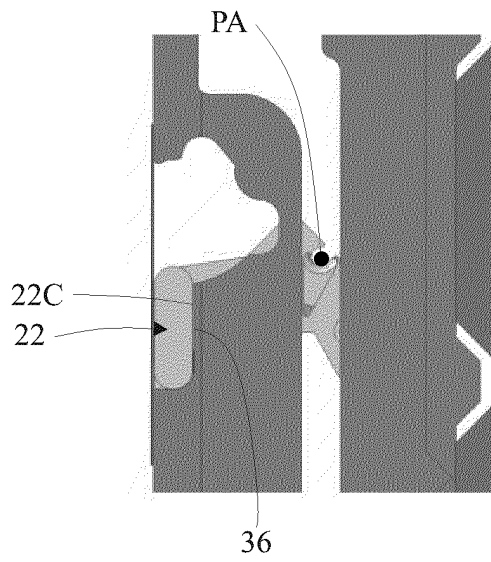
**Fig. 11b**



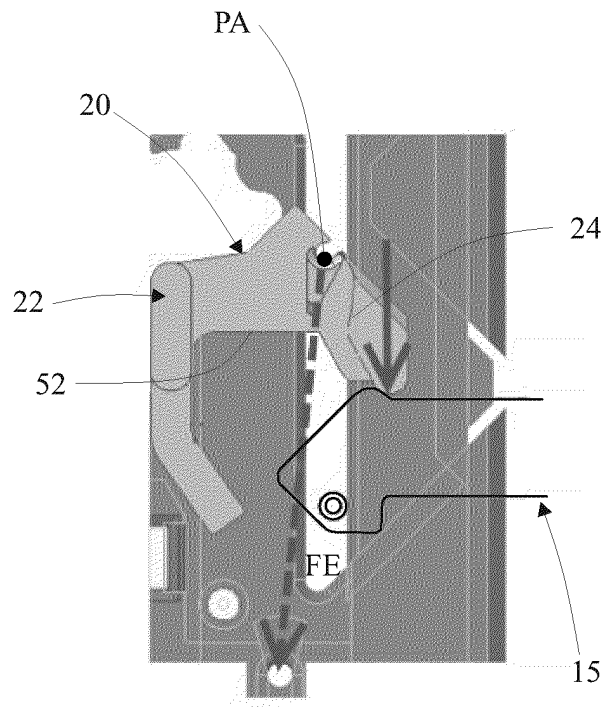
**Fig. 12a**



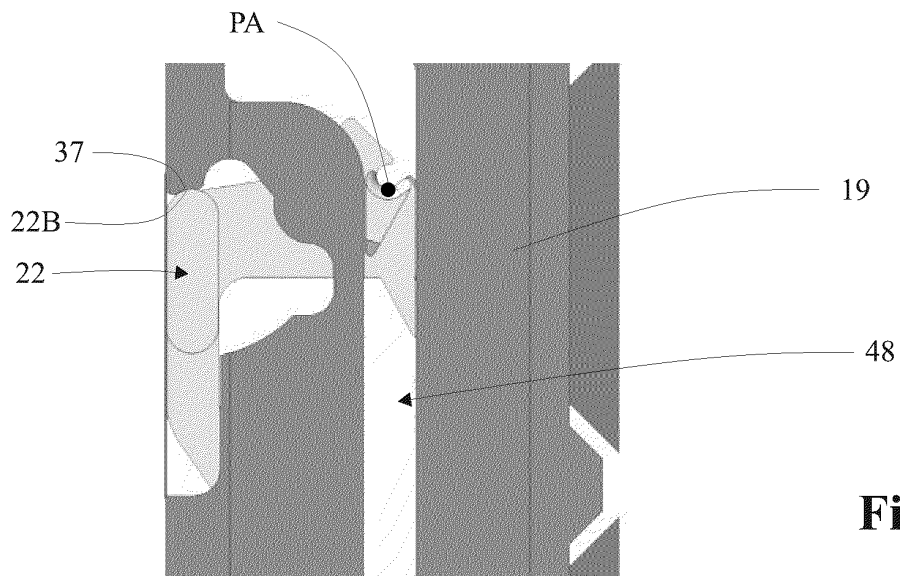
**Fig. 12b**



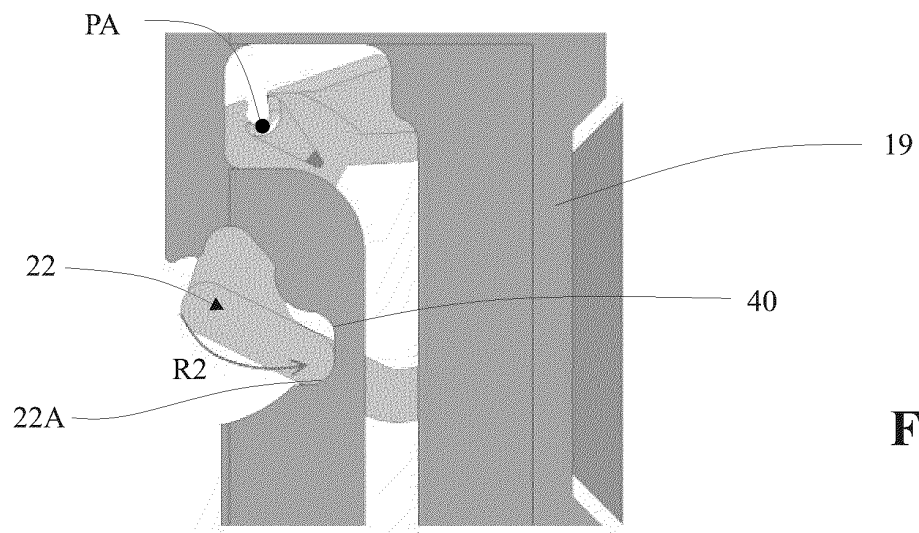
**Fig. 13a**



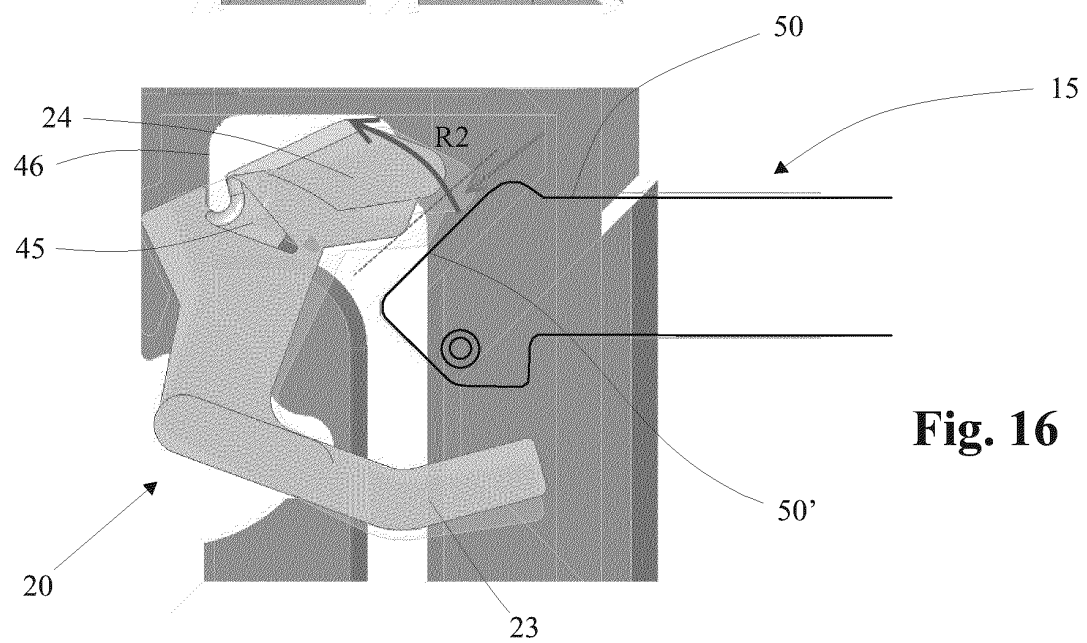
**Fig. 13b**



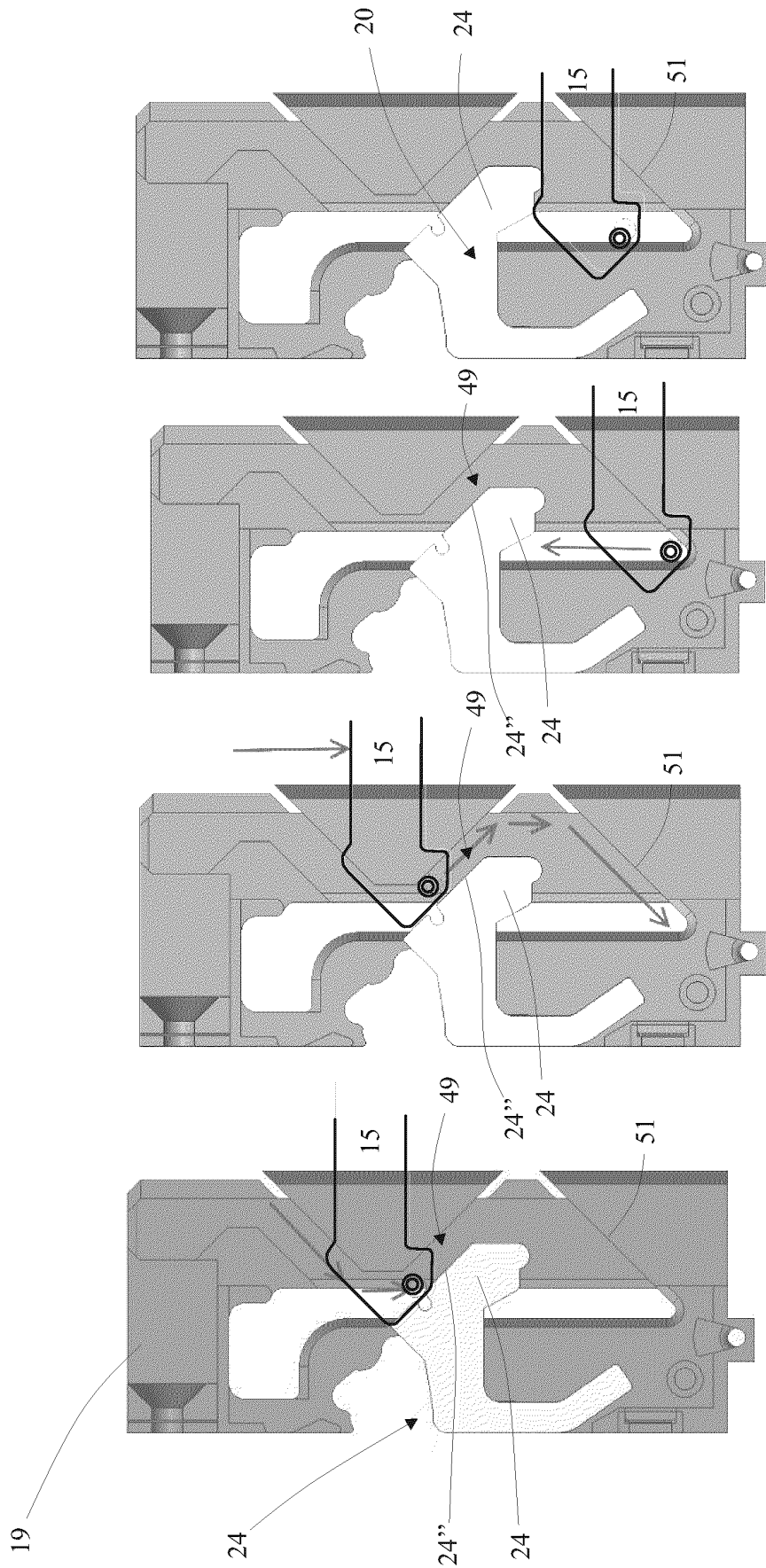
**Fig. 14**



**Fig. 15**



**Fig. 16**



**Fig. 17a**

**Fig. 17b**

**Fig. 17c**

**Fig. 17d**



## EUROPEAN SEARCH REPORT

Application Number  
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| DOCUMENTS CONSIDERED TO BE RELEVANT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                               |                                                            |                                          |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------------|
| Category                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Citation of document with indication, where appropriate, of relevant passages                 | Relevant to claim                                          | CLASSIFICATION OF THE APPLICATION (IPC)  |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | IT UB20 156 296 A1 (GIBUS S P A)<br>4 June 2017 (2017-06-04)<br>* the whole document *        | 1-10                                                       | INV.<br>E06B9/86<br>E06B9/42<br>E06B9/80 |
| A                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | EP 3 000 958 A1 (PALAGINA S R L [IT])<br>30 March 2016 (2016-03-30)<br>* the whole document * | 1-10                                                       |                                          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                               |                                                            | TECHNICAL FIELDS SEARCHED (IPC)          |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                               |                                                            | E06B                                     |
| The present search report has been drawn up for all claims                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                               |                                                            |                                          |
| Place of search<br><b>Munich</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                               | Date of completion of the search<br><b>29 January 2020</b> | Examiner<br><b>Altamura, Alessandra</b>  |
| <p>CATEGORY OF CITED DOCUMENTS</p> <p>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</p> <p>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/>&amp; : member of the same patent family, corresponding document</p> |                                                                                               |                                                            |                                          |

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ON EUROPEAN PATENT APPLICATION NO.**

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29-01-2020

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| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|-------------------------------------------|----|---------------------|----------------------------|---------------------|
| IT UB20156296                             | A1 | 04-06-2017          | -----                      |                     |
| EP 3000958                                | A1 | 30-03-2016          | NONE                       |                     |
| -----                                     |    |                     |                            |                     |

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**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

- EP 3000958 A [0016]
- IT 102015000080419 [0024]