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(54) METHOD FOR MOVING A ROLLER SHUTTER AT A CONTROLLED SPEED ALONG AN UPWARD OR DOWNWARD PATH AND ASSOCIATED ACTUATING SYSTEM

VERFAHREN ZUR BEWEGUNG EINES ROLLLADENS MIT EINER GESTEUERTEN
GESCHWINDIGKEIT IN AUFWÄRTS- ODER ABWÄRTSRICHTUNG UND ENTSPRECHENDES
BETÄTIGUNGSSYSTEM

PROCÉDÉ POUR DÉPLACER UN VOLET ROULANT À UNE VITESSE CONTRÔLÉE SELON UNE
TRAJECTOIRE ASCENDANTE OU DESCENDANTE ET SYSTÈME D'ACTIONNEMENT ASSOCIÉ

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(56) References cited:
EP-A- 1 582 681 US-A- 1 234 750

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Description

[0001] The invention relates to a method for moving a roller shutter at a controlled speed along an upward or downward path and an associated actuating system, in particular an actuating system for roller shutters, sun awnings or the like, of the type powered by a low dc voltage.

[0002] A particular type of actuating system for roller shutters is one which has a dc voltage for powering its motor ranging between about 12 and 24 Volts. The invention concerns such actuating systems, which shall be referred to as DC actuating systems. DC actuating systems are useful in cases where it is required to automate roller shutters by means of actuating systems which are powered using very low voltages, for safety reasons or when no public mains supply is present. There are also the not insignificant further advantages of being able to use a battery power supply for the actuating system, of having very limited overheating of the motor, and of the need for only two power supply wires, instead of three, because there is no earth.

[0003] The drawback of DC actuating systems is the difference in speed which they impart to the roller shutter during the upward or downward movement. For cost-related reasons the dc motor of DC actuating systems is not driven by a converter, which would allow speed control by means of modulation of the dc voltage, but simply the power is applied to the terminals of the motor either directly or with reversed polarity, depending on the desired upward or downward movement of the roller shutter. Therefore, the power supplied by the motor is the same, but the load changes because, during the upward movement, the motor raises the roller shutter and, during the downward movement, it is drawn along by its weight. The result is a downward speed of even five times the upward speed (for example from 6 to 30 rpm on the driving shaft) and proportional to the rolling movement of the roller shutter. If the roller shutter descends very rapidly it may result in a potentially dangerous situation where there is the risk of impact against persons, in addition to the undesirable technical effect of a roller shutter which moves at speeds which are not controlled by the system. In DC actuating systems with a converter stage the movement of the roller shutter is uniform, but at the cost of a system which is considerably more complex, prone to malfunctions and costly. EP 1582681A1 discloses an actuating system according to the preamble of claim 1.

[0004] The main object of the present invention is to provide a method for moving a roller shutter at a controlled speed along an upward or downward path. Another object is to provide a DC actuating system with a uniform performance as regards movement of the roller shutter. Yet another object is to reduce the costs and the difficulty of production of the said DC actuating system.

[0005] These objects are achieved with a method according to claims 12-14 for moving a roller shutter at a controlled speed along an upward or downward path. The method is implemented by an actuating system for a roller shutter, sun awning or the like according to claims 1-11.

[0006] The invention may use a braking device on the shaft (either on an associated kinematic chain or on the roller shutter itself which is for example radio controlled) which moves the roller shutter, so as to limit and/or regulate the downward speed and, if required, the upward speed thereof. Even though normally the speed to be regulated is the downward speed, it may be useful, in some cases, to have to limit with a brake also the upward speed. It is possible, and this is a further advantage of the invention, to modify the braking device normally mounted on the actuating system so as to perform the braking function not only in the rest position of the roller shutter, when it is at a standstill, but also during its movement. In this way it is possible to obtain optimum integration of the components, without having to use any second braking device.

[0007] The advantages of a device according to the invention will in any case become clearer from the following description of a preferred embodiment which refers to the accompanying drawing in which:

- Fig. 1 is an exploded view of part of an actuating system for roller shutters comprising the device according to the invention;
- Fig. 2 is a view of the components of the actuating system of Fig. 1 assembled;
- Fig. 3 is a cross-sectional view along the plane A-A of Fig. 2;
- Figs. 4 and 5 are cross-sectional views along the plane B-B of Fig. 3 for two operating conditions of the device;
- Fig. 6 is an axonometric view of the rear of a disk present in the actuating system of Fig. 1;
- Fig. 7 is an axonometric view of the front of the disk of Fig. 6;
- Fig. 8 is a cross-sectional view along the plane C-C of Fig. 6;
- Fig. 9 is a cross-sectional view along the plane D-D of Fig. 6;
- Fig. 10 shows a spring of the actuating system of Fig. 1;
- Fig. 11 shows a graph plotting the characteristics of the actuating motor of Fig. 1.

[0008] Fig. 1 shows the components of an actuating system 10 according to the invention, which are enclosed inside a tubular body (not shown) of the actuating system 10. These components are as follows:

- a shaft 12 of an electric motor (not shown), coaxial with the tubular body and supported by suitable bearings 13, only one of which is shown;
- resilient means 14 (a spring here) which push a rotating friction disk 16, which forms a seat for an annular braking element 20 with a high coefficient of friction (for example made of brake lining material) towards the fixed surface of an engaging disk 18 (for example made of brake lining material) fixed on a cage 24 which is in turn enclosed inside the tubular body. The disk 16 is slidable axially with respect to the shaft 12 between two positions: a first position where the braking element 20 is in contact with the engaging ring 18 and a second position where they are separated, so as to be able to be selectively engaged in order to brake the motor 12;
- a toothed transmission spindle 26 which is rigidly joined to the disk 16 and which passes through the braking element 20, the engaging disk 18 and the cage 24, so as to interconnect kinematically with a reduction gear connected to the roller shutter (both not shown).
- motion transmission members 22 situated between the shaft 12 and the support disk 16 and comprising a pin 50 which is inserted into a corresponding hole 52 in one end 12a of the shaft 12 and which interacts with shaped walls of a cavity 42 formed in the disk 16, as will be better described below. The overall function of the members 22 is to move the disk 16 and separate the element 20 from the engaging ring 18 when the shaft 12 rotates, keeping them instead in contact when the shaft 12 is stationary, by means of the resilient means 14 pressing both against the bearing 13 and on a collar 38 of the disk 16, so as to push the latter towards the engaging ring 18. Other parts for transmission of the motion may also be used, provided that they are functionally the same.

[0009] Figures 2 and 3 show the components described assembled together, highlighting their relative arrangement. It should be noted, in particular in Fig. 3, that the ends 50a, 50b of the pin 50 are arranged in an approximately midway position between inclined surfaces 44a, 44b and 45a, 45b, which are formed by shaping the inner walls of the cavity 42, as will be explained more clearly below. In Fig. 3 only the two inclined surfaces 44b and 45b are visible.

[0010] Figures 6 to 9 show in detail the outer and inner constructional form of the support piece 16. It comprises a circular retaining disc 30 inside which the disk 20 can be positioned and which tapers towards its base, extending with a cylindrical collar 38 which in turn has inside it the axial cavity 42. The cavity 42 extends inside the support piece 16, is partly closed at the top by an element 25 for engagement with/supporting the spindle 26 and has a profile which is symmetrical with respect to the cross-sectional centre plane D-D of the support piece 16, whence the use of suffixes "a" and "b" as references to indicate symmetrical parts. For the sake of simplicity reference is made on occasions to parts present only on one wall of the cavity 42. The cavity 42 has an entry opening which is composed, in plan view, of a rectangular slot 46 (Fig. 6) which has two identical elongated, flat, lateral walls 41b, 48b on the long side and which has, added in the centre thereof, a circular empty space 47 with a diameter greater than the short side of the slot 46, with two semi-circular walls 49a, 49b. The entry opening of the cavity 42 substantially corresponds to the form of the assembly consisting of the end 12a of the shaft 12 and the pin 50, namely the overall dimensions of the slot 46 and the empty space 47 are such as to receive the end 12a and the pin 50, as shown in Figure 3.

[0011] The cavity 42 comprises four identical inclined surfaces 44a, 44b and 45a, 45b which are opposite and symmetrical to each other with respect to the plane D-D and situated respectively two on either side of the cavity 42 and two facing each other.

[0012] The semi-circular walls 49b, 49a continue inside the cavity 42, maintaining their radius of curvature, and terminate respectively in semi-circular walls 43b, 43a with a smaller surface area.

[0013] The inclined surfaces 44b and 45b (and correspondingly the inclined surfaces 44a and 45a on the other side of the cavity 45) respectively connect the walls 41b and 48b with flat walls 51b and 53b which are slightly inclined with respect to the lie of the plane D-D. Consequently, the walls 51b, 53b and 43b with the symmetrical walls 51a, 53a and 43b define a terminal part 55 of the cavity 42 which is widened with respect to the inlet.

[0014] As can be seen from Figures 3 and 9, the pin 50 is inserted inside the cavity 42 and its ends 50a, 50b are arranged in front of the inclined surfaces 44a, 44b and 45a, 45b. In order to facilitate understanding in Figs. 3 and 9 the longitudinal axis of the pin 50 has been indicated by S, it being shown alone in Fig. 9 in order to highlight there the positioning of the pin 50 inside the cavity 42.

[0015] Constructional data of the actuating system 10 are now provided below by way of example. Figures 8 and 9 show some important dimensions of the disk 16 which are reproduced below with the corresponding numerical values:

Depth C1 of the walls 41 b, 48b, 41 a, 48a:	7 mm
Maximum dimension C2 of cavity 42:	15 mm
Radius C3 of the walls 43a, 43b:	2 mm
Width C4 of short side of the slot 46:	3.1 mm
Diameter C5 of the empty circular space 47:	7 mm

[0016] The inclination of the inclined surfaces 44a, 44b and 45a, 45b with respect to the axis T is about 10 degrees, while the pin 50 has a diameter of 2 mm and length of 14 mm.

[0017] The constructional characteristics of the spring 14, to be read with reference to Fig. 10, are as follows:

5	Length of free spring LO:	19 mm
	Diameter of wire L1:	1 mm
	Outer diameter L2:	7 mm
	Middle diameter L3:	6 mm
10	Inner diameter L4:	5 mm
	Spring index:	6
	Length of pre-stressed spring:	16.853 mm
	Length of spring under full load:	8.267 mm
	Operating stroke:	8.586 mm
15	Operative spring length:	10.414 mm
	Pitch L5 of free spring:	3.5 mm
	Spring modulus:	9.3171 N/mmj
	Compression of pre-stressed spring:	2.15 mm
20	Compression of operative spring:	56.49%
	Maximum permissible compression of spring:	65%
	Space L6 between spring turns:	2.5 mm

[0018] The graph in Fig. 11 shows the characteristic curves of the electric motor of the actuating system 10. The values shown are the power consumption P-in, the efficiency R, the speed V, the current consumption I and the power output P-out as a function of the torque CC.

[0019] As regards the braking characteristics of the material which forms the braking element 20 and 18, its coefficient of friction may be between 0.3 and 0.45.

[0020] The actuating system 10 is characterized by two functioning modes: one for the upward movement and one for the downward movement. During the upward movement, the weight force of the roller shutter produces a torque opposing the torque supplied by the motor 12, while during the downward movement the two torques become concordant.

[0021] The actuating system 10 functions, owing to the action of the abovementioned torques, in the following manner (particular reference should be made to Figures 4 and 5). When the shaft 12 is stationary (Fig. 4), the spring 14 pushes the disk 16 and the braking element 20 against the engaging disk 18, and the static friction present between the braking element 20 and the disk 18 prevents relative rotation thereof. Therefore, the spindle 26 connected to the disk is locked and the roller shutter is kept stationary.

[0022] When the shaft 12 rotates (Fig. 5), two different conditions arise, depending on the direction of movement of the roller shutter (upward or downward movement). In both cases, the pin 50, which is rotated by the motor 12, strikes with its ends 50a, 50b two inclined surfaces and presses against them. The inclined surfaces in question are the pairs 44a, 45b or 44b, 45a, depending on the direction of rotation.

[0023] During the upward movement, the torque supplied by the motor 12 and the torque created by the weight force of the roller shutter have opposite directions. Therefore, the pin 50 pushes up to the end of the associated inclined surfaces 44a, 45b or 44b, 45a and imparts to the disk 16 a displacement with an axial direction towards the resilient means 14. Said displacement results in total separation of the braking element 20 from the disk 18, thereby resulting in the end of the braking action. Thus the torque of the motor 12 is fully transmitted to the spindle 26 and from there to the roller shutter.

[0024] During the downward movement the driving torque of the motor 12 and the torque due to the weight force of the roller shutter are concordant. Upon activation of the motor 12 the pin 50 is pushed towards the associated inclined surfaces 44a, 45b or 44a, 45a and applies a small thrust thereon. This thrust acts against the resilient means 14 and reduces the pressure thereof on the disk 16 until the static friction present between the braking element 20 and the disk 18 - which is proportional to the pressure of the resilient means 14 - decreases to the point that it is no longer sufficient to stop their relative rotation. The disk 16 starts to slide on the disk 18 braked by the dynamic friction and the downward movement of the roller shutter therefore starts. The torque produced by the motor 12 and the torque produced by the weight force of the roller shutter are added together and therefore do not allow the pin 50 to reach the end of the inclined surfaces 44a, 45b or 44b, 45a, therefore there is not complete separation of the braking element 20 from the disk 18. The braking action is not sufficient to interrupt/stop the movement of the roller shutter but, by designing the components with correct dimensions, its downward speed may be controlled.

[0025] In order to brake and stop the roller shutter it is sufficient to stop the movement of the motor 12 so that the pin

50 returns into the position shown in Fig. 4 by means of the action of the resilient means 14.

[0026] A simple modification, for example to the form and/or inclination of the inclined surfaces 44a, 44b, 45a, 45a, allows varied operation of the actuating system to be obtained, including maintaining the braking action also during the upward movement of the roller shutter or a different response of the braking system, so as to adapt it to any roller shutter or motor.

[0027] The system from this point of view can be easily calibrated, for example using resilient means with an adjustable thrusting force (it is possible to use a ring nut which is screwed onto the shaft 12 and against which the spring 14 presses; by screwing the ring nut the length at rest of the spring 14 and therefore its thrusting force against the disk 16 may be varied).

[0028] Clearly the invention may envisage a different braking system, for example with the insertion of one or more braking elements depending on the movement of the roller shutter. Instead of using the same braking device both for the rest condition of the roller shutter and for its movement, two braking devices may be used, each optimized to perform a single braking function.

[0029] Finally, the braking system may also be situated outside the tubular body, as already mentioned, for example arranged in guides which define the path of the roller shutter during the upward or downward movement. This system may be a shoe-type brake or an electromagnetic brake duly controlled in a synchronized manner by the same control unit which controls the electric motor. Independently of the type of braking system, the latter may intervene during the movement of the roller shutter either continuously or intermittently at given time intervals.

Claims

1. Actuating system (10) for a roller shutter, sun awning or the like, comprising motor means (12) able to move the roller shutter along an upward or downward path, wherein

during the upward movement the weight force of the roller shutter produces a torque opposing the torque supplied by the motor (12), while during the downward movement the two torques become concordant, and comprising braking means (16, 20) able to brake the roller shutter during the upward and downward movement, said braking means (16, 20) being adapted to keep stationary the roller shutter when the shaft (12) is stationary; said braking means (16, 20) being adapted to maintain the braking action also during the upward movement of the roller shutter, during activation of the motor (12) the braking action of the braking means (16, 20) being not sufficient to interrupt/stop the movement of the roller shutter;

characterized in that

said braking means (16, 20) comprises a rotating friction disk (16), which forms a seat for an annular braking element (20), said seat comprising a circular retaining disk (30) inside which the annular braking element (20) is positioned, said rotating friction disk (16) being pushable by resilient means (14) towards the fixed surface of an engaging disk (18), which is fixed on a cage (24).

2. Actuating system (10) according to claim 1, **characterized in that** said actuating system (10) comprises

- a toothed transmission spindle (26) which is rigidly joined to the disk (16) and which pass through the braking element (20), the engaging disk (18) and the cage (24) so as to interconnect kinematically with a reduction gear connected to the roller shutter; and

- motion transmission members (22) situated between the shaft (12) and the support disk (16) comprising a pin (50) which is inserted into a corresponding hole (52) in one end (12a) of the shaft (12) and which interact with shaped walls of a cavity (42) formed in the disk (16).

3. Actuating system (10) according to Claim 1, in which the braking means (16, 22) are activated in a continuous manner in order to brake the roller shutter at least during the downward movement.

4. Actuating system (10) according to Claim 1, in which the braking means (16, 20) are activated intermittently so as to brake the roller shutter at least during the downward movement.

5. Actuating system (10) according to any one of the preceding claims, in which the braking means (16, 20) are also designed to lock the roller shutter when it is stationary.

6. Actuating system (10) according to any one of the preceding claims, in which the motor means comprise an electric motor (12) which is powered with a dc voltage applied directly or with reversed polarity depending on the desired upward or downward movement of the roller shutter and the shaft (12) of which transmits the movement to the roller

shutter.

7. Actuating system (10) according to Claim 6, in which the dc power supply voltage is less than 30 V.
8. Actuating system (10) according to Claim 6 or 7, in which the braking means (16, 20) are coupled to the shaft of the motor (12).
9. Actuating system (10) according to Claim 8, in which the braking means (16, 20) comprise a friction disk (200) which can be selectively engaged so as to brake the motor (12).
10. Actuating system (10) according to Claim 1, in which the braking means (16, 20) are arranged along the upward or downward path of the roller shutter.
11. Actuating system (10) according to Claims 1, in which the braking means (16, 20) are arranged on the roller shutter.
12. Method for moving a roller shutter at a controlled speed along an upward or downward path, comprising the steps of:
 - setting in motion the roller shutter by means of motor means (12);
 - braking the roller shutter using braking means independent of the action of the motor means (12), so as to maintain a desired speed of the roller shutter along the path,

said braking means (16, 20) comprising a rotating friction disk (16), which forms a seat for an annular braking element (20), said seat comprising a circular retaining disc (30) inside which the disk (20) is positioned, said rotating friction disk (16) being pushable by resilient means (14) towards the fixed surface of an engaging disk (18), which is fixed on a cage (24).

13. Method according to Claim 12, **characterized in that** the braking means (16, 20) act with friction.

Patentansprüche

1. Betätigungssystem (10) für einen Rollladen, eine Sonnenmarkise oder Ähnliches, aufweisend ein Motormittel (12), welches den Rollladen entlang eines Aufwärts- oder Abwärtspfades bewegen kann, wobei die Gewichtskraft des Rollladens während der Aufwärtsbewegung ein Drehmoment produziert, welches dem durch den Motor (12) gelieferten Drehmoment entgegensteht, wobei die beiden Drehmomente während der Abwärtsbewegung gleichsinnig werden, und aufweisend ein Bremsmittel (16, 20), welches den Rollladen während der Aufwärts- und Abwärtsbewegung bremsen kann, wobei das Bremsmittel (16, 20) dazu angepasst ist, den Rollladen stationär zu halten, wenn die Welle (12) stationär ist; wobei das Bremsmittel (16, 20) dazu angepasst ist, den Bremsvorgang auch während der Aufwärtsbewegung des Rollladens aufrecht zu halten, wobei während des Ansteuerns des Motors (12) die Bremswirkung des Bremsmittels (16, 20) nicht dazu ausreicht, die Bewegung des Rollladens zu unterbrechen / zu stoppen;
dadurch gekennzeichnet, dass
das Bremsmittel (16, 20) eine Rotierreibe (16) aufweist, welche eine Aufnahme für ein ringförmiges Brems-
element (20) formt, wobei die Aufnahme eine kreisförmige Haltescheibe (30) aufweist, innerhalb welcher das ring-
förmige Brems-
element (20) positioniert ist, wobei die Rotierreibe (16) durch ein federndes Mittel (14) gegen
die fixierte Oberfläche einer Einrastscheibe (18) drückbar ist, welche an einem Käfig (24) fixiert ist.
2. Betätigungssystem (10) gemäß Anspruch 1, **dadurch gekennzeichnet, dass**
das Betätigungssystem (10) aufweist:
 - eine verzahnte Übertragungsspindel (26), welche mit der Scheibe (16) starr verbunden ist und welche durch das Brems-
element (20), die Einrastscheibe (18), und den Käfig (24) hindurch verläuft, um mit einem Redukti-
onsgetriebe kinematisch zusammengeschaltet zu sein, das mit dem Rollladen verbunden ist; und
 - Bewegungsübertragungsmittel (22), die zwischen der Welle (12) und der Lagerscheibe (16) angeordnet sind,
aufweisend einen Bolzen (50), der in ein korrespondierendes Loch (52) in einem Ende (12a) der Welle (12)
eingesetzt ist, und welcher mit geformten Wänden eines Hohlraumes (42) interagiert, welche in der Scheibe
(16) geformt sind.

3. Betätigungssystem (10) gemäß Anspruch 1, in welchem die Bremsmittel (16, 22) in kontinuierlicher Art und Weise aktiviert werden, um den Rollladen wenigstens während der Abwärtsbewegung zu bremsen.
- 5 4. Betätigungssystem (10) gemäß Anspruch 1, in welchem die Bremsmittel (16, 20) zeitweise aktiviert werden, um den Rollladen wenigstens während der Abwärtsbewegung zu bremsen.
5. Betätigungssystem (10) gemäß einem der vorherigen Ansprüche, in welchem die Bremsmittel (16, 20) auch dazu konstruiert sind, den Rollladen zu arretieren, wenn dieser stationär ist.
- 10 6. Betätigungssystem (10) gemäß einem der vorherigen Ansprüche, in welchem das Motormittel einen elektrischen Motor (12) aufweist, welcher mit einer Gleichspannung angetrieben wird, die direkt oder mit umgedrehter Polarität angelegt wird, abhängig von der gewünschten Aufwärts- oder Abwärtsbewegung des Rollladens und der Welle (12), von welcher die Bewegung auf den Rollladen übertragen wird.
- 15 7. Betätigungssystem (10) gemäß Anspruch 6, in welchem die Stromversorgungs-Gleichspannung kleiner als 30 V ist.
8. Betätigungssystem (10) gemäß Anspruch 6 oder 7, in welchem die Bremsmittel (16, 20) an die Welle des Motors (12) gekoppelt sind.
- 20 9. Betätigungssystem (10) gemäß Anspruch 8, in welchem die Bremsmittel (16, 20) eine Reibscheibe (200) aufweisen, welche selektiv in Eingriff gebracht werden kann, um den Motor (12) zu bremsen.
10. Betätigungssystem (10) gemäß Anspruch 1, in welchem die Bremsmittel (16, 20) entlang des Aufwärts- oder Abwärtspfades des Rollladens angeordnet sind.
- 25 11. Betätigungssystem (10) gemäß Anspruch 1, in welchem die Bremsmittel (16, 20) auf dem Rollladen angeordnet sind.
12. Verfahren zum Bewegen eines Rollladens mit einer gesteuerten Geschwindigkeit entlang eines Aufwärts- oder Abwärtspfades, aufweisend die Schritte:
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 - Versetzen des Rollladens in Bewegung, mittels eines Motormittels (12);
 - Abbremsen des Rollladens unter Verwendung eines Bremsmittels, unabhängig von dem Wirken des Motormittels (12), um eine gewünschte Geschwindigkeit des Rollladens entlang des Pfades aufrecht zu erhalten, wobei das Bremsmittel (16, 20) eine Rotationsreibscheibe (16) aufweist, welche eine Aufnahme für ein ringförmiges Bremsselement (20) formt, wobei die Aufnahme eine kreisförmige Haltescheibe (30) aufweist, innerhalb welcher die Scheibe (20) positioniert ist, wobei die Rotationsreibscheibe (16) durch ein federndes Mittel (14) gegen die fixierte Fläche einer Einrastscheibe (18) gedrückt werden kann, welche an einem Käfig (24) fixiert ist.
- 35 13. Verfahren gemäß Anspruch 12, **dadurch gekennzeichnet, dass** die Bremsmittel (16, 20) durch Reibung funktionieren.
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Revendications

- 45 1. Système d'actionnement (10) pour un volet roulant, un store d'ombrage ou similaire, comprenant des moyens de moteur (12) pouvant déplacer le volet roulant le long d'une trajectoire ascendante ou descendante, dans lequel :

pendant le mouvement ascendant, la force de poids du volet roulant produit un couple opposé au couple fourni par le moteur (12), alors que pendant le mouvement descendant, les deux couples deviennent concordants, et
50 comprenant des moyens de freinage (16, 20) pouvant freiner le volet roulant pendant le mouvement ascendant et descendant,
lesdits moyens de freinage (16, 20) étant adaptés pour maintenir le volet roulant fixe lorsque l'arbre (12) est fixe ;
lesdits moyens de freinage (16, 20) étant adaptés pour maintenir l'action de freinage également pendant le mouvement ascendant du volet roulant, pendant l'activation du moteur (12), l'action de freinage des moyens
55 de freinage (16, 20) n'étant pas suffisante pour interrompre/arrêter le mouvement du volet roulant ;
caractérisé en ce que :

lesdits moyens de freinage (16, 20) comprennent un disque de friction rotatif (16), qui forme un siège pour

un élément de freinage annulaire (20), ledit siège comprenant un disque de retenue circulaire (30) à l'intérieur duquel l'élément de freinage annulaire (20) est positionné, ledit disque de friction rotatif (16) pouvant être poussé par des moyens élastiques (14) vers la surface fixe d'un disque de mise en prise (18) qui est fixé sur une cage (24).

- 5 2. Système d'actionnement (10) selon la revendication 1, **caractérisé en ce que** ledit système d'actionnement (10) comprend :

10 un axe de transmission denté (26) qui est rigidement assemblé au disque (16) et qui passe à travers l'élément de freinage (20), le disque de mise en prise (18) et la cage (24) afin de s'interconnecter de manière cinématique avec un engrenage de réduction raccordé au volet roulant ; et
les éléments de transmission de mouvement (22) situés entre l'arbre (12) et le disque de support (16) comprenant une broche (50) qui est insérée dans un trou (52) correspondant dans une extrémité (12a) de l'arbre (12) et qui interagissent avec des parois profilées d'une cavité (42) formée dans le disque (16).

- 15 3. Système d'actionnement (10) selon la revendication 1, dans lequel les moyens de freinage (16, 22) sont activés de manière continue afin de freiner le volet roulant au moins pendant le mouvement descendant.

- 20 4. Système d'actionnement (10) selon la revendication 1, dans lequel les moyens de freinage (16, 20) sont activés de manière intermittente afin de freiner le volet roulant au moins pendant le mouvement descendant.

- 5 5. Système d'actionnement (10) selon l'une quelconque des revendications précédentes, dans lequel les moyens de freinage (16, 20) sont également conçus pour verrouiller le volet roulant lorsqu'il est fixe.

- 25 6. Système d'actionnement (10) selon l'une quelconque des revendications précédentes, dans lequel les moyens de moteur comprennent un moteur électrique (12) qui est alimenté avec une tension de courant continu appliquée directement ou avec une polarité inversée en fonction du mouvement ascendant ou descendant souhaité du volet roulant et dont l'arbre (12) transmet le mouvement au volet roulant.

- 30 7. Système d'actionnement (10) selon la revendication 6, dans lequel la tension d'alimentation de courant continu est inférieure à 30 V.

- 35 8. Système d'actionnement (10) selon la revendication 6 ou 7, dans lequel les moyens de freinage (16, 20) sont couplés à l'arbre du moteur (12).

9. Système d'actionnement (10) selon la revendication 8, dans lequel les moyens de freinage (16, 20) comprennent un disque de friction (200) qui peut être sélectivement mis en prise afin de freiner le moteur (12).

- 40 10. Système d'actionnement (10) selon la revendication 1, dans lequel les moyens de freinage (16, 20) sont agencés le long de la trajectoire ascendante ou descendante du volet roulant.

11. Système d'actionnement (10) selon la revendication 1, dans lequel les moyens de freinage (16, 20) sont agencés sur le volet roulant.

- 45 12. Procédé pour déplacer un volet roulant à une vitesse contrôlée le long d'une trajectoire ascendante ou descendante, comprenant les étapes consistant à :

mettre en marche le volet roulant au moyen des moyens de moteur (12) ;
freiner le volet roulant à l'aide des moyens de freinage indépendamment de l'action des moyens de moteur (12), afin de maintenir une vitesse souhaitée du volet roulant le long de la trajectoire,
50 lesdits moyens de freinage (16, 20) comprenant un disque de friction rotatif (16), qui forme un siège pour un élément de freinage annulaire (20), ledit siège comprenant un disque de retenue circulaire (30) à l'intérieur duquel le disque (20) est positionné, ledit disque de friction rotatif (16) pouvant être poussé par des moyens élastiques (14) vers la surface fixe d'un disque de mise en prise (18), qui est fixé sur une cage (24).

- 55 13. Procédé selon la revendication 12, **caractérisé en ce que** les moyens de freinage (16, 20) agissent avec friction.

FIG. 2

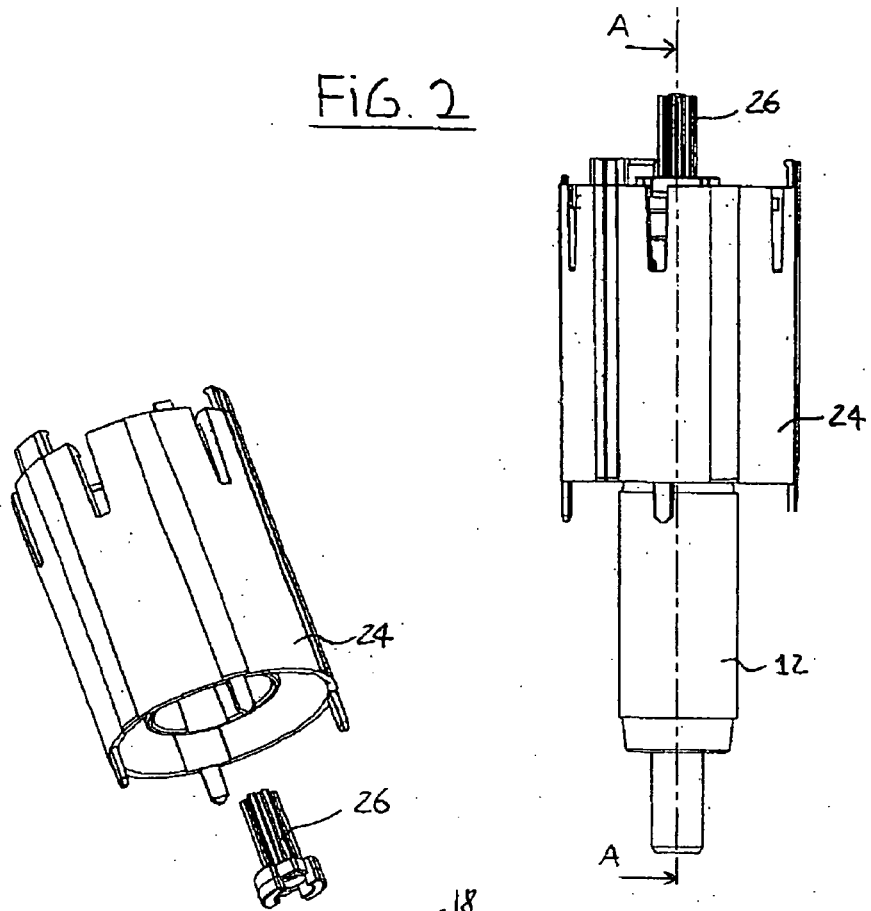
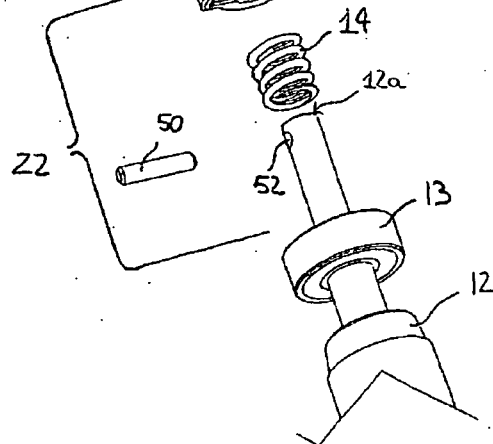


FIG. 1



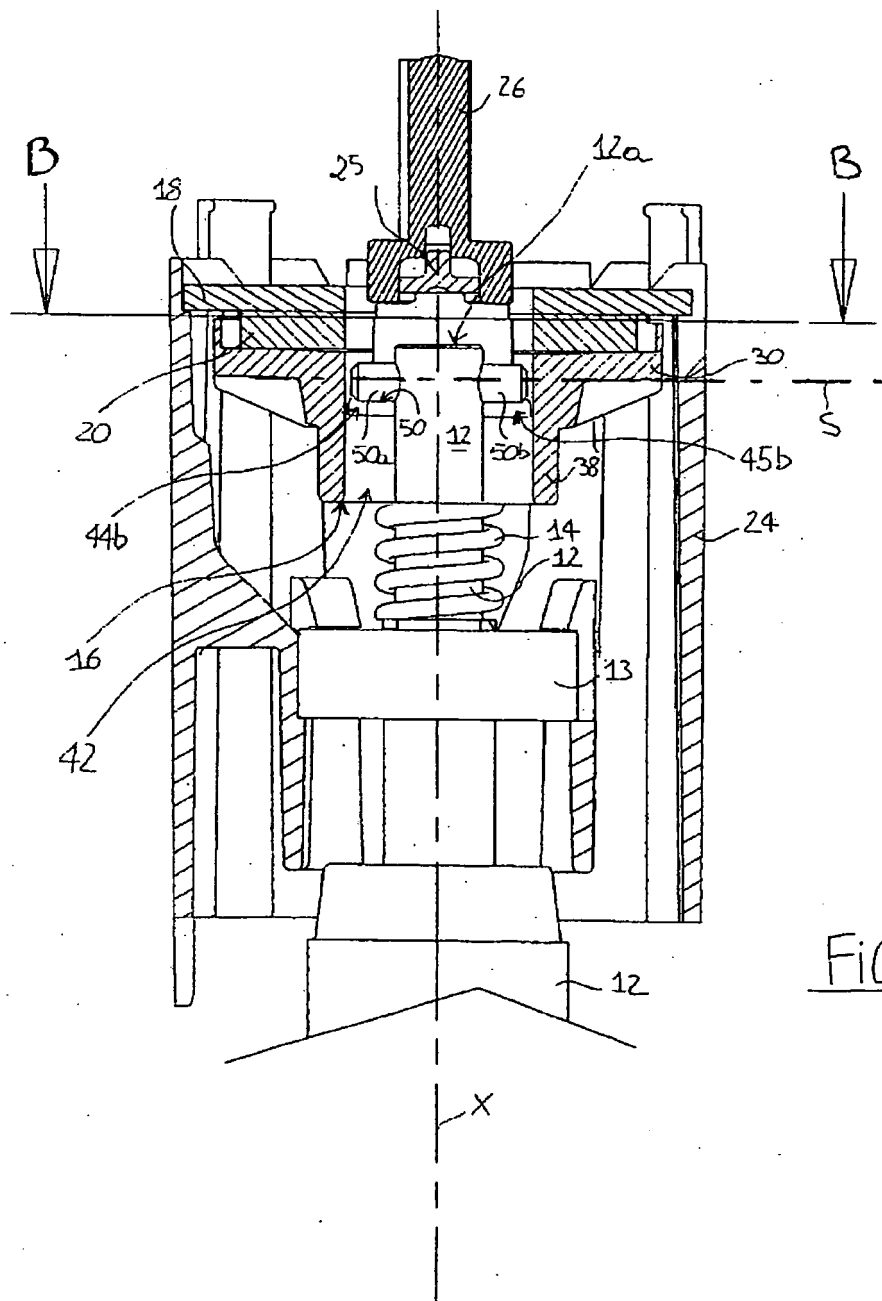
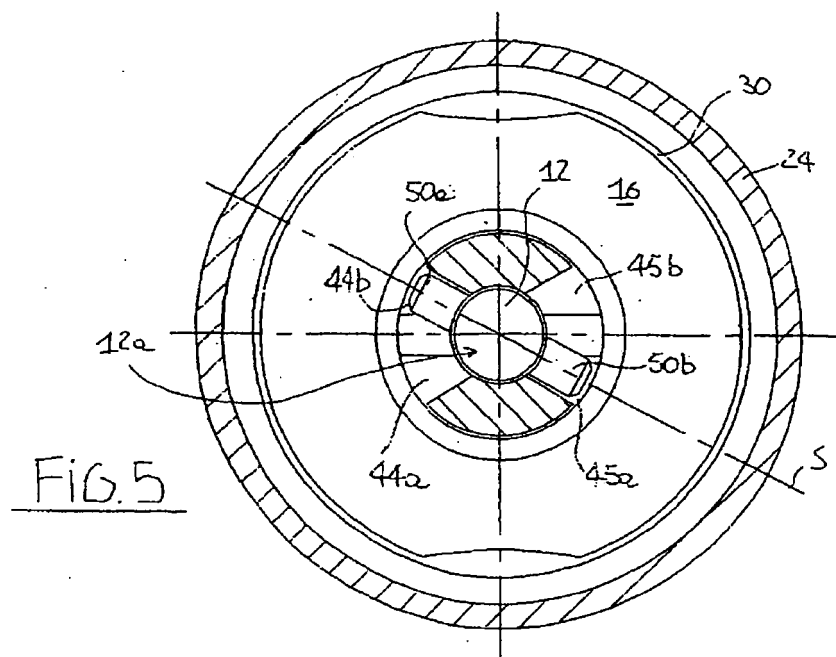
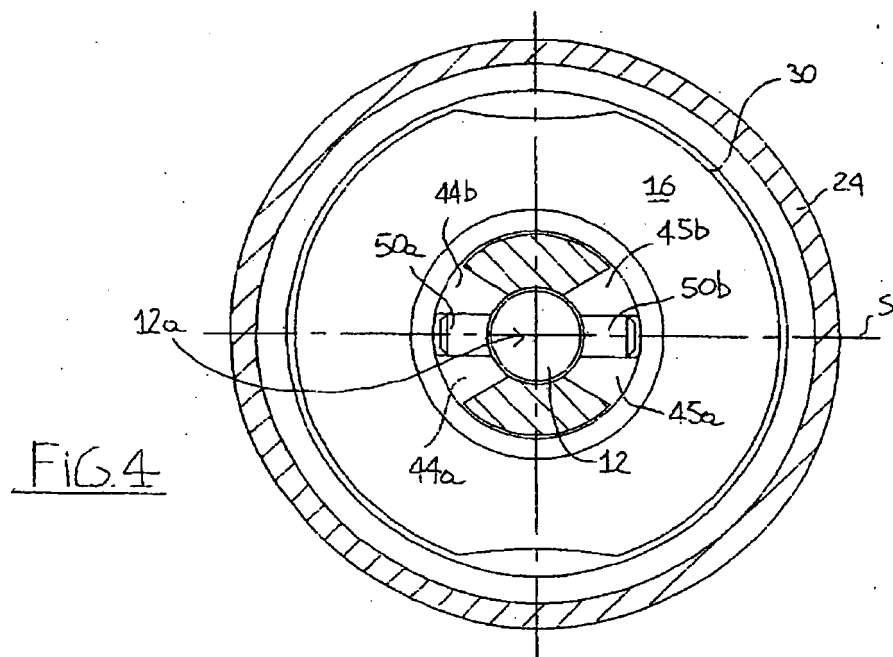
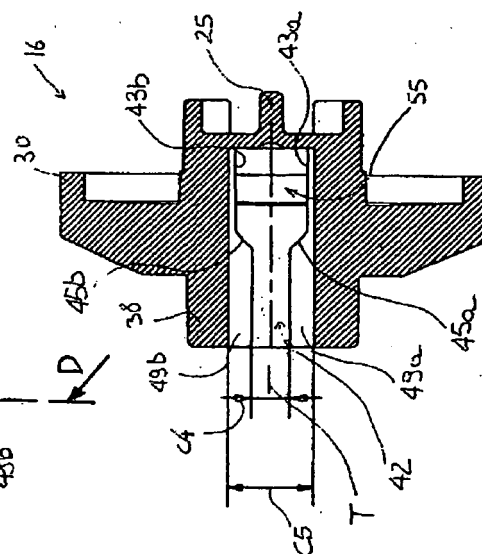
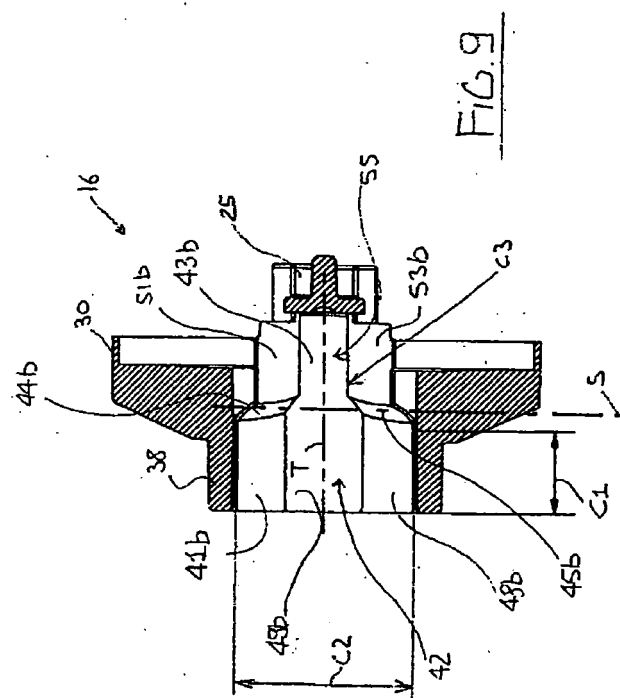
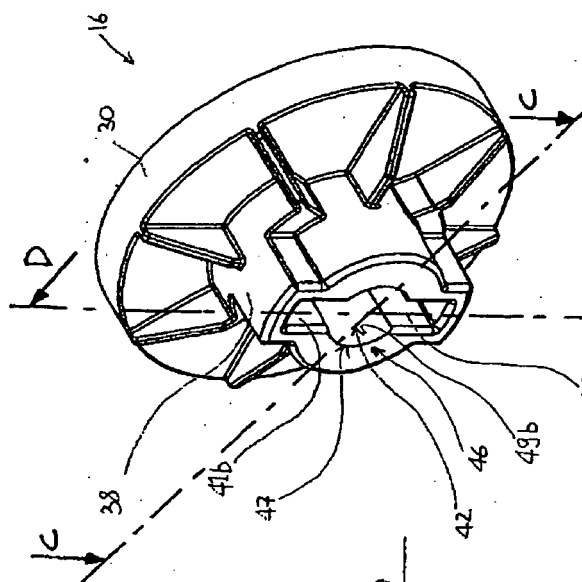
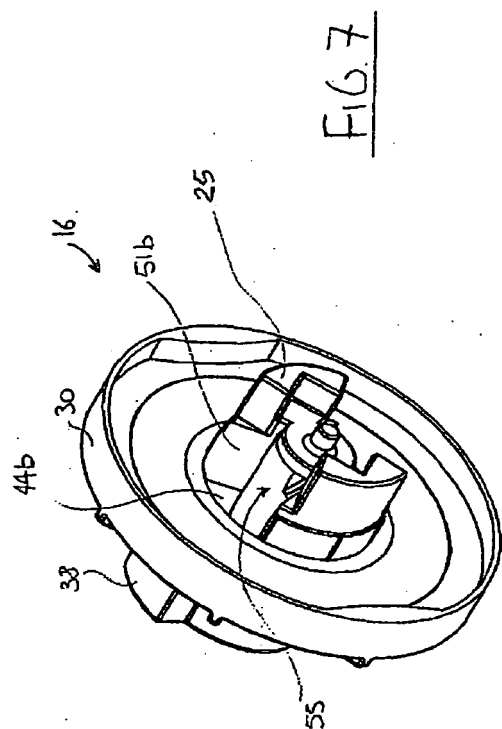


FIG. 3





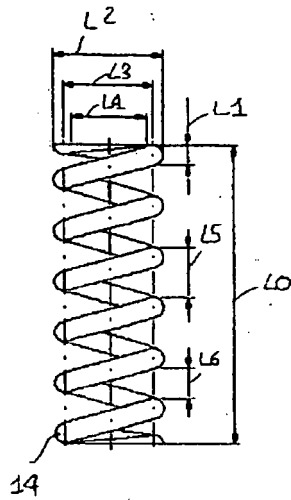


FIG. 10

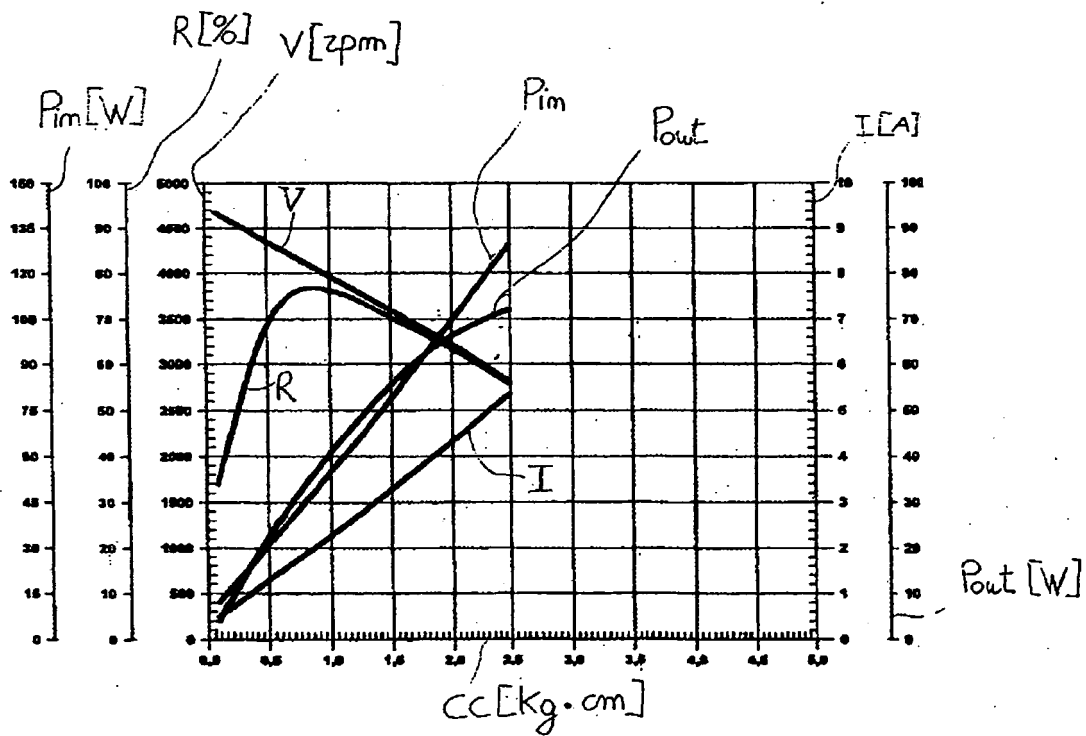


FIG. 11

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1582681 A1 [0003]