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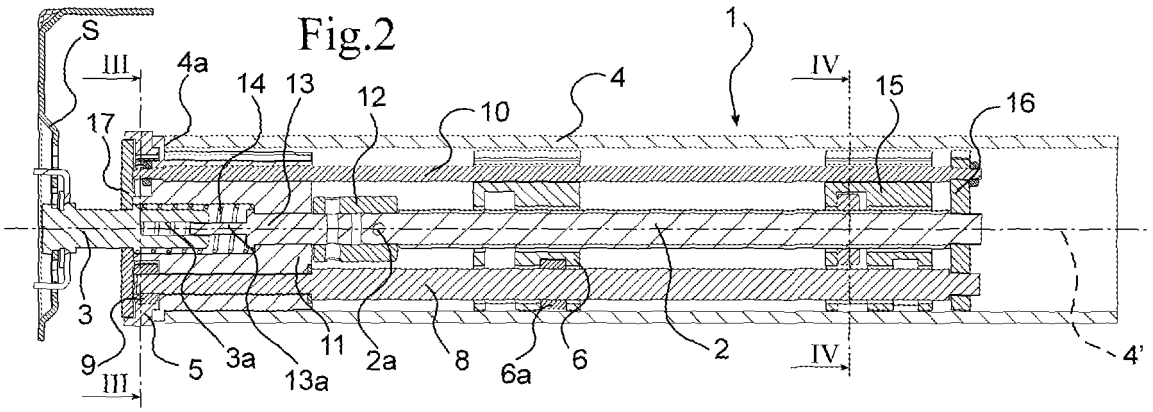
(54) **Winding roller**

(57) Winding roller, preferably adapted to be used as a roller blind device, comprising:
- a winding tube (4);
- support means (2, 3) of said winding tube, said winding tube being pivotally mounted around its own axis on said support means (2, 3);
- end stroke (6) adapted to define a rotational movement block of the winding tube (4) around said axis, said end stroke means (6) being provided within said winding tube (4),

characterized in that adjustment means (5, 8) of said end stroke means are provided, said adjustment means (5, 8) interfacing with the outside of said winding tube (4).

Fig.2



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Description

[0001] The present invention relates to a winding roller, preferably to be used as a roller blind device.

[0002] Winding rollers used in roller blinds are known in the art, of the type comprising:

- a winding tube;
- support means of said winding tube, said winding tube being pivotally mounted around its own axis on said support means;
- end stroke means adapted to define the rotational movement block of the winding tube around said axis, said end stroke means being provided within the said winding tube.

[0003] According to the known art, the winding rollers have end stroke means that can be adjusted only once they have been extracted from the winding tube containing them. When the winding roller is installed, for example, to be used as a roller blind device, the extracting operation of the end stroke means from the winding tube is quite inconvenient and complicated. In fact, in such a case, the winding roller is initially in such a position that it is difficult to handle it easily, and the winding roller itself is weighed down and obstructed by the blind panel wound onto it and by means adapted to allow the winding roller installation.

[0004] It is an object of the present invention to solve the above-mentioned drawbacks, providing a winding roller having a simple structure in which the end stroke means can be adjusted from outside the winding tube. The above-mentioned object is obtained with a winding roller having the characteristics according to preamble of claim 1 and characterized in that it includes adjustment means of said end stroke means, said adjustment means interfacing with the outside of said winding tube. According to a preferred embodiment, said end stroke means can be adjustable using an adjustment ring nut which is disposed at one end of the winding tube, which is pivotally movable relative to the latter and which is provided with a cylindrical seizable portion, coaxial to the winding tube.

[0005] Further characteristics and advantages will become apparent with reference to the attached drawings, provided by way of non-limitative example, in which:

- Figure 1 is a perspective view of the winding roller according to the invention in which the winding tube is shown partially to display the inside of the roller;
- Figure 2 is a partial cross sectional view along a longitudinal plane of the winding roller according to the invention;
- Figure 3 is a sectional view according to the line III-III of Figure 2;
- Figure 4 is a sectional view according to the line IV-IV of Figure 2.

[0006] In figures 1 and 2 a winding roller is shown according to the invention, designed with the reference numeral 1.

[0007] The winding roller 1 comprises a winding roller 4 extending according to a substantially horizontal direction (with reference to Figure 2) and that is pivotally mounted around its own axis 4' through a cap 11, integral with it, on a fixing pin 3. The pin 3 extends in line with one end 4a of the winding tube, coaxially to and outside of the latter.

[0008] In Figure 2 only a part of the winding roller is shown (the left part with reference to Figure 2). The "missing" part includes a further support S, the same as that shown in Figures 2 and 3, and a conventional operating device, for example, with a chain or winch device, which is inserted within the winding tube 4, through which a user controls the rotation of the winding roller.

[0009] A bar 2 is disposed coaxially within the winding tube 4 and is restricted in its rotation to the fixing pin 3 at one of its ends 2a. Particularly, the end 2a of the bar 2 is connected to the fixing pin 3 through junction members made up of a joint 12 and a stick 13 respectively, in which the joint 12 integrally connects the bar 2 and the stick 13. The stick 13, crossing the cap 11, is restricted in its rotation to the fixing pin 3 through a shape connection constituted of a projection 13a of stick 13 which is inserted within a corresponding groove 3a provided in the fixing pin 3. Furthermore, the fixing pin 3 is translatable relative to the stick 13 with the projection 13a which moves within the groove 3a, and elastic means 14 are provided to keep pin 3 in an extracted position.

[0010] The bar 2 and the pin 3 act as support means for the winding roller according to the invention.

[0011] This specific configuration which provides the pin 3 translatable relative to the winding tube 4, is not restricting for the objects of the invention, but is, however, fairly advantageous as it makes the winding roller susceptible to being mounted on supports S with different axle base so that the installation process of the winding roller according to the invention becomes fairly quick and simple.

[0012] The bar 2 includes a portion having an external thread on which a slider 15 is mounted. As can be seen in Figure 4, the slider 15 includes a threaded portion 15a which screws together with the threaded portion of the bar 2, on which a plate 15b is mounted in a shape connection. The plate 15b has an upper hollow 15c within which a projection 4c of the winding tube 4 is provided, such that the slider 15 is integral in its rotation with the winding tube 4. Particularly, when the winding tube 4 is controlled in rotation, it drags the slider 15 in rotation, which, interacting through its threaded portion 15a of the bar 2, translates in turn relative to the bar 2. The type of thread of the nut thread screw coupling between the bar 2 and the slider 15 determines the respective directions of the rotational movement of winding tube 4 and the translation movement of the slider 15 in reciprocal agreement.

[0013] Within the winding tube 4, there is provided a

further bar 8 extending in a substantially parallel direction to the axial direction of the winding tube 4. The bar 8 has a threaded portion extending in a position and along a length substantially corresponding to those of the threaded portion of the bar 2. A locking element 6 is provided within the winding tube, restricted in rotation with the latter according to the methods already illustrated for the slider 15. Furthermore the locking element has a threaded part 6a that screws together with the threaded portion of the bar 8. The locking element 6 extends in a transversal direction within the winding tube 4 so that it intercepts the slider 15.

[0014] The bar 8 extends up to the end 4a of the winding tube where a gear wheel 9 is force fitted firmly onto the end of the bar 8. The gear wheel 9 is coupled with an adjustment ring nut 5 having internal gear teeth that cooperate with the external gear teeth of the wheel 9. The adjustment ring nut 5 has a substantially cylindrical conformation and is pivotally disposed and coaxially on the winding tube 4 at the end 4a of the latter. The adjustment ring nut 5 has a seizable portion 5a on the outside of the winding tube on a side surface of the ring nut 5. A plate 17, that can be seen in Figure 2, closes the opening of the end 4a of the winding tube 4.

[0015] When the adjustment ring nut 5 is turned by a user, it makes gear wheel 9 and bar 8 rotate, which in turn makes the locking element 6 translate and screw together with it.

[0016] With reference to Figure 2, the locking element 6 acts as a movement end stroke for the slider element 15 in the right to left translation direction. As described above, the rotational movement of the winding tube 4 and the translation movement of the slider 15 are reciprocally dependent, so that when the translation movement of the slider element 15 is locked by the locking element 6, the rotational movement in the corresponding direction (depending on the type of thread of the nut thread screw coupling between the bar 2 and the slider 15) of the winding tube 4 is also locked. Hence, it is understood that the locking element 6 acts as an effective end stroke element of the rotational movement of the winding tube 4.

[0017] A fixed retainer 16 is provided at the end of the bar 2 opposite to the locking element 6 relative to the slider 15, that constitutes a further end stroke of the slider 15 for the movement in the opposite direction relative to the movement intercepted by the locking element 6, and accordingly for the rotational movement of the winding tube in the corresponding direction.

[0018] As can be seen in Figure 2, following the adjustment of the ring nut 5, the locking element 6 can take on different positions in which it can intercept and block the slider 15 in any position of its translation stroke.

[0019] The translation stroke of the slider 15, and hence the number of rotations that can be carried out by the winding tube 4, are determined by the distance between the fixed retainer 11 and the locking element 6.

[0020] The winding roller according to the present invention also provides pins 10 for reinforcing the structure of the winding roller. The pins 10 extend from the cap 11 onto which they are fixed, in a substantially parallel direction to the axial direction of the latter, up to the fixed retainer 11.

[0021] Between the fixed retainer 11 and the slider 15, it is possible to include a further locking element, adjustable using adjustment means such as those provided for the locking element 6, and that provides a end stroke for the slider 15 and for the opposite direction of the movement to the movement intercepted by the locking element 6, and for the rotational movement of the winding tube 4 in the corresponding direction. Therefore, it is possible to provide two end stroke positions of the rotational movement of the winding tube 4, adjustable through respective adjustment means and that, by using the winding roller, correspond to two different degrees of winding of the blind onto the winding roller 1.

[0022] Naturally, various modifications to the construction aspects and the embodiments could be possible compared to the details described and illustrated without departing from the scope of the present invention, as described in the following claims.

Claims

1. Winding roller, preferably to be used as a roller blind device, comprising:

- a winding tube (4);
- support means (2, 3) of said winding tube, said winding tube being pivotally mounted around its own axis on said support means (2, 3);
- end stroke means (6) adapted to define a block of the rotational movement of the winding tube (4) around said axis, said end stroke means (6) being provided within said winding tube (4),

characterized in that adjustment means (5, 8) of said end stroke means are provided, said adjustment means (5, 8) interfacing with the outside of said winding tube (4).

2. Winding roller according to claim 1, **characterized in that** said adjustment means include an adjustment ring nut which is disposed at one end of the winding tube (4), pivotal around the latter.

3. Winding roller according to claim 1, **characterized in that** said adjustment ring nut (5) has a substantially cylindrical seizable portion which is coaxial with the winding tube.

4. Winding roller according to claim 1, **characterized in that** said support means (2, 3) comprise an elongated element (2) extending along a direction which is substantially coincident with said axis of said wind-

ing tube (4), said elongated element (2) comprising a threaded portion within the winding tube (4) on which an integral slider (15) is pivotally mounted rigidly with the winding tube (4) and to be screwed coupled with said threaded portion such that, following the rotation of said winding tube (4) said slider (15) translates relative to said elongated element (2).

5. Winding roller according to claim 4, **characterized in that** said end stroke means (6) comprise a translatable block (6) along said elongated element (2).

6. Winding roller according to claim 5, **characterized in that** said means of adjustment (5, 8) comprise a further elongated element (8) extending in a substantially parallel direction to said axis and which can rotate relative to said winding tube (4), said further elongated element (8) comprising a threaded portion within said winding tube (4) on which said block is mounted such that following the rotation of said further elongated element (8) said block (6) translates relative to said extended element (8).

7. Winding roller according to claim 6, **characterized in that** said further elongated element (8) can be controlled from the outside through a gear unit (9, 5).

8. Winding roller according to claim 7, **characterized in that** said gear unit comprises a gear wheel (9) force fitted onto one end of said further elongated element (8), said gear wheel cooperating with a corresponding toothed portion of said adjustment ring nut (5).

9. Winding roller according to claim 6, **characterized in that** said support means comprise a fixing pin (3) for fixing said roller, said pin being translatable relative to the winding tube (4) along a longitudinal direction of said tube between a retracted position and an extracted position, elastic means being provided for maintaining said pin in said extracted position.

10. Winding roller according to claim 8, **characterized in that** said threaded portion of said further elongated element (8) is extended in a position and along a length which substantially correspond to those of the threaded portion of the elongated element (2).

Fig.1

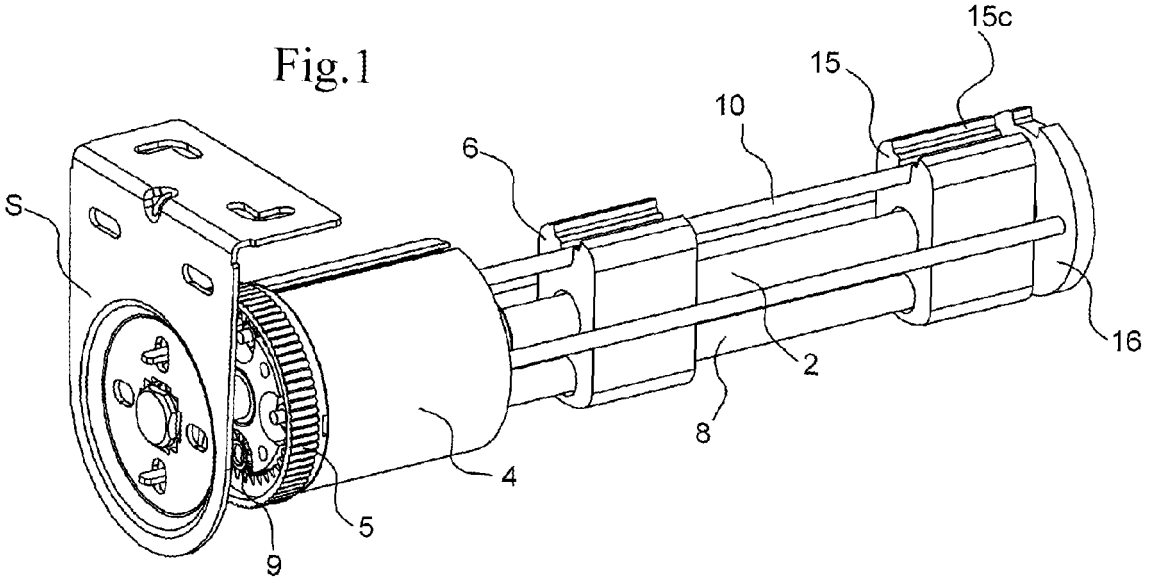
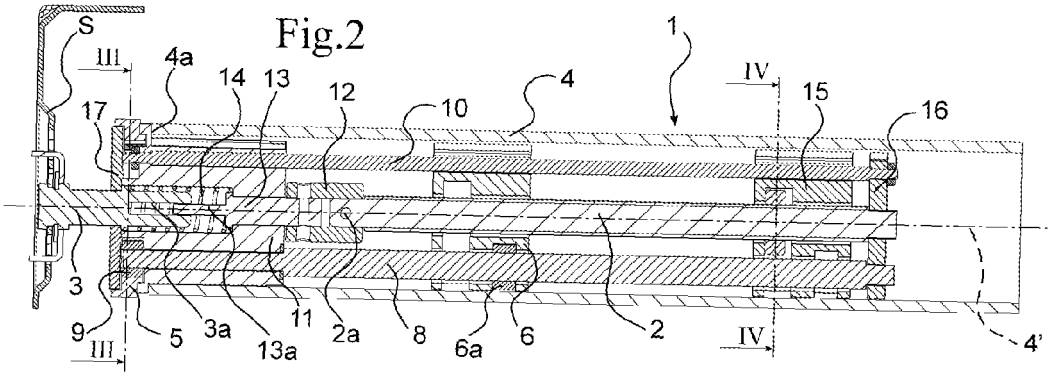


Fig.2



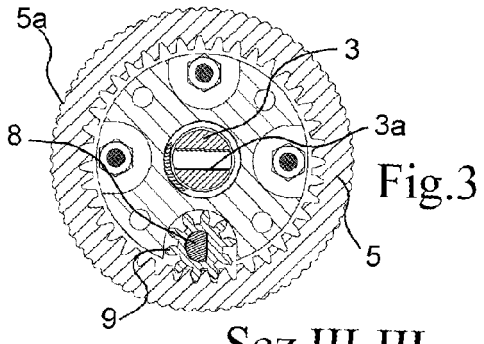


Fig.3

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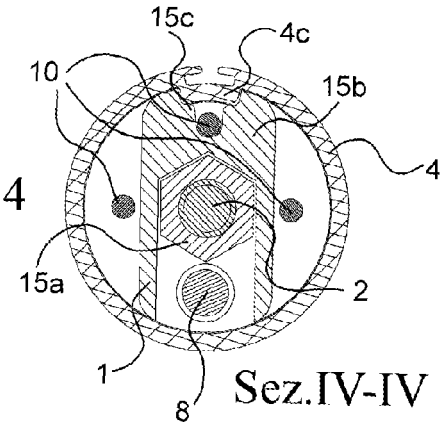
Fig.4



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