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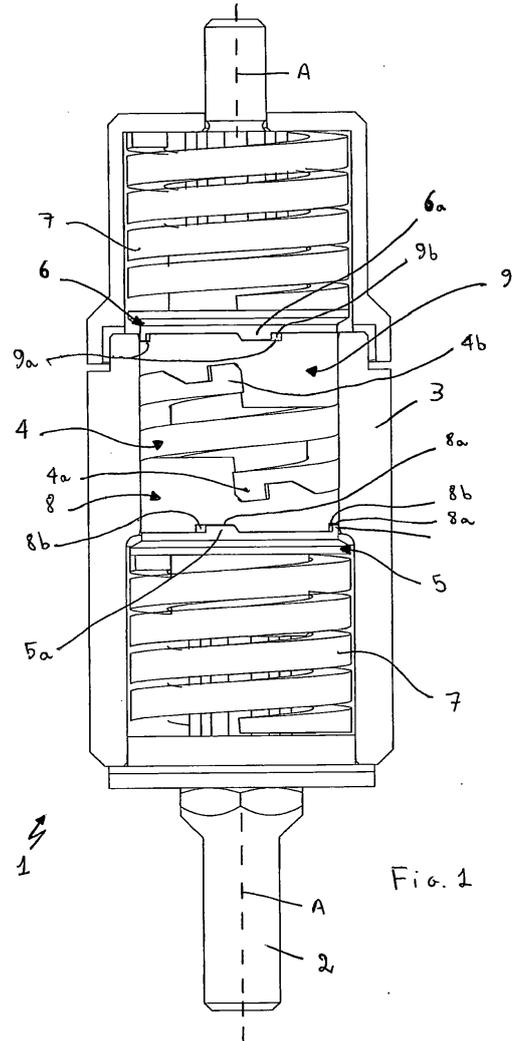
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Remarks:

Amended claims in accordance with Rule 137(2) EPC.

(54) **Hinge element with angular selective lock**

(57) A hinge element for wings and/or doors of vehicles and/or furniture, comprising a first portion (2) connectable to a fixed part of a vehicle or a piece of furniture and a second portion (3) operatively associated with the first portion (2) and connectable to a movable part of a vehicle or a piece of furniture, the first and second portions (2,3) in co-operation defining a rotation axis A; the hinge element further comprises angular selective locking means (4,5,6) coaxially mounted between the first and second portions (2,3) and susceptible of being configured in a reversible manner between a braking condition at which relative rotation between the first and second portions (2,3) is substantially prevented and an unlocking condition at which, on the contrary, relative rotation between the first and second portions (2,3) is substantially allowed.



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Description

[0001] The present invention relates to a hinge element that can be adopted in furniture and/or vehicle doors and provided with such functional features as to allow a so-called "angular selective lock", i.e. features capable of allowing the door or the wing to be maintained in a steady and "braked" position, at any angular position of intermediate, minimum or maximum opening.

[0002] It is known that furniture or vehicle doors are generally opened (and closed) by a rotating-motion action carried out around the axis of one or more hinges and these motion actions can lead to various configurations of partial opening (as a function of the different build of the user entering/exiting the vehicle or of the different volume of the object to be introduced into or removed from the furniture compartment, for example, and so on).

[0003] Up to now, to enable stabilisation of some "partial opening" positions, pivoting mechanisms are used that comprise suitable indented guides which offer peaks of resistance to rotation located at a finite and discrete number of rotation angles; due to this type of devices (widely used on car doors) "steady and braked" positions can be obtained only in few angular configurations, while out of these angles the door/wing rotates with a low resistance and therefore must be retained in position by the user.

[0004] Alternatively, it is possible to provide rotation hinges offering a high and constant resistance to rotation (by mounting the hinge parts with a high interference or providing suitable friction means, for example); therefore, the constant braking effect of this resistance makes every possible partial aperture angle "steady", but a great physical effort is required from the user for any manipulation of the door/wing.

[0005] It is finally known a third type of opening and closing articulation contemplating the cooperation between traditional hinges and usually hydraulic or pneumatic "shock absorbing" or "damping" jacks; these jacks offer high resistance during the starting step of the door/wing movements but instantaneously reduce this resistance immediately after said starting step; in this way when the door/wing is not moved, it is possible to obtain steadiness and braking, and at the same time low actuation forces are required during movements.

[0006] However, the presence of jacks, usually of the linear type and therefore of non-negligible linear size, involves great bulkiness of the opening and closing mechanism, which cannot be always accepted in terms of general construction (let us think of the reduced space for positioning these jacks in the car bodyworks, for example) and also increases costs, in addition producing a potential decrease in reliability and maintenance.

[0007] While the known art mentioned above is widely used, it has different drawbacks: accordingly, in this field, the present invention aims at conceiving a hinge element with angular selective lock capable of obviating the above mentioned limits.

[0008] Mainly, the present invention aims at conceiving a hinge element enabling opening positions of the wing/door that are steady and braked in any intermediate angle to be obtained, while at the same time allowing movements of the wing/door to be carried out with little effort.

[0009] At the same time, the present invention aims at conceiving a hinge element having maximum structure simplicity and above all maximum compactness, so that mounting of same can take place in the widest range of applications, while costs are minimised.

[0010] The present invention also aims at conceiving a hinge element having optimal reliability and requiring almost zero maintenance during its operating life, as well as having costs reduced as much as possible.

[0011] The technical task mentioned and the aims specified are substantially achieved by a hinge element having the features set out in one or more of the appended claims.

[0012] Description of a preferred but not exclusive embodiment of a hinge element according to the invention is now given by way of non-limiting example, with reference to the accompanying drawings, in which:

- Fig. 1 is a section view of the hinge element according to the invention in a first operating configuration;
- Fig. 2 is a section view of the hinge element according to the invention in a second operating configuration;
- Fig. 3 is a section view of the hinge element according to the invention in a third operating configuration; and
- Fig. 4 is a section view of the hinge element according to the invention in a fourth operating configuration.

[0013] With reference to the drawings, the hinge element according to the present invention is generally identified with reference numeral 1 and it substantially comprises a first portion 2 connectable to a "fixed part" (the chassis of a vehicle or the frame of a piece of furniture, for example) and a second portion 3 operatively associated with the first portion 2 and in turn connectable to a "movable part" (the door or hatchback of a vehicle or the wing of a piece of furniture, for example); the above mentioned first and second portions 2 and 3 in mutual cooperation define a rotation axis A.

[0014] Advantageously, hinge 1 comprises angular selective locking means, that is coaxially mounted between the first and second portions 2, 3 and also can be reversibly configured between a braking condition at which relative rotation between the first and second portions is substantially prevented, and an unlocking condition at which, on the contrary, relative rotation between the first and second portions is substantially allowed.

[0015] At this point the structural and operating differences of the present invention from the above mentioned known art have to be emphasised: in fact, on the one hand there are hinges with "discrete" angular lock that

can be found in the car field and do not possess locking means "coaxial" with the hinge but generally depend on shaped contours mounted out of the hinge, and on the other hand there are hinges with effect of variation of the resisting force, which effect is obtained through hydraulic jacks once again not coaxial with the hinge.

[0016] Also to be remembered is the presence of hinges with coaxial braking means but that cannot be reconfigured into two conditions at which they exert torsional stress/rotation-resisting forces of differentiated intensity.

[0017] Turning back to the structural and operating description of the invention, it is possible to see that the angular selective locking means comprises a torsion body 4 (preferably of "elastic" nature and typically consisting of a twisted spring); this torsion body 4 is coaxially fitted on the first or second portion 2 or 3 and can be reversibly configured between a braking condition, at which it is wound around axis A on the first or second portion, and a loosened condition at which on the contrary it becomes unrolled around the axis relative to the first or second portion.

[0018] In terms of operation, due to the presence of the torsion body, there are at least two interfacing conditions with the main "kinematic" mechanisms of the hinge; in fact, when the spring exerts its maximum radial force around the portion on which it is pivotally mounted, a high value of rotation-resisting force is created that is discharged on the two hinge portions and therefore makes the angular position of the door/wing connected to the "movable" portion of said hinge steady and braked.

[0019] When the door/wing's user wishes to move said door/wing from the steady and braked position, "unrolling" of the spring is caused (or in other words, the spring is actuated in such a manner that its winding angle on the hinge portion on which it is mounted decreases), instantaneously reducing the torsional stress-resisting force and actually eliminating braking on the wing/door; in this way the user can move the wing/door without any effort and at the end of movement (that can be a partial-opening or partial-closing movement) the hinge immediately comes back to a configuration offering steadiness and braking again.

[0020] More generally, the spring is urged at one of its ends (depending on the rotation direction to be imparted to the door/wing) so as to reduce its radial pressure; this radial-pressure reduction gives rise to a consequent and instantaneous reduction in the rotation-resisting force.

[0021] In greater detail and referring to the accompanying drawings, it will be possible to see that the torsion body 4 has a first end 4a and a second end 4b mutually opposite.

[0022] From the operating point of view, the torsion body 4 exerts the braking effect due to friction generated by the radial contact pressure (that can be a "forcing" pressure towards a surface placed on the outer diameter thereof, as in the accompanying drawings, or a "clamping" pressure on the inner diameter); as to the example shown in the figures, forcing is maximum when a tangen-

tial thrust is exerted on each of the two ends 4a and 4b, while the braking effect is reduced (by a factor of about 2 to 4) when traction is exerted on each of said ends 4a and 4b.

5 **[0023]** If on the contrary a clamping effect is wished to be utilised (given by contact of the torsion body 4 with the inner diameter thereof), forcing is maximum when a tangential traction is exerted on the ends thereof, while the braking effect is reduced when on the ends a tangential thrust is exerted.

10 **[0024]** In other words, it is possible to see that the torsion body 4 can be reversibly configured between at least two radial-forcing conditions on the portion (2 or 3) on which it is fitted; these forcing conditions are therefore adapted to generate different rotation torque between portions 2 or 3, by friction.

15 **[0025]** The angular and radial movement between the ends of the torsion body 4 can be, within the scope of the present invention, very reduced (at least in macroscopic terms or in relation to the sizes typical of the hinge 1 components) or even "unnecessary" because the effect of varying the braking force can be obtained by varying the radial pressure (outwards or inwards) by thrust or traction on one end 4a or 4b.

20 **[0026]** The angular selective locking means in turn comprises a first and a second release element 5 and 6, which are connected to the above mentioned first and second ends 4a and 4b respectively and are therefore respectively interposed between the torsion body 4 and the first and second portions 2 and 3.

25 **[0027]** In the illustrated embodiment, the release elements 5 and 6 are slidable along axis A and at the same time are angularly secured to each other and to at least one of portions 2 or 3, so as to ensure the above described operation; in other words, the first and second release elements 5 and 6 can be reversibly configured between an engagement position, at which they enable the torsion body 4 to take its braking condition, and a disengagement position at which they instead allow the torsion body 4 to take its loosened condition.

30 **[0028]** It will be understood that the change of configuration of the release elements 5 and 6 takes place at the moment the user exerts a "starting" action for moving the door/wing from the angular position in which it is; conveniently, depending on the rotation direction for opening or closure of the door/wing - and therefore on the hinge portion connected to the door/wing - change of configuration of one alone of the release elements occurs, in such a manner as to ensure "reversible" effectiveness in both the actuation directions.

35 **[0029]** In terms of technical effect, the operating cooperation of the parts hitherto described enables actuation of the door/wing with low effort or force in both possible rotation directions, starting from any (angular) position in which the hinge is braked in both rotation directions.

40 **[0030]** In other words, the first and second release elements 5 and 6 can be configured in mutual alternation between the respective engagement position and the re-

spective disengagement position; to carry out this change of configuration the release elements are slidable along axis A in such a manner that when the first release element 5 is in the engagement position, the second release element 6 is in the disengagement position (and vice versa, when the first release element 5 is in the disengagement position, the second release element 6 is in the engagement position).

[0031] The first and second release elements 5 and 6 can be therefore (reversibly) configured between a position in which they exert a (preferably tangential) thrust or traction on the ends 4a and 4b of the torsion body 4, and these positions are therefore adapted to generate the different "radial forcing" conditions enabling the hinge 1 to reach its particular operation.

[0032] From a structural point of view, it should be recognised that the release elements 5 and 6 are angularly integral with each other and with the first portion 2 (or, depending on current requirements, with the second portion 3); the first and second release elements 5 and 6 can be thus configured between a simultaneous-engagement position in the two rotation directions, in which they ensure braking without play of the "movable part" of hinge 1, and a position in which they instead enable subsequent unlocking in the two possible rotation directions of the door/wing mounted on hinge 1.

[0033] In order to allow the release elements to change configuration in a reversible manner, also present is thrust means 7 (consisting of axial springs fitted on axis A, for example) operatively acting on the first and/or second release element 5 and/or 6 to configure them at least in the engagement condition.

[0034] Structural connection between the torsion body 4 and the rest of the mechanism of the angular selective locking means is further ensured by the following components:

- a first intermediate connecting block 8 interposed between the first end 4a of the torsion body 4 and the first release element 5; and
- a second intermediate connecting block 9 interposed between the second end 4b of the torsion body 4 and the second release element 6.

[0035] The mentioned intermediate connecting blocks 8 and 9 are fitted on axis A and are further rotatable around axis A, in such a manner as to enable the ends of the torsion body to move, consequently varying the winding angle.

[0036] With reference to the embodiment reproduced in the figures (by way of example), it is possible to see that the mentioned intermediate connecting blocks 8 and 9 are rotatable around axis A and at the same time are adapted to transmit tangential traction and thrust forces to the ends 4a and 4b of the torsion body 4.

[0037] As regards transfer of mechanical actions, it should be pointed out that the first and second intermediate connecting blocks 8 and 9 are adapted to transmit

thrust or traction forces, preferably in a tangential direction, to the ends 4a and 4b of the torsion body 4; to this aim, elements 8 and 9 are not constrained in rotation on pivot (second portion) 2 (unlike elements 5 and 6), but they rotate with the torsion element 4 around axis 2.

[0038] From an operating point of view, the intermediate connecting blocks 8 and 9 also interface with the release elements 5 and 6, through the presence of suitable means for individual alternated engagement; this means for individual alternated engagement acts between the torsion body 4 and the first or second release element 5 or 6, in such a manner that the first release element 5 is active on the torsion body 4 on the occurrence of rotations in a first direction around axis A or alternatively in such a manner that the second release element 6 is active on the torsion body 6 on occurrence of rotations around axis A in a second direction opposite to the just mentioned "first rotation direction".

[0039] In greater detail, it will be appreciated that the means for individual alternated engagement comprises a first series of engagement teeth 5a which protrude from the first release body 5, and a corresponding first series of engagement seats 8a formed in the first intermediate connecting block 8 and designed to receive the first series of engagement teeth 5a with circumferential tolerance around axis A.

[0040] To ensure the necessary symmetry of operation during opening and closing, also present is a second series of engagement teeth 6a protruding from the second release body 6 and a corresponding second series of engagement seats 9a formed in the second intermediate connecting block 9 and designed to receive the second series of engagement teeth 6a with circumferential tolerance 9b around axis A.

[0041] The circumferential tolerance 8b and 9b has been such implemented in the present invention as to enable alternated operation of the release bodies 5 and 6; in fact, this tolerance allows a "dead rotation angle" of the hinge to be available in which, depending on the rotation direction, first the tolerance becomes exhausted and subsequently one of the two release bodies is engaged while the other is excluded from operation.

[0042] Engagement and disengagement of the release bodies 5 and 6 are in addition obtained through a suitable profile of the engagement seats 8a and 9a that on one side have a stop wall substantially perpendicular to a perimetral edge of the respective intermediate connecting block, and on the opposite side have an interference surface with an inclined course.

[0043] As to the engagement teeth 5a and 6a, they have a profile that on one side has a perpendicular corner adapted to set itself against the stop wall of the engagement seats 8a and 9a and on the other (opposite) side have an inclined surface designed to relatively run on the corresponding interference surface of the engagement seats.

[0044] According to a further (optional) feature of the present invention, the angular selective locking means

can be made adapted to generate starting torque having different absolute values for accomplishing the unlocking condition in opposite rotation directions (clockwise and anticlockwise, for example) of the first portion 2 relative to the second portion 3 of hinge 1; this differentiation of the absolute values of the starting torque can be, for example, obtained by acting on the shape of the operatively coupled components 5a and 8a, or on the shape of the operatively coupled components 6a and 9a (or, if appropriate, on the force imparted by the thrust means 7 that can be consequently dimensioned).

[0045] If it is wished to provide the present invention with an additional functional feature, it is advantageously possible to equip it with an unlocking assembly acting at least on the torsion body 4 and/or the first release body 5 and/or the second release body 6, so as to constantly maintain the angular selective locking means in the unlocking condition in a predetermined sub-interval of aperture angles (and typically, in a sub-interval included between a predetermined threshold value and a closing angle of the wing/door).

[0046] The unlocking assembly can be made following many modalities, provided it enables low actuation forces of the wing/door to be maintained at least in a rotation sub-arc thereof included between the overall rotation arc of the hinge element; for instance, in the car field, the unlocking assembly can be used for maintaining the door free from constraints to rotation in all partial-aperture angles that are very close to the condition of "door closed" until reaching a given minimum partial aperture angle that can be dictated by ergonomic requirements.

[0047] Thanks to the features of the present invention, the resisting force acting on the hinge can be accurately calibrated; in particular, the angular selective locking means is adapted to generate rotation-resisting friction forces between the first and second portions of the hinge element 1 having differentiated intensity between the braking condition and the unlocking condition; in a preferential differentiation of these values the "starting" forces (or in other words, the forces to rotation enabling the "steady and braked" opening condition to be overcome) are provided to be substantially double in the braking condition relative to the unlocking condition, but for particular applications (e.g. doors/wings with out-standard weights and/or sizes) this difference can reach a scale factor at least quadruple in the braking condition relative to the unlocking condition.

[0048] The invention achieves many advantages.

[0049] In fact, due to the particular construction architecture hitherto described (and hereinafter claimed) it is possible to obtain an almost infinite variety of partial aperture angles of doors/wings, and all these possible angles are equally characterised by being steady and braked; at the same time, starting from anyone of these partial aperture angles it is possible to move the doors/wings with low actuation forces or stress.

[0050] Furthermore, the structure and operating features of the present invention enable considerable com-

pactness of the whole and very quick and error-proof assembly.

[0051] As a result of the above, it is possible to see that a further advantage of the present invention consists in great operating reliability and great duration.

[0052] Finally, it should be appreciated that the present invention enables the manufacturing costs of the tool to be maintained low and does not involve particular complications or modifications and adaptations even on vehicles or furniture of known type, which is advantageous for the overall production economy and the final price of the product.

15 Claims

1. A hinge element for wings and/or doors of vehicles and/or furniture, comprising a first portion (2) connectable to a fixed part of a vehicle or a piece of furniture and a second portion (3) operatively associated with said first portion (2) and connectable to a movable part of a vehicle or a piece of furniture, said first and second portions (2, 3) in co-operation defining a rotation axis (A),

characterised in that it comprises angular selective locking means coaxially mounted between the first and second portions (2, 3) and susceptible of being configured in a reversible manner between a braking condition at which relative rotation between the first and second portions (2, 3) is substantially prevented and an unlocking condition at which, on the contrary, relative rotation between the first and second portions (2, 3) is substantially allowed.

2. An element as claimed in claim 1, wherein said angular selective locking means comprises a torsion body (4) preferably elastic and more preferably comprising a twisted spring, said torsion body (4) being coaxially fitted on the first or the second portion (2 or 3) and being able to be configured in a reversible manner between a braking condition at which it is wound up around the axis (A) on the first or second portion (2 or 3) and a loosened condition at which on the contrary it becomes unrolled around the axis (A) relative to the first or second portion (2 or 3) .

3. An element as claimed in claim 2, wherein said torsion body (4) has a first end (4a) and a second end (4b) mutually opposite, the angular selective locking means further comprising a first and a second release element (5, 6) connected to said first and second ends (4a, 4b) respectively, and interposed between the torsion body (4) and the first and second portions (2 and 3) respectively, said first and second release means (5, 6) being able to be configured in a reversible manner between an engaged position at which they enable the torsion body (4) to take said braking condition and a disengaged position at which

on the contrary they enable the torsion body (4) to take said loosened condition.

4. An element as claimed in claim 3, wherein the first and second release elements (5, 6) are able to be configured, in mutual alternation, between said engaged position and said disengaged position, are slidable along the axis (A) and are angularly integral with each other and relative to the first or the second portion (2 or 3), the first release element (5) being in the engaged position when the second release element (6) is in the disengaged position and vice versa.

5. An element as claimed in anyone of the preceding claims, wherein also present is thrust means (7) operatively acting on the first and/or the second release element (5 and/or 6) so as to configure them at least in the engaged condition.

6. An element as claimed in anyone of the preceding claims, wherein also present is:

- a first intermediate connecting block (8) interposed between the first end (4a) of the torsion body (4) and the first release element (5); and
 - a second intermediate connecting block (9) interposed between the second end (4b) of the torsion body (4) and the second release element (6),
- said first and second intermediate connecting blocks (8, 9) being fitted on the axis (A) and being further rotating around the axis (A) itself.

7. An element as claimed in claim 6, wherein there is also the presence of single-engagement means active in alternation between the torsion body (4) and with the first or second release element (5 or 6), the first release element (5) being active on the torsion body (4) on occurrence of rotations in a first direction around the axis (A), the second release element (6) being active on the torsion body (4) on occurrence of rotations around the axis (A) in a second direction opposite to said first direction.

8. An element as claimed in claim 7, wherein said single-engagement means in alternation comprises:

- a first series of engagement teeth protruding from the first release body (5);
- a first series of engagement seats (8a) formed in the first intermediate connecting block (8) and designed to receive said first series of engagement teeth (5a) with circumferential tolerance (8b) around the axis (A);
- a second series of engagement teeth (6a) protruding from the second release body (6); and
- a second series of engagement seats (9a) formed in the second intermediate connecting

block (9) and designed to receive said second series of engagement teeth (6a) with circumferential tolerance (9b) around the axis (A).

9. An element as claimed in anyone of the preceding claims, wherein also present is an unlocking assembly active at least on the torsion body (4) and/or the first release body (5) and/or on the second release body (6), in such a manner as to constantly maintain the angular selective locking means in the unlocking condition in a predetermined sub-interval of aperture angles, said sub-interval being preferably included between a predetermined threshold value and a closure angle.

10. An element as claimed in anyone of the preceding claims, wherein the angular selective locking means is adapted to generate friction forces resisting to rotations between the first and second portions (2, 3) having differentiated intensity between the braking condition and the unlocking condition, said intensity being preferably double in the braking condition and more preferably quadruple in the braking condition.

11. An element as claimed in anyone of the preceding claims, wherein the angular selective locking means is adapted to generate static torque having different absolute values for carrying out the unlocking condition in opposite rotation directions of the first portion (2) relative to the second portion (3) of the hinge (1).

Amended claims in accordance with Rule 137(2) EPC.

1. A hinge element for wings and/or doors of vehicles and/or furniture, comprising a first portion (2) connectable to a fixed part of a vehicle or a piece of furniture and a second portion (3) operatively associated with said first portion (2) and connectable to a movable part of a vehicle or a piece of furniture, said first and second portions (2, 3) in co-operation defining a rotation axis (A), wherein said hinge element comprises angular selective locking means coaxially mounted between the first and second portions (2, 3) and susceptible of being configured in a reversible manner between a braking condition at which relative rotation between the first and second portions (2, 3) is substantially prevented and an unlocking condition at which, on the contrary, relative rotation between the first and second portions (2, 3) is substantially allowed and wherein said angular selective locking means comprises a torsion body (4) preferably elastic and more preferably comprising a twisted spring, said torsion body (4) being coaxially fitted on the first or the second portion (2 or 3) and being able to be configured in a reversible manner

between a braking condition at which it is wound up around the axis (A) on the first or second portion (2 or 3) and a loosened condition at which on the contrary it becomes unrolled around the axis (A) relative to the first or second portion (2 or 3), **characterized** by the fact that said torsion body (4) has a first end (4a) and a second end (4b) mutually opposite, the angular selective locking means further comprising a first and a second release element (5, 6) connected to said first and second ends (4a, 4b) respectively, and interposed between the torsion body (4) and the first and second portions (2 and 3) respectively, said first and second release means (5, 6) being able to be configured in a reversible manner between an engaged position at which they enable the torsion body (4) to take said braking condition and a disengaged position at which on the contrary they enable the torsion body (4) to take said loosened condition, wherein the first and second release elements (5, 6) are able to be configured, in mutual alternation, between said engaged position and said disengaged position, are slidable along the axis (A) and are angularly integral with each other and relative to the first or the second portion (2 or 3), the first release element (5) being in the engaged position when the second release element (6) is in the disengaged position and vice versa.

2. An element as claimed in anyone of the preceding claims, wherein also present is thrust means (7) operatively acting on the first and/or the second release element (5 and/or 6) so as to configure them at least in the engaged condition.

3. An element as claimed in anyone of the preceding claims, wherein also present is:

- a first intermediate connecting block (8) interposed between the first end (4a) of the torsion body (4) and the first release element (5); and
 - a second intermediate connecting block (9) interposed between the second end (4b) of the torsion body (4) and the second release element (6),
- said first and second intermediate connecting blocks (8, 9) being fitted on the axis (A) and being further rotating around the axis (A) itself.

4. An element as claimed in claim 3, wherein there is also the presence of single-engagement means active in alternation between the torsion body (4) and with the first or second release element (5 or 6), the first release element (5) being active on the torsion body (4) on occurrence of rotations in a first direction around the axis (A), the second release element (6) being active on the torsion body (4) on occurrence of rotations around the axis (A) in a second direction opposite to said first direction.

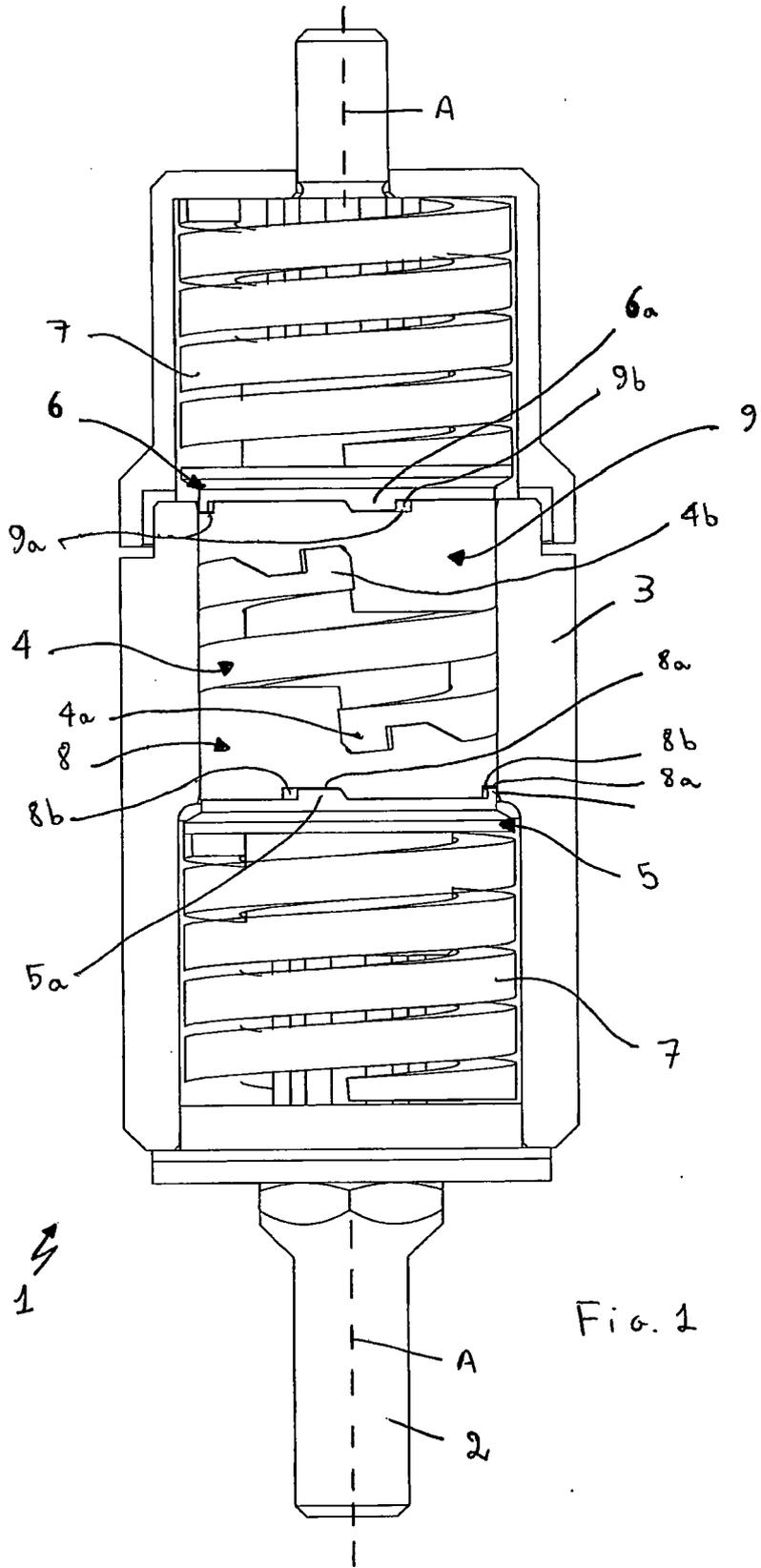
5. An element as claimed in claim 4, wherein said single-engagement means in alternation comprises:

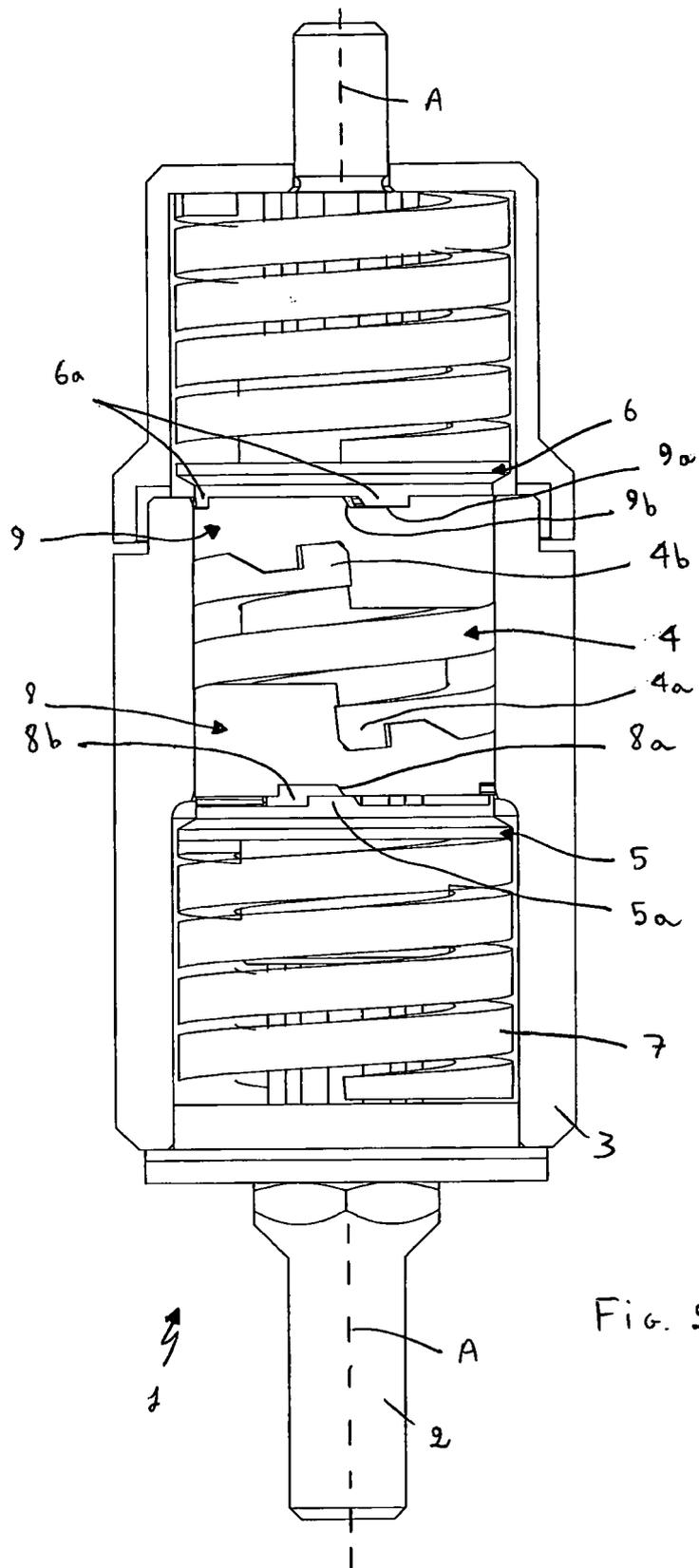
- a first series of engagement teeth protruding from the first release body (5);
- a first series of engagement seats (8a) formed in the first intermediate connecting block (8) and designed to receive said first series of engagement teeth (5a) with circumferential tolerance (8b) around the axis (A);
- a second series of engagement teeth (6a) protruding from the second release body (6); and
- a second series of engagement seats (9a) formed in the second intermediate connecting block (9) and designed to receive said second series of engagement teeth (6a) with circumferential tolerance (9b) around the axis (A).

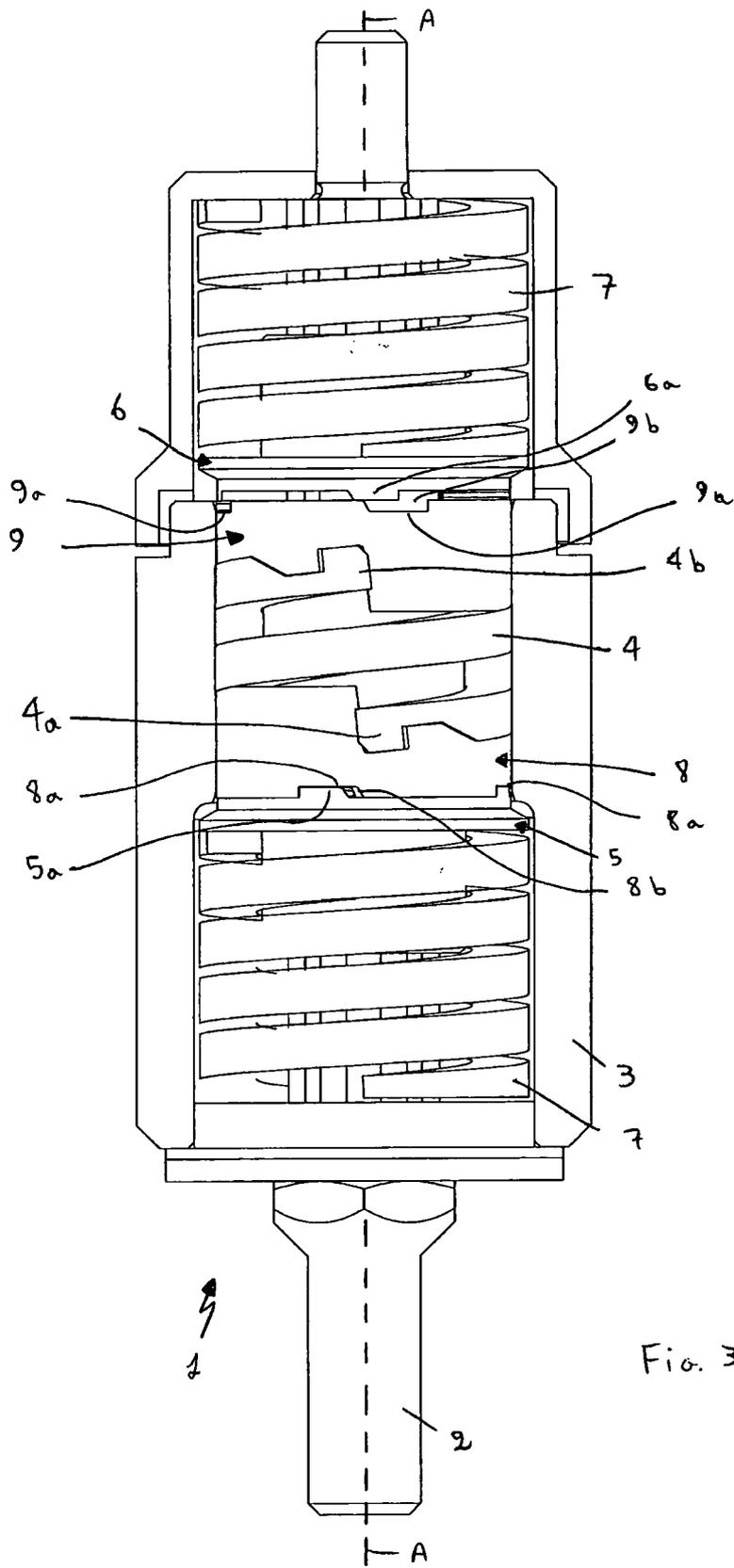
6. An element as claimed in anyone of the preceding claims, wherein also present is an unlocking assembly active at least on the torsion body (4) and/or the first release body (5) and/or on the second release body (6), in such a manner as to constantly maintain the angular selective locking means in the unlocking condition in a predetermined sub-interval of aperture angles, said sub-interval being preferably included between a predetermined threshold value and a closure angle.

7. An element as claimed in anyone of the preceding claims, wherein the angular selective locking means is adapted to generate friction forces resisting to rotations between the first and second portions (2, 3) having differentiated intensity between the braking condition and the unlocking condition, said intensity being preferably double in the braking condition and more preferably quadruple in the braking condition.

8. An element as claimed in anyone of the preceding claims, wherein the angular selective locking means is adapted to generate static torque having different absolute values for carrying out the unlocking condition in opposite rotation directions of the first portion (2) relative to the second portion (3) of the hinge (1).







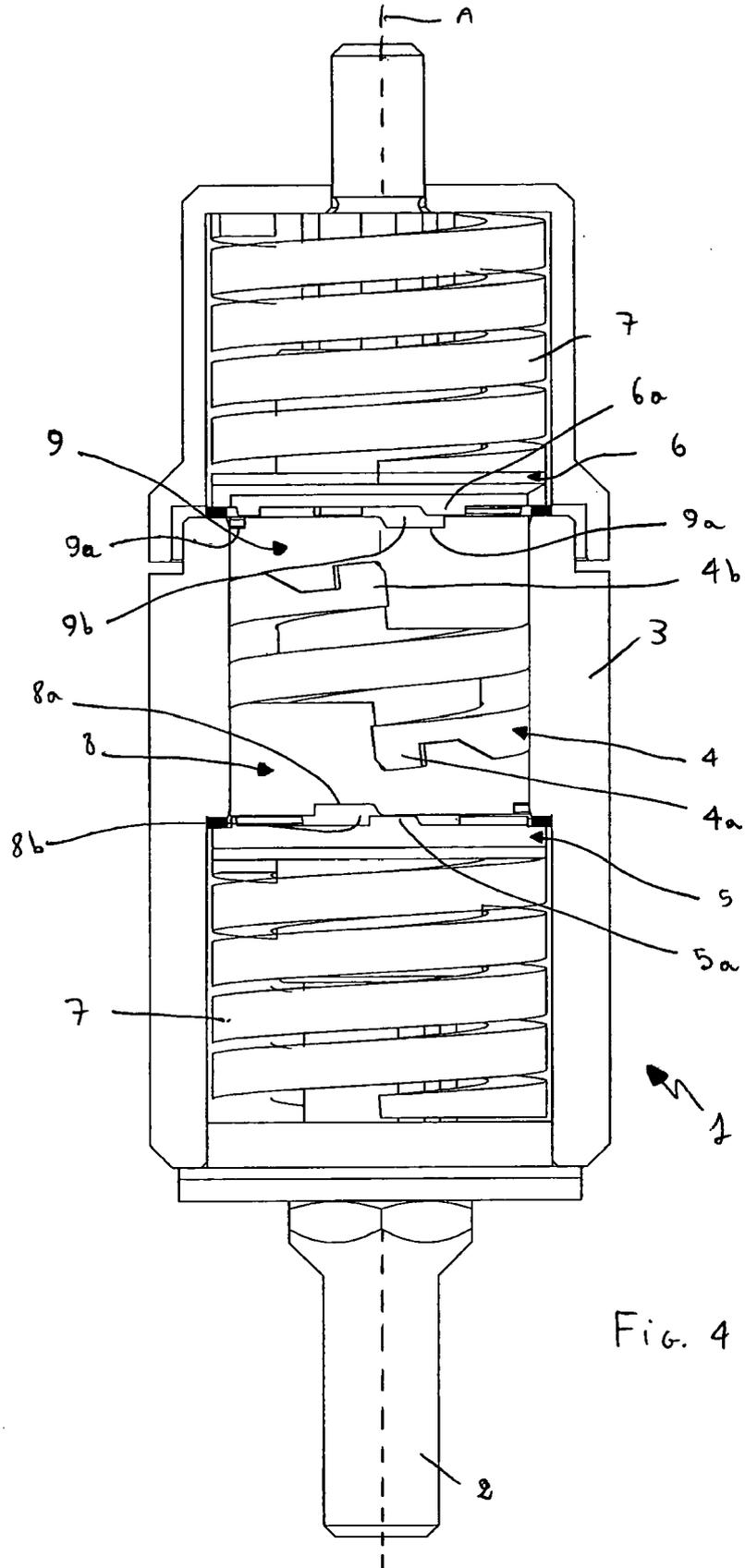


Fig. 4



EUROPEAN SEARCH REPORT

Application Number
EP 11 42 5306

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	FR 2 865 234 A1 (COUTIER MOULAGE GEN IND [FR]) 22 July 2005 (2005-07-22) * page 6, line 25 - page 7, line 23; figures *	1-5,9,10 6-8	INV. E05D11/10
X	----- WO 2006/074811 A1 (FICO CABLES SA [ES]; TERRADES PRAT JAUME [ES]; VIDAL JORNET JORDI [ES]) 20 July 2006 (2006-07-20) * page 13, line 19 - page 16, line 25; figures 7-11 *	1-3,10, 11	
X	----- US 2003/102692 A1 (MOOY ROBERT H [CA] ET AL) 5 June 2003 (2003-06-05) * paragraph [0055]; figures 1-12 *	1-3,10, 11	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05D
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		22 May 2012	Witasse-Moreau, C
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

2
EPO FORM 1503_03.02 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 42 5306

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

22-05-2012

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
FR 2865234	A1	22-07-2005	NONE	

WO 2006074811	A1	20-07-2006	DE 102005001706 A1	27-07-2006
			EP 1841937 A1	10-10-2007
			WO 2006074811 A1	20-07-2006

US 2003102692	A1	05-06-2003	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82