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(54) Actuation device for roll-up elements and the like

(57) An actuation device for roll-up elements and the like comprising a tubular body (1) which can be inserted in the tube (2) of a roll-up element (3). The tubular body (1) has a supporting head (10) at one end and an actuation element (11) for turning the tube (2) at the other end. The device further comprises, inside the tubular body (1), an electric motor (20), a brake (22) which is adapted to prevent the movement of the roll-up element (3) when the motor (20) is not powered, and a reduction unit (23) which is adapted to turn the actuation element (11). Stroke limiting elements (30) externally to the tubular body (1) are further provided.

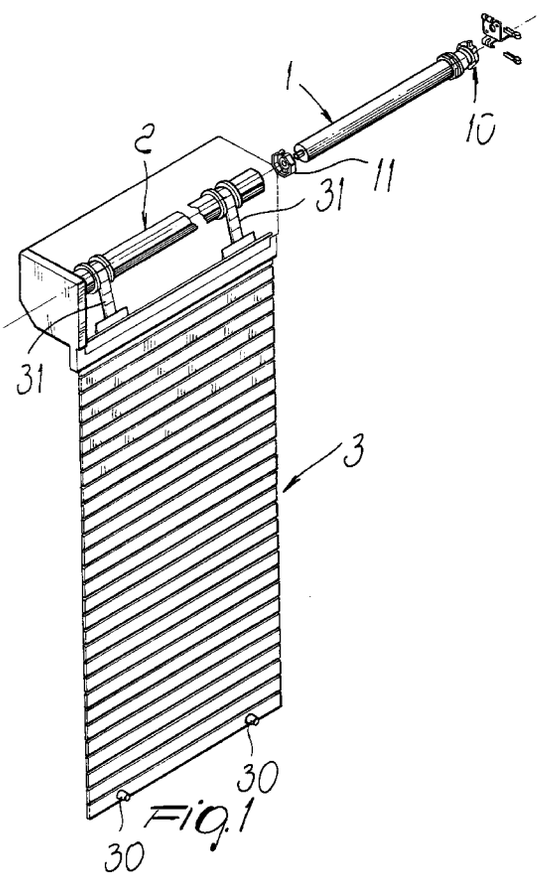

Fig.1

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Description

[0001] The present invention relates to an actuation device for roll-up elements and the like.

[0002] It is known that tubular gearmotor units are used for the automatic actuation of roll-up elements such as roller blinds, shutters and the like; said units are substantially constituted by a tubular body which ends, at one end, with the support of said gearmotor and ends, at the other end, with a pivot for actuating the roll-up element which actuates the tube of the roll-up element, inside which the tubular body is arranged.

[0003] A limit switch, a capacitor, a motor, a brake and a reduction unit are provided inside the tubular body.

[0004] The limit switch is meant to control the maximum stroke of the roll-up element during ascent and descent and must be adjusted at installation time.

[0005] The capacitor is meant to provide the correct starting torque to the single-phase motor when the actuation of the roll-up element begins, while the electric motor is meant to operate, by means of the reduction unit, the usually octagonal tube whereon the roll-up element is connected.

[0006] The brake is meant to prevent movement of the blind when the motor is not powered.

[0007] In the devices of the prior art there are first of all considerable constructive complexities which arise from the presence of the limit switch; considerable difficulties are also encountered in correctly adjusting the stroke that the roll-up element can perform.

[0008] The aim of the invention is to solve the above problem, by providing an actuation device for roll-up elements and the like which has drastic constructive simplifications, eliminating the need to adjust the limit switch located inside the tubular body.

[0009] Within the scope of the above aim, a particular object of the invention is to provide an actuation device in which the entire system is considerably simplified from the constructive point of view and all the installation steps are reduced.

[0010] Another object of the present invention is to provide an actuation device which, thanks to its particular constructive characteristics, is capable of giving the greatest assurances of reliability and safety in use.

[0011] Another object of the present invention is to provide an actuation device which can be easily obtained starting from commonly commercially available elements and materials and is also competitive from a merely economical point of view.

[0012] This aim, these objects and others which will become apparent hereinafter are achieved by an actuation device for roll-up elements and the like, according to the invention, which comprises a tubular body which can be inserted in the tube of a roll-up element, said tubular body having a supporting head at one end and an actuation element for turning said tube at the other end, characterized in that it comprises, inside said tubular body, an electric motor, a brake which is adapted to prevent the movement of the roll-up element when the motor is not powered, and a reduction unit which is adapted to turn said actuation element, stroke limiter means arranged externally to said tubular body being further provided.

[0013] Further characteristics and advantages of the present invention will become apparent from the following detailed description of a preferred but not exclusive embodiment of an actuation device for roll-up elements and the like, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a schematic view of the actuation device which can be applied inside the tube of a roll-up element;
Figure 2 is a sectional view of the actuation device according to the invention;
Figure 3 is a view of the actuation device with a clutch;
Figure 4 is a view of a one-way detent device which can be inserted in the tube of the roll-up element;
Figure 5 is a view of a one-way detent device which can be inserted in said tubular body.

[0014] With reference to the above Figures, the actuation device for roll-up elements and the like, according to the invention, comprises a tubular body 1 which can be inserted in the generally octagonal tube 2 of a roll-up element 3.

[0015] The tubular body 1 has a supporting head 10 at one head and, at its other end, an actuation element 11 which is constituted for example by a driving pulley which couples to the tube 2 in order to turn it and actuate the roll-up element.

[0016] Inside the tubular body 1 an electric motor 20 is provided which is supplied with a capacitor 21 interposed in order to actuate the single-phase motor.

[0017] The motor is connected to a brake 22, which in turn actuates a reduction unit 23, the output pivot 24 whereof is associated with the driving pulley 11.

[0018] The brake is meant to prevent the movement of the roll-up element when the motor is not powered; this locking action is performed both against the descent of the roll-up element under its own weight and against attempts to roll up the roll-up element by pushing manually.

[0019] The particularity of the invention is constituted by the fact that inside the tubular body there is no complicated limiting switch which is subject to adjustments; the stroke limiting means are instead provided externally to the tubular body and are advantageously provided directly on the roll-up element; said means are provided by way of retainers 30, which are located at the lower end of the roll-up element, and by way of means for locking the portions that connect the roller and the roll-up element, which in a preferred embodiment are provided by way of articulated segments 31 which mutually lock if they are mutually pushed.

[0020] This makes it impossible to perform rolling in the opposite direction once the blind or roll-up element has been pulled down completely, since the segments, by mutually jamming, lock the rotation of the tube.

[0021] This embodiment is particularly simple, since the absence of the limit switch inside the tubular element eliminates the need for adjustments and settings of any kind.

[0022] In order to increase safety, it is possible to provide a clutch 40 which is arranged between the brake and the reduction unit and is designed to limit the rotation torque when the roll-up element reaches the end of its upward and downward stroke.

[0023] The clutch 40 is advantageously provided by means of a die-cast body 41, which ends with a pinion 42 which is designed to transmit motion to the reduction unit and has, at the other end, a circular seat with recesses which accommodate balls 43 which are fixed to the driving shaft and are pushed elastically.

[0024] In normal load conditions, the balls, pushed by a spring, engage the recess of the body of the clutch and transmit the rotary motion; when an overload occurs or the blind jams, the higher retaining force compresses the spring, the balls retract into the hole of the shaft, allowing slippage between the body of the clutch and the driving shaft; in these conditions, the motor continues to turn without actuating the blind, which has reached the end of its stroke.

[0025] Another possibility for limiting the maximum load of the motor is to provide an electronic board which disconnects the power supply when a limit rotational torque is exceeded and accordingly an abnormal absorption of current occurs.

[0026] According to another embodiment, shown in Figure 4, it is possible to provide a one-way detent, designated by the reference numeral 50, which is substantially constituted by a hub 51 which internally accommodates locking blocks 52 pushed by respective springs 53.

[0027] The blocks can be inserted in notches 54 provided on the internal surface of the octagonal ring 55 for connection to the tube.

[0028] The movement of the motor is transmitted to the hub by means of the square hole 57, and the springs, by pushing the blocks outward, cause said blocks to transmit the same rotary motion to the outer ring as well when the direction of rotation is counterclockwise relative to the drawings, while when the rotation is clockwise said blocks, pushed by the outer ring, overcome the force of the springs and retract into their seats, thus allowing the relative sliding between the hub and the the ring.

[0029] In these conditions, the motor continues to rotate without actuating the roll-up element, which has reached the end of its downward stroke.

[0030] The embodiment with a one-way detent, as shown in Figure 5, can also be provided inside the tubular body 1 by placing a one-way detent assembly between the brake and the reduction unit instead of the clutch.

[0031] In this case, the one-way detent, designated by the reference numeral 60, can have balls 61 which are similar to those used for the clutch and are pushed by a spring 62 into saw-tooth cam-shaped seats 63; in the drawing, said seats 63 are orientated so as to transmit motion clockwise, and motion can be transmitted counterclockwise by reversing the seats.

[0032] From the above description it is evident that the invention achieves the intended aim and objects and in particular it is stressed that an actuation device is provided which is extremely simple and functional and entails, for its execution, the use of unstable switches, i.e., of switches which require constant human presence during the actuation of the roll-up element; said control can also be remote but in any case with human presence.

[0033] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept.

[0034] All the details may also be replaced with other technically equivalent elements.

[0035] In practice, the materials employed, as well as the contingent shapes and dimensions, may be any according to requirements.

[0036] The disclosures in Italian Patent Application No. MI98A000438 from which this application claims priority are incorporated herein by reference.

[0037] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. An actuation device for roll-up elements and the like, comprising a tubular body (1) which can be inserted in the tube (2) of a roll-up element (3), said tubular body (1) having a supporting head (10) at one end and an actuation element (11) for turning said tube (2) at the other end, characterized in that it comprises, inside said tubular body (2), an electric motor (20), a brake (22) which is adapted to prevent the movement of the roll-up element (3) when the motor (20) is not powered, and a reduction unit (23) which is adapted to turn said actuation element (11), stroke limiting means (30) arranged externally to said tubular body (1) being also provided.

2. The actuation device according to claim 1, characterized in that said stroke limiter means (30) are associated with said roll-up element (3).

3. The actuation device according to the preceding

claims, characterized in that said stroke limiter means comprise protruding elements (30) which are located at the free edge of the blind and elements (31) constituted by articulated sectors which are interposed between said tube (2) and the end of said roll-up element (3), said articulated sectors (31) being mutually articulated when subjected to traction and being mutually locked when subjected to compression.

4. The actuation device according to one or more of the preceding claims, characterized in that it comprises a clutch (40) which is interposed between said brake (22) and said reduction unit (23).

5. The actuation device according to one or more of the preceding claims, characterized in that it comprises an electronic board which is adapted to monitor the electric power absorption of said motor (20) in order to interrupt the electric power supply in case of overload.

6. The actuation device according to one or more of the preceding claims, characterized in that it comprises a one-way detent unit (50) for the idle rotation of said gearmotor (20) when said roll-up element (3) is at the end of its descent stroke.

7. The actuation device according to one or more of the preceding claims, characterized in that said one-way detent unit (50) comprises a hub (51) which supports blocks (52) which are pushed elastically, said hub (51) being accommodated within a ring (55) which can be inserted in said tube (2) and has, on its internal surface, notches (54) for the insertion of said blocks (52) when the hub (51) rotates in one direction and for the ratchet-like disengagement of said blocks (52) when said hub (51) rotates in the other direction.

8. The actuation device according to one or more of the preceding claims, characterized in that said one-way detent unit (66) is arranged, inside said tubular body (2), between said brake (22) and said reduction unit (23), said one-way detent unit comprising balls (61) which are pushed elastically so as to engage in saw-tooth cam-shaped seats (63).

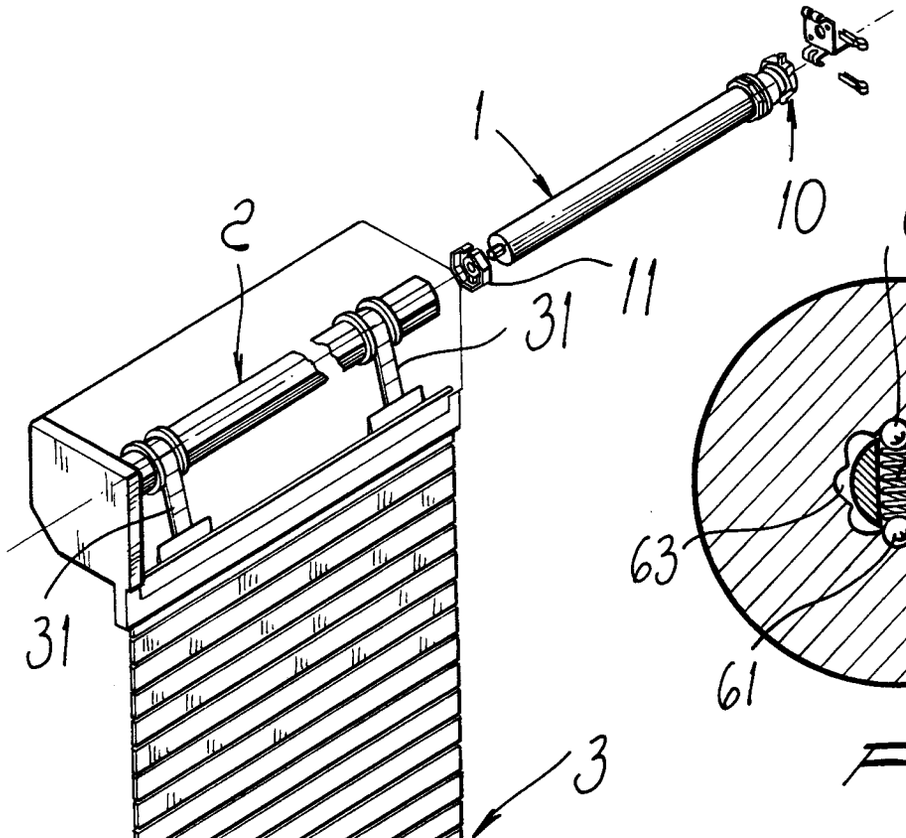

Fig.1

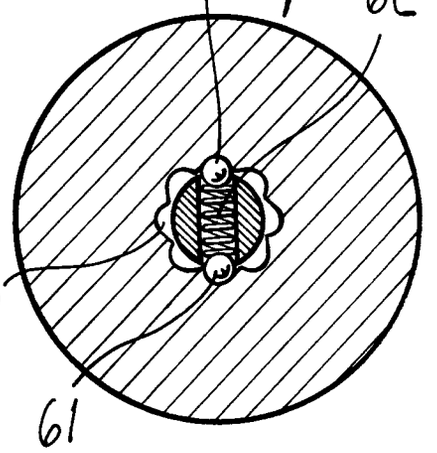

Fig.5

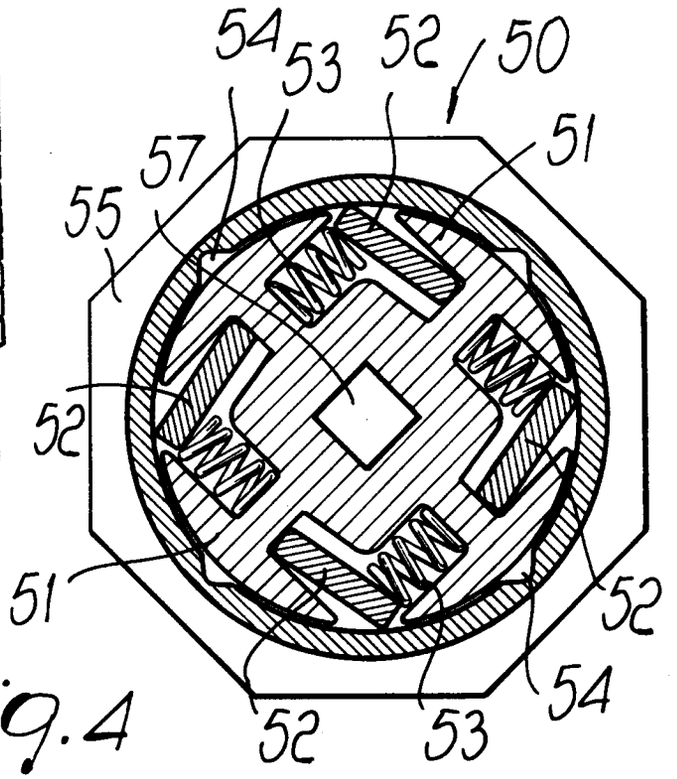

Fig.4

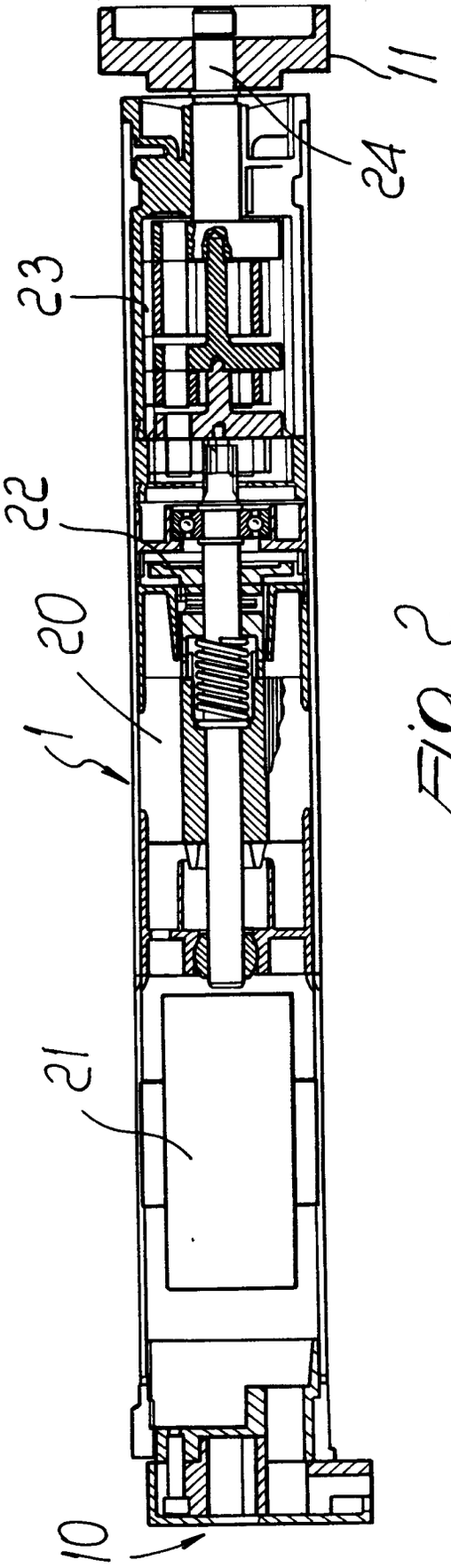

Fig. 2

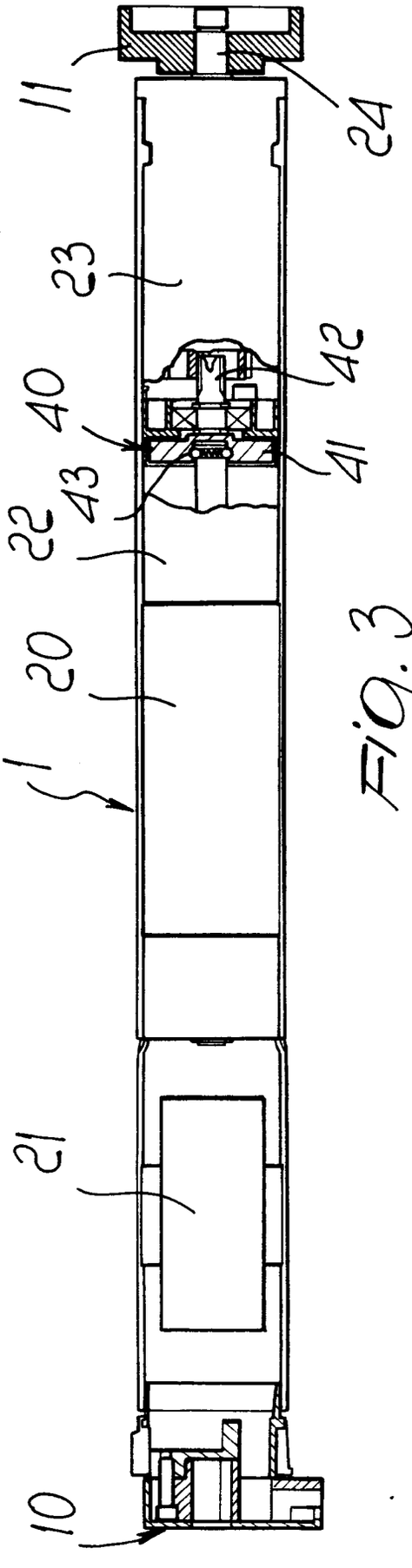

Fig. 3