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(54) **Support assembly for an arm of a drop arm awning with a tensioning device**

(57) The support assembly comprises a base part (1) and an arm (2) arranged to rotate with respect to the base part (1) between high tension and low tension positions, and a tensioning device including a elastic element (6) arranged to bias the arm to said low tension position. A locking device includes a first protrusion (8) formed in an angled portion (13) of the base part (1) facing a peripheral wall (7) of a proximal end of the arm (2), a second protrusion (9) formed in an outer surface of said peripheral wall (7) close to said first protrusion (8) when the arm (2) is in the high tension position, and a retaining part (10) defining a stem (36) having grooves (11) to lock with said first and second protrusions (8, 9) when the retaining part (10) is inserted between said angled portion (13) and the peripheral wall (7).

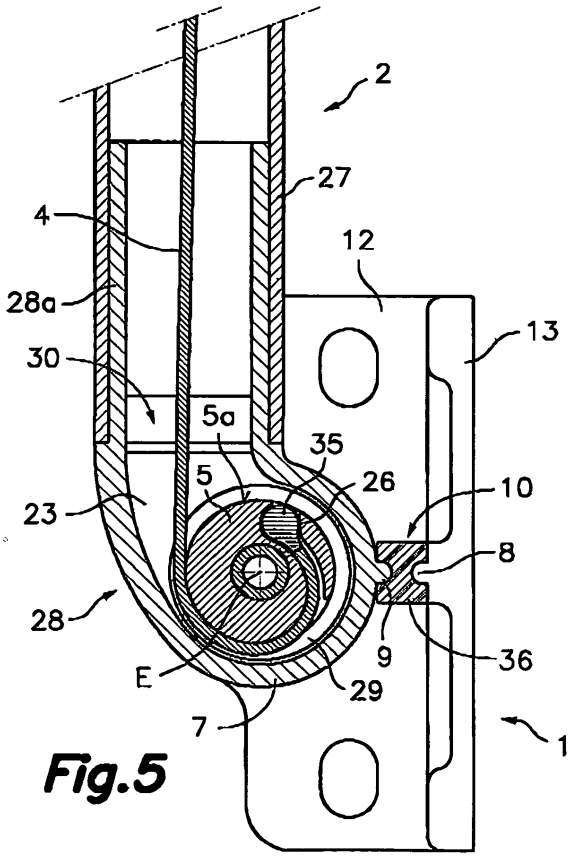

Fig.5

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Description

Technical Field

[0001] The present invention relates to a support assembly for an arm of a drop arm awning with a tensioning device, and more specifically to an articulated support assembly for an arm of a drop arm awning with an elastic device under tension arranged to apply a turning torque to the arm and to provide tension to the canvas, and provided with a locking device for immobilizing the rotation of the arm with respect to a base part in a high or maximum tension position.

Background

[0002] Drop arm awnings generally comprise a pair of upper supports which bear a winding shaft in which there is fixed a rear edge of a canvas, a load bar fixed to a front edge of said canvas, and a pair of lower supports connected in an articulated manner to proximal ends of respective rigid arms the distal ends of which are connected in an articulated manner to the mentioned load bar. The winding shaft is connected to a manually operated or motor-driven mechanism which allows rotating the winding shaft in both directions to wind or unwind the canvas, and elastic elements are housed inside the arms and connected to the respective lower supports to apply a turning torque on the arms in a suitable direction to help extend the canvas, providing tension thereto at all times.

[0003] Document ES 1051839 U discloses an articulated support for an arm of a drop arm awning with elastic load. The support comprises, for the proximal end of each arm, a base part configured to be fixed to a support surface, such as a wall or the like, and the arm has a lower articulation end connected to the corresponding base part such that the arm can rotate with respect to the base part around an articulation axis. The base part defines a core provided with a side surface arranged around said articulation axis, and in said core there is fixed an end of a flexible transmission element the other opposite end of which is connected to an end of an elastic element, such as a coil spring, housed inside the arm and connected thereto at its other opposite end, such that a portion of the mentioned flexible transmission element is supported on said side surface of the core. As the arm rotates from an unfolded position to a folded position, the flexible transmission element is wound on the core of the base part and pulls on the elastic element, deforming it and increasing the tension exerted by it. When the arm rotates in the opposite direction a contrary effect occurs, without the elastic element ever ceasing to provide tension.

[0004] The mentioned lower articulation end of the arm defines a cup provided with a peripheral wall which surrounds the mentioned core of the base part, leaving an annular space between the side surface of the core and an inner surface of said peripheral wall of the cup sufficient to house that part of the flexible transmission element which is supported on the core. The lower articulation end of the arm also provides a passage communicating the annular space with the hollow interior of the arm where the elastic element is assembled and the flexible transmission element is installed through said passage. With this arrangement, the flexible transmission element remains completely concealed by the cup in the articulation area. The cup has at an outer end an orifice through which a fixing screw coaxial with the articulation axis is installed, and a cover inserted in an edge of said orifice conceals the head of the screw and the orifice. The core includes a hole configured to receive, when the mentioned cover is removed, a pin introduced through a notch provided in an edge of the orifice of the cup, for the purpose of immobilizing the rotation of the arm with respect to the base part during operations associated with installing and uninstalling the awning.

[0005] A drawback of this locking device formed by the mentioned pin and the corresponding hole is that it requires the cover to be removed for its operation. When, as is usual, the arm and support assembly is supplied in a locked manner from the factory or workshop, the cover must be supplied loose separately, with an evident risk of being lost. In addition, in order for the locking pin to be able to be installed through the orifice of the cup, the hole of the base part in which it is housed must be significantly close to the articulation axis, and this makes the shearing force to which the pin is subjected due to the turning torque imparted by the elastic element be relatively high.

Disclosure of the Invention

[0006] The present invention contributes to mitigate or solve the previous and other drawbacks by providing a support assembly for an arm of a drop arm awning with a tensioning device, of the type comprising a base part configured to be fixed to a support surface and linked to a proximal end of said arm such that the arm can rotate with respect to the base part around an articulation axis. The mentioned tensioning device comprises an elastic element under tension housed inside the arm and connected to a flexible transmission element, which is connected in turn to a core of the base part. The mentioned core has a side surface surrounding the articulation axis, and a portion of said flexible transmission element is supported on said side surface of the core. The mentioned proximal end of the arm defines a peripheral wall partially surrounding the core and that portion of the flexible transmission element supported thereon. With this construction, rotations of the arm with respect to the base part pull on said flexible transmission element or loosen it, thereby varying the tension of said elastic element between high tension and low tension positions. The support assembly is furthermore provided with a locking device for immobilizing the rotation of the arm with respect to the base part in said high tension position.

[0007] The support assembly of the present invention

is **characterized in that** said locking device comprises at least one first retaining configuration formed in the base part, at least one second retaining configuration formed in an outer surface of the peripheral wall of the proximal end of the arm, in a position such that said second retaining configuration is close to said first retaining configuration when the arm is in the high tension position, and a removable retaining part configured to be locked with both the first and second retaining configurations and thereby immobilize the rotation of the arm with respect to the base part in the high tension position against a torque imparted by the tensioning device.

[0008] The mentioned retaining part has a stem and a gripping configuration by means of which it can be gripped to insert the stem into the support assembly in a locking position, locking the first and second retaining configurations when the arm has been previously rotated with respect to the base part to the high tension position against the torque imparted by the tensioning device. The retaining part can then be left indefinitely inserted in the locking position as long as necessary, which facilitates to a great extent operations of storing, handling and installing or uninstalling the awning; especially the operations of fixing the base parts to a wall or another support surface. Once the awning is installed, or when deemed appropriate, the retaining part can be gripped at the gripping configuration, which is in an accessible position when the stem is inserted, to pull on it and remove the retaining part from the support assembly, whereby the arm is free again to rotate with respect to the base part and subjected to the torque imparted by the tensioning device and to the torque imparted by the tension of the canvas.

[0009] The base part and the arm are configured such that the respective retaining configurations are relatively far from the articulation axis, therefore the forces to which the retaining part is subjected due to the torque imparted by the tensioning device are relatively low compared with supports of the prior art, and consequently the retaining part can be made of a relatively weak material, such as plastic, for example,. Another advantage of the support assembly of the present invention over other supports of the prior art is that the retaining part can be inserted and removed as many times as necessary without needing to disassemble any of the parts which form the support assembly.

Brief Description of the Drawings

[0010] The previous and other features and advantages will be more fully understood from the following detailed description of an embodiment with reference to the attached drawings, in which:

Figure 1 is an exploded perspective view of a support assembly for an arm of a drop arm awning with a tensioning device according to an embodiment of the present invention;

Figure 2 is a perspective view of a removable retaining part forming part of the support assembly of the present invention as an auxiliary element;

Figure 3 is a cross sectional view taken along the plane III-III indicated in Figure 2;

Figure 4 is a perspective view of the support assembly of Figure 1 assembled, with the arm arranged in a high tension position with respect to the base part and locked by means of the retaining part of Figure 2;

Figure 5 is a cross sectional side view of the support assembly locked in the high tension position;

Figure 6 is a bottom view of the support assembly arranged in the high tension position and without the retaining part; and

Figure 7 is a cross sectional side view of the support assembly released in a low tension position.

Detailed Description of an Exemplary Embodiment

[0011] With reference first to Figure 1, the support assembly for an arm of a drop arm awning with a tensioning device according to an exemplary embodiment of the present invention comprises a base part 1 configured to be fixed to a wall or another support surface and to be linked to a proximal end of an arm 2 such that said arm 2 can rotate with respect to the base part 1 around an articulation axis E. The support assembly furthermore comprises a tensioning device including an elastic element 6 and a flexible transmission element 4 for imparting a turning torque on the arm 2 with respect to the base body 1 and a locking device including a retaining part 10 for temporarily immobilizing the rotation of the arm 2 with respect to the base part 1 in said high tension position.

[0012] The base part 1 has an L-shaped cross sectional configuration with a base portion 12 perpendicular to the articulation axis E and an angled portion 13 parallel to the articulation axis E, both provided with respective holes 12a, 13a for the installation of screws or other fixing elements, such that the base part 1 can be fixed to the wall or another support surface in two alternative positions as appropriate: with the base portion 12 placed against the support surface or with the angled portion 13 placed against the support surface. In the base portion 12 there is formed a support portion 25 from which there extends a core 5 having an anchoring configuration 26 and a side surface 5a arranged surrounding said articulation axis E (see also Figures 5 and 7). A through hole 15 coaxial with the articulation axis E is formed through said support portion 25 and said core 5.

[0013] The arm 2 comprises a shank 27 formed by a hollow tubular member and an end part 28 which forms the proximal end of the arm 2 and which has a connection portion 28a which can be coupled by insertion into said shank 27. The mentioned end part 28 defines a peripheral wall 7 which, when the arm 2 and the base part 1 are assembled, partially surrounds the core 5 leaving an annular space 29 between both of them (see Figures 5 and 7). The mentioned annular space 29 is in communication

with the hollow interior of the shank 27 through a passage 30. The end part 28 of the arm 2 furthermore has an outer end wall 16 connected to the peripheral wall 7 and provided with a through hole 17 coaxial with the articulation axis E.

[0014] When the arm 2 and the base part 1 are assembled, a screw 18 is passed through the respective through holes 15, 17 and coupled to a nut 19 with the intermediation of corresponding washers 39, 40 to keep the arm 2 linked to the base part 1 with the possibility of rotation around the articulation axis E. To guide the relative rotational movements and to mitigate the friction between the arm 2 and the base part 1, there are arranged bearing means such as, for example, a radial bronze bearing 20 housed in the through hole 17 of the end part 28 and in which there is inserted a steel bushing 21 partially housed in the mouth of the through hole 15 of the base part 1, and axial plastic bearings 22, 23 interposed between the end part 28 of the arm 2 and the core 5 of the base part 1. A pair of covers 31, 32 are provided to cover the through hole 17 of the end part 28 and the head of the screw 18 on one side and the through hole 15 of the base part 1 and the nut 19 on the other.

[0015] The mentioned tensioning device comprises an elastic element 6, such as a coil spring, housed inside the arm 2 and connected at a distal end (not shown) to a fixed anchor inside the arm 2. The elastic element 6 has a proximal end connected, by means of a hook 33 for example, to an engagement configuration 34 formed at a distal end of a flexible transmission element 4, which has, at a proximal end, an anchor configuration 35 coupled to the mentioned anchoring configuration 26 of the core 5 of the base part 1. As shown in Figures 5 and 7, in the assembled support assembly, a portion of said flexible transmission element 4 is housed in the annular space 29 and supported on said side surface 5a of the core 5 of the base part 1, whereas another portion of the flexible transmission element 4 is arranged between the annular passage 29 and the interior of the shank 27 through said passage 30.

[0016] The flexible transmission element 4 is sized to keep the elastic element 6 under tension whichever the position of the arm 2. However, when the arm 2 performs a rotation with respect to the base part 1 in a first direction (clockwise direction in Figures 5 and 7), the flexible transmission element 4 is wound on the core 5 additionally pulling on the elastic element 6, whereby the latter is deformed, being extended and increasing the tension. Figure 5 shows the arm 2 in a high tension position, in which the tensioning device applies a relatively high torque to the arm 2 with respect to the base part 1. Inversely, when the arm 2 performs a rotation with respect to the base part 1 in a second opposite direction (counterclockwise direction in Figures 5 and 7), the flexible transmission element 4 is unwound from the core 5, loosening the elastic element 6, whereby the latter recovers, decreasing the tension. Figure 7 shows the arm 2 in a low tension position, in which the tensioning device applies a relatively low torque to the arm 2 with respect to the base part 1.

[0017] The mentioned locking device comprises a first retaining configuration, such as, for example, a first protrusion 8 in the form of a rib substantially parallel to the articulation axis E, formed in the angled portion 13 of the base part 1, and a second retaining configuration, such as, for example, a second protrusion 9 in the form of a rib substantially parallel to the articulation axis E, formed in an outer surface of the peripheral wall 7 of the end part 28 at the proximal end of the arm 2. Said first and second protrusions 8, 9 are positioned such that the second protrusion 9 is facing and at a short distance from the first protrusion 8 when the arm 2 is in the high tension position shown in Figures 5 and 6. The locking device is completed with a removable retaining part 10 configured to be locked with both the first and second protrusions 8, 9 and thereby immobilize the rotation of the arm 2 with respect to the base part 1 in the high tension position against a torque imparted by the tensioning device, as can be seen in Figures 4, 5 and 6.

[0018] Figures 2 and 3 individually show the retaining part 10 which, in the illustrated embodiment, comprises a stem 36 having grooves 11 on opposite sides thereof, and a gripping configuration 24 attached to an end of the stem 36. The grooves 11 are configured to slide tightly along the first and second protrusions 8, 9.

[0019] To activate the locking device, it is first necessary to rotate the arm 2 in the first direction against the torque imparted by the tensioning device until reaching the high tension position (shown in Figures 4, 5 and 6), in which the first and second protrusions 8, 9 are facing one another, and then to insert the stem 36 of the retaining part 10 between said angled portion 13 of the base part 1 and the peripheral wall 7 of the proximal end of the arm 2 with the grooves 11 in a direction substantially parallel to the articulation axis E and sliding the grooves 11 along the first and second protrusions 8, 9. In the locked situation (best shown in Figure 5), the first and second protrusions 8, 9 are retained in the grooves 11 of the retaining part 10 such that the latter immobilizes the rotation of the arm 2 with respect to the base part 1 in the high tension position. To deactivate the locking device, it is enough to grip the gripping configuration 24 which, when the stem 36 is inserted into the locking situation, is in an accessible position (Figure 4), and pull on the retaining part 10 until removing it from the support assembly, whereby the arm 2 can rotate again with respect to the base part 1 under the effect of the torque imparted by the tensioning device or the torque imparted by the tension of the canvas.

[0020] Although it is not indispensable, the locking device of the illustrated embodiment comprises a third protrusion 14 in the form of a rib substantially parallel to the articulation axis E formed in the base portion 12 of the base part 1 in a position facing a lower portion of the first protrusion 8 (Figures 6 and 7). Thus, when the arm 2 is in the high tension position, the third protrusion 14 is

aligned with the second protrusion 9, and when the retaining part 10 is inserted the second and third protrusions 9, 14 are retained in one and the same groove 11, strengthening the locking action and collaborating in holding the retaining part 10 in the locking situation. In the illustrated embodiment, the first and third protrusions 8, 14 are connected by a lower rib 37 and the grooves 11 of the retaining part 10 are connected at the free end of the stem 36 by a notch 38 configured to be coupled with said lower rib 37.

[0021] It will be understood that the support assembly admits multiple variants and alternative embodiments, all included within the scope of the present invention as it is defined in the attached claims. For example, in an alternative embodiment, not shown, the third protrusion 14 could be omitted. In another alternative embodiment, not shown, only one of the first and second protrusions 8, 9 has the form of a rib substantially parallel to the articulation axis E, whereas the other one can be a simple lug or the like. Alternatively, at least one of the first and second protrusions 8, 9 can be formed by two or more lugs aligned in a direction substantially parallel to the articulation axis. In yet another alternative embodiment, not shown, the retaining part 10 could have other locking configurations instead of the grooves 11, provided that they serve to be locked with the first and second retaining configurations of the base part 1 and of the arm 2, respectively, and thereby immobilize the rotation of the arm 2 with respect to the base part 1 in the high tension position at least in the mentioned first direction, i.e., in the direction corresponding to a torque imparted by the tensioning device. Alternatively, the first, second and/or third protrusions 8, 9, 14 could be arranged in positions different from those shown in the illustrated embodiment. It will also be understood that, alternatively, the locking configurations of the retaining part could be protrusions and the respective first, second and third retaining configurations of the base part 1 and the arm 2 could be grooves or indentations, in a construction reverse to that of the illustrated embodiment.

[0022] Other modifications and variations based on the embodiment shown and described will easily occur to a person skilled in the art without departing from the scope of the present invention as it is defined in the attached claims.

Claims

1. A support assembly for an arm of a drop arm awning with a tensioning device, of the type comprising a base part (1) configured to be fixed to a support surface and linked to a proximal end of said arm (2) such that the arm (2) can rotate with respect to the base part (1) around an articulation axis (E), wherein said tensioning device comprises an elastic element (6) under tension housed inside the arm (2) and connected to a flexible transmission element (4) connected to the base part (1), a portion of said flexible transmission element (4) being supported on a side surface of a core (5) surrounding said articulation axis (E), and wherein said proximal end of the arm (2) defines a peripheral wall (7) surrounding the mentioned core (5) and that portion of the flexible transmission element (4) supported thereon, such that rotations of the arm (2) with respect to the base part (1) pull on said flexible transmission element (4) or loosen it, varying the tension of said elastic element (6) between high tension and low tension positions, a locking device being provided for immobilizing the rotation of the arm (2) with respect to the base part in said high tension position, wherein said locking device comprises at least one first retaining configuration (8) formed in the base part (1), at least one second retaining configuration (9) formed in an outer surface of said peripheral wall (7) at the proximal end of the arm (2), in a position such that said second retaining configuration (9) is close to said first retaining configuration (8) when the arm (2) is in the high tension position; and a removable retaining part (10) configured to be locked with both the first and second retaining configurations (8, 9) and thereby immobilize the rotation of the arm (2) with respect to the base part (1) in the high tension position against a torque imparted by the tensioning device, **characterized in that:**

   the first retaining configuration (8) is a first protrusion (8) formed in an angled portion (13) of the base part (1) and facing the peripheral wall (7) of the proximal end of the arm (2);
   the second retaining configuration (9) is a second protrusion (9);
   the locking device comprises a third protrusion (14) formed in a base portion (12) of the base part (1) in a position such that it is aligned with said second protrusion (9) when the arm (2) is in the high tension position; and
   said retaining part (10) defines a stem (36) having grooves (11) on opposite sides thereof, the first and second protrusions (8, 9) being retained in one of said grooves (11) and the second protrusion (9) being retained in the other one of the grooves (11) when the retaining part (10) is inserted between said angled portion (13) of the base part (1) and the peripheral wall (7) of the proximal end of the arm (2) with the grooves (11) in a direction substantially parallel to the articulation axis (E).

2. The support assembly according to claim 1, **characterized in that** at least one of the first and second protrusions (8, 9) has the form of a rib substantially parallel to the articulation axis (E).

3. The support assembly according to claim 1 or 2,

characterized in that the retaining part (10) defines a gripping configuration (24) connected to the stem (36) and arranged to be in an accessible position when the retaining part is inserted.

4. The support assembly according to any one of the previous claims, **characterized in that** the core (5) of the base part (1) has a through hole (15) coaxial with the articulation axis (E), and the proximal end of the arm (2) has an outer end wall (16) connected to the peripheral wall (7) and provided with a through hole (17) coaxial with the articulation axis (E), wherein a screw (18) is passed through said through holes (15, 17) and coupled to a nut (19) to keep the arm (2) linked to the base part (8) with bearing means (20, 21, 22, 23) interposed between both of them.

5. The support assembly according to any one of the previous claims, **characterized in that** the flexible transmission element (4) has a proximal end fixed to the core (5) of the base part (1).

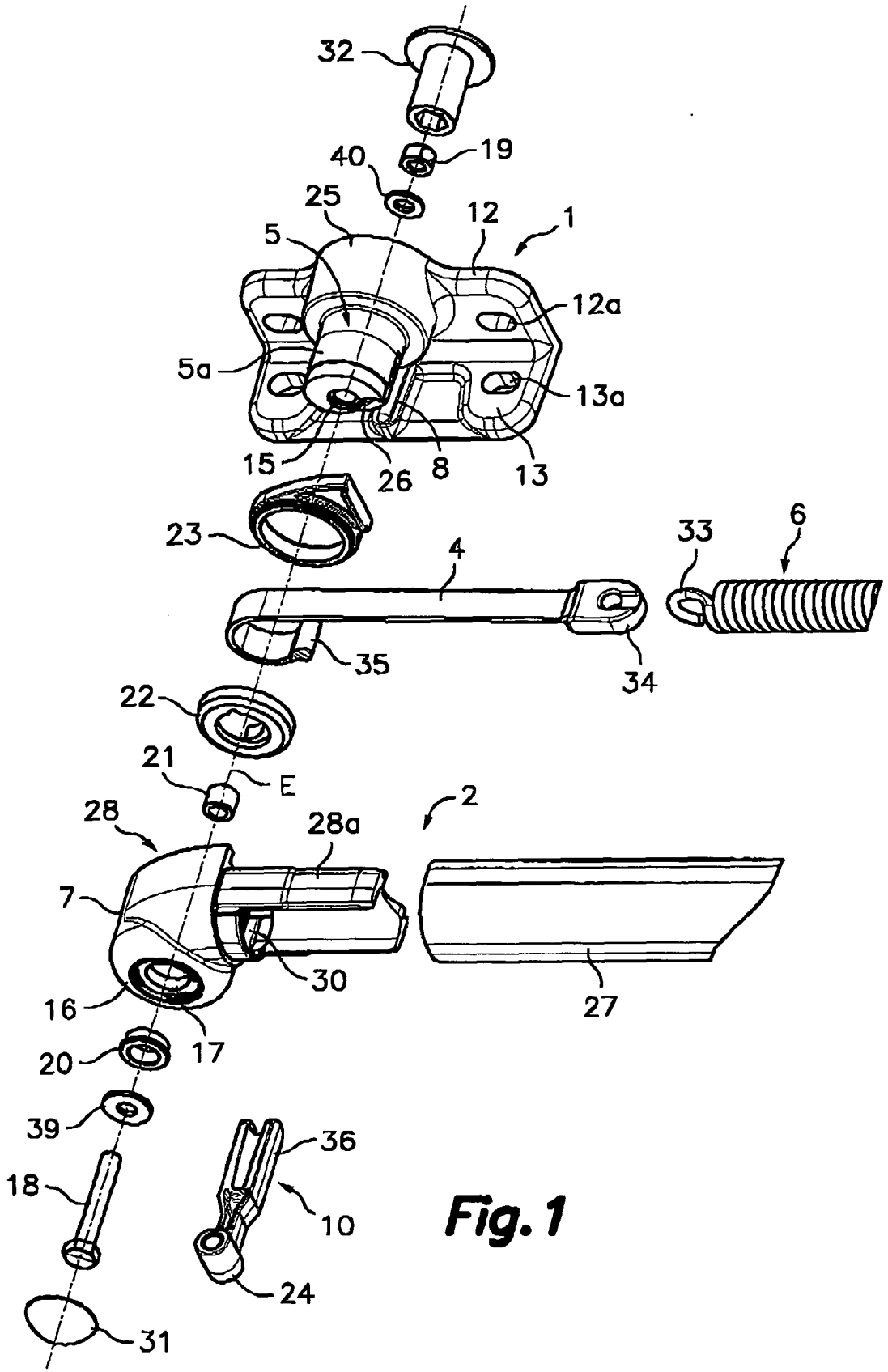
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Fig. 1

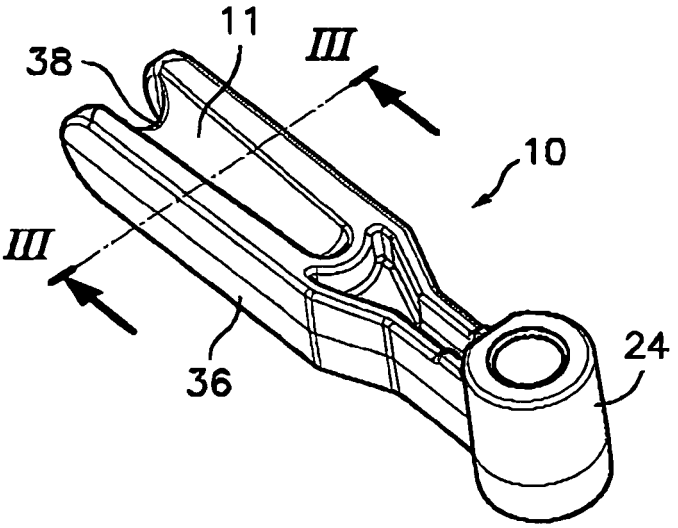

Fig.2

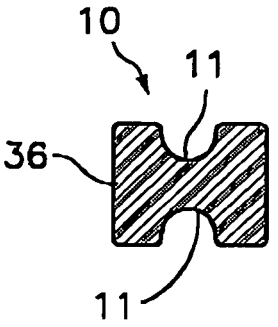

Fig.3

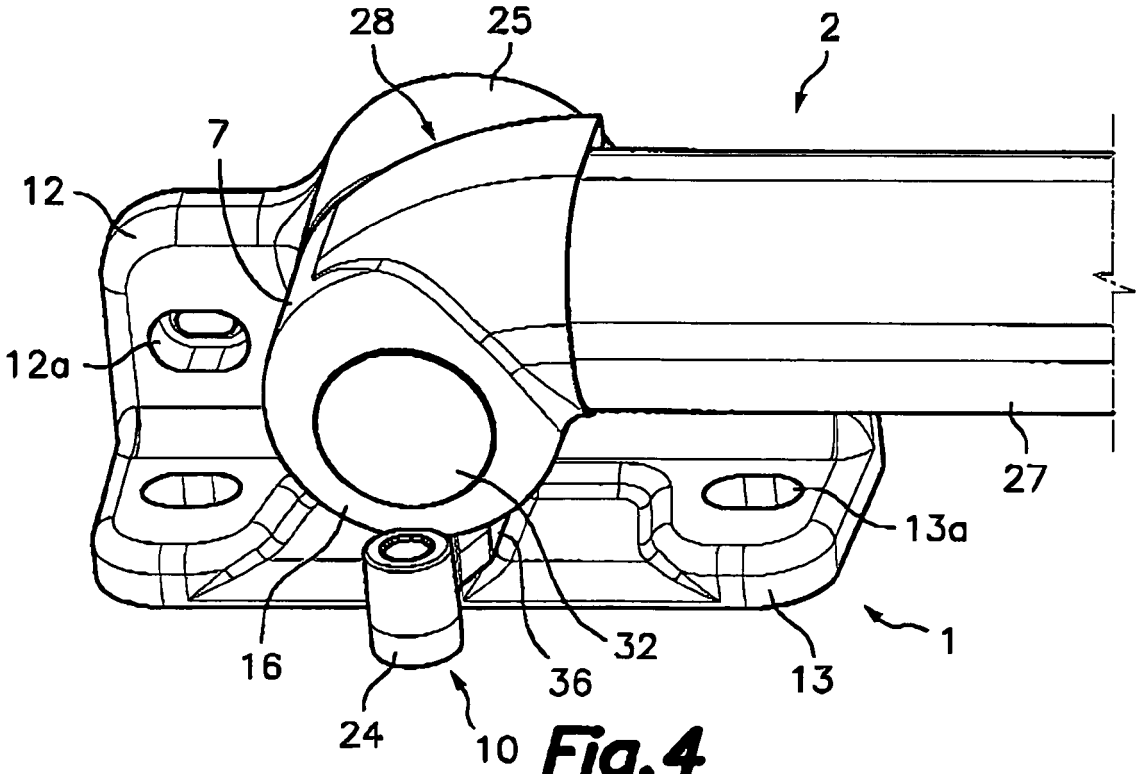

Fig.4

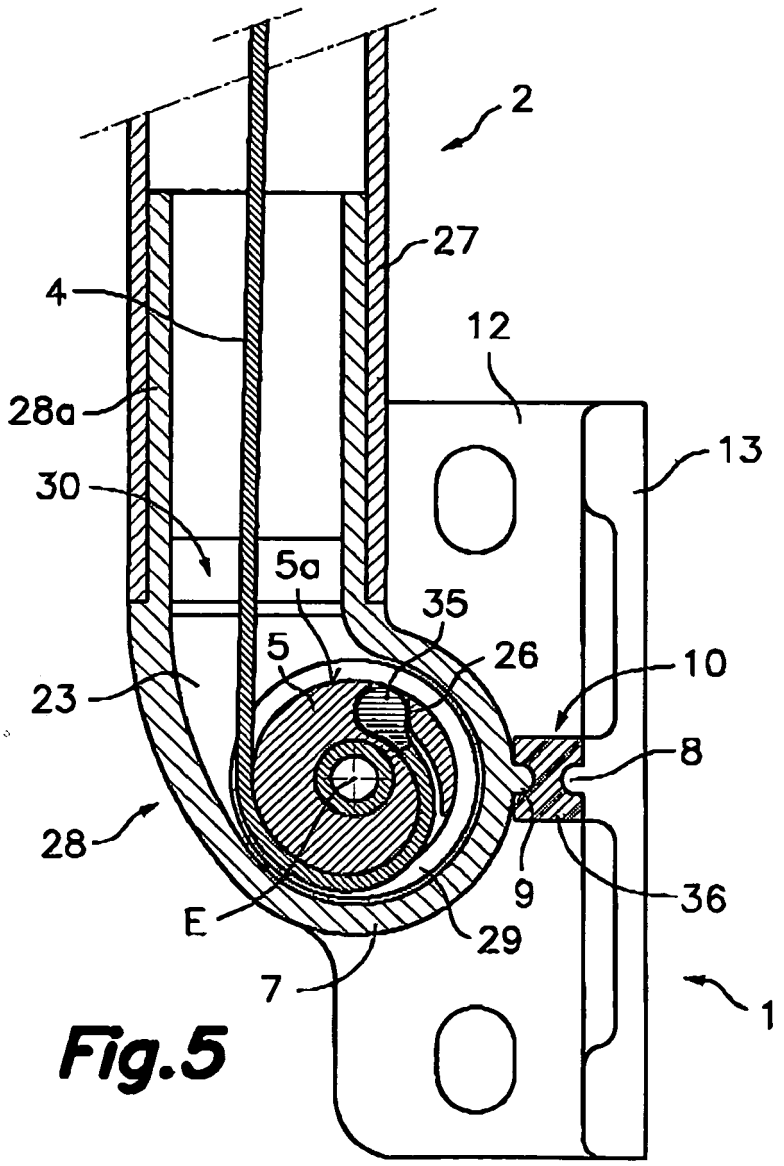

Fig.5

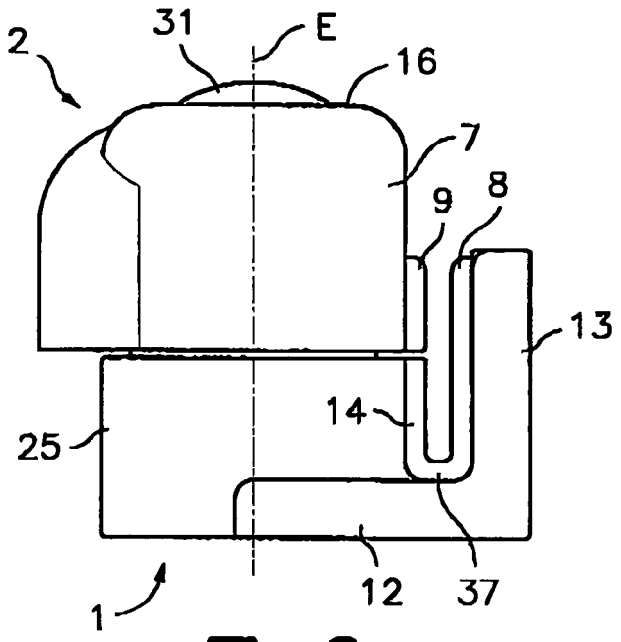
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Fig.6

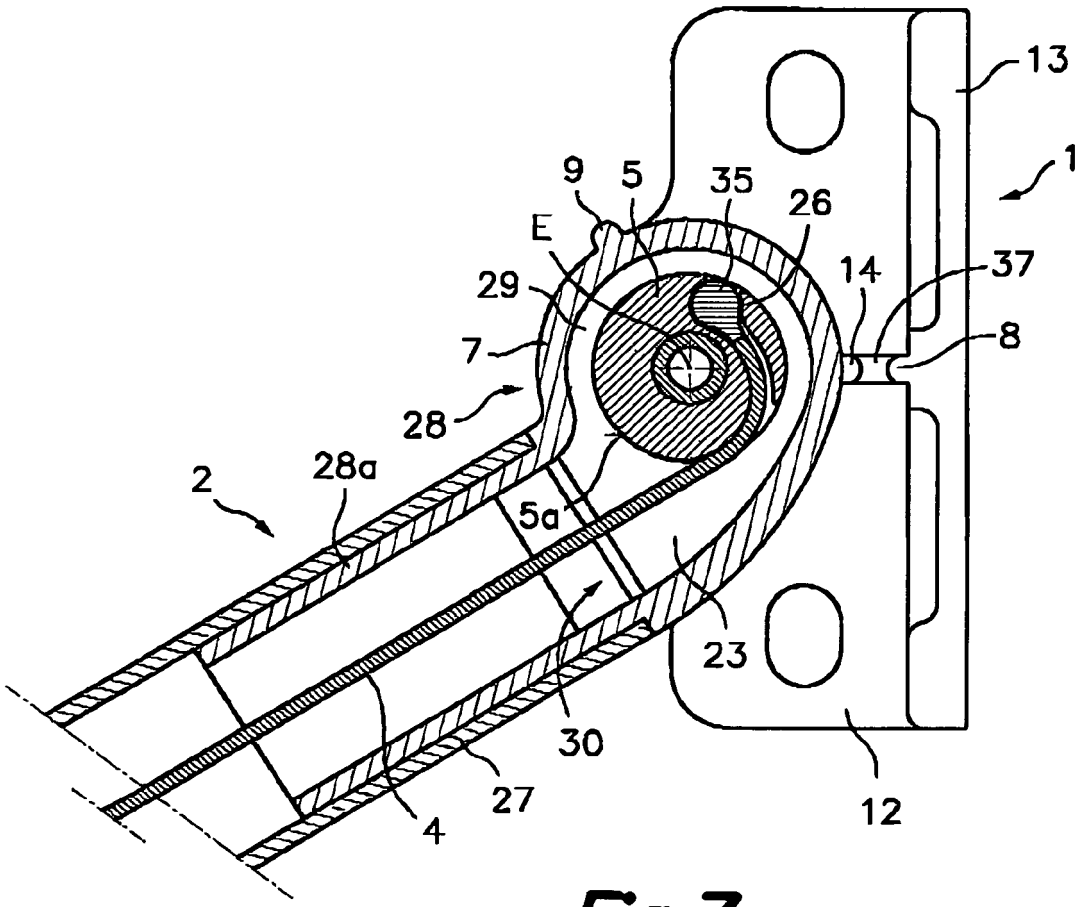
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Fig.7

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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