

(19)



(11)

**EP 1 522 667 B1**

(12)

**EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention  
of the grant of the patent:  
**24.10.2018 Bulletin 2018/43**

(51) Int Cl.:  
**E05F 15/619** <sup>(2015.01)</sup> **E05F 11/06** <sup>(2006.01)</sup>

(21) Application number: **04023584.8**

(22) Date of filing: **04.10.2004**

(54) **DEVICE FOR ANCHORING TO A SHUTTER THE FREE END OF A FLEXIBLE ELEMENT  
ASSOCIATED WITH AN ACTUATOR FOR MOVING THE SHUTTER**

VORRICHTUNG ZUM VERANKERN AN EINEM KLAPPLADEN EINES FREIEN ENDES EINES  
EINEM LADENANTRIEB ZUGEORDNETEN BIEGSAMEN ELEMENTES

DISPOSITIF D'ANCRAGE À UN VOLET D'UNE EXTRÉMITÉ D'UN ÉLÉMENT FLEXIBLE ASSOCIÉ  
À UN DISPOSITIF ACTIONNEUR DU VOLET

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**

(30) Priority: **07.10.2003 IT PD20030234**

(43) Date of publication of application:  
**13.04.2005 Bulletin 2005/15**

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## Description

**[0001]** The present invention relates to a device for anchoring to a shutter the free end of a flexible element that is associated with an actuator for moving said shutter.

**[0002]** Chain-type actuators for moving shutters are known which allow automatic opening and closing of shutters, especially of shutters located in positions that are difficult to reach, such as for example the skylights of a gymnasium or of an industrial building.

**[0003]** These actuators comprise, within a box-like container that is fixed to the frame of the casing of the shutter, a chain that is guided so that it can slide by guiding elements along a preset path that leads outside through an opening in the box-like container.

**[0004]** The chain is of the type that can flex only in one direction, and is prevented from flexing in the opposite direction.

**[0005]** The chain has a free end, which is associated with a device for anchoring to the corresponding shutter, which is composed of an engagement terminal, rigidly fixed to the free end of the flexible element, and of a complementary engagement block, which can be coupled to the engagement terminal and is rigidly fixed to the shutter.

**[0006]** The movement actuator is usually applied to the frame of the casing by means of an adjustable bracket; to achieve optimum closure of the shutter on the casing, there must be no gap between the shutter and the casing when the chain has retracted fully and therefore the shutter is closed.

**[0007]** Unfortunately, it is hardly ever possible to achieve perfect closure of the shutter on the casing merely by adjusting the bracket; one is able only to provide a coarse adjustment, without being able to determine the correct degree of compression of the gaskets between the shutter and the casing.

**[0008]** Various devices have been studied in order to perform fine adjustment of the closing action.

**[0009]** One of these devices, for example, comprises an engagement terminal, which is fixed to the shutter and comprises a threaded element, the head of which is screwed to the free end of the chain; adjustment occurs by screwing the threaded element more or less tightly onto the free end.

**[0010]** This device and the other devices that have been studied, however, are very awkward in the adjustment operation, since it is always necessary to disengage the engagement terminal from the shutter and perform the adjustment, which is usually not straightforward. In the case described above, for example, it can be difficult to rotate the threaded element; this operation, moreover, almost always requires a wrench-like tool.

**[0011]** It should also be noted that this adjustment operation is difficult because of the awkward position in which the shutters are located such as for example at high levels in industrial buildings, gymnasiums, et cetera.

**[0012]** As described earlier, in order to adjust the closing

action it is necessary to determine the gap between the shutter and the casing and therefore the engagement terminal must be rigidly coupled to the shutter by means of the engagement block.

**[0013]** Once the gap has been determined, it is necessary to disengage the engagement terminal from the engagement block and perform fine adjustment.

**[0014]** Disengaging the engagement terminal is not always easy with currently known anchoring devices; therefore, this operation entails a certain waste of time and is also difficult because of the awkward position in which said shutters are often located.

**[0015]** Another problem linked to the conventional shutter movement actuators arises from the fact that the chains are flexible only on one side; this entails that gusts of wind or accidental impacts may cause the chain to collapse on the flexible side and suddenly close the shutter, with the risk of damaging the corresponding associated glass pane and of causing splinters to fall.

**[0016]** CH 412 623 A discloses an actuating device for a skylight window, comprising an actuating wire rope provided with an operator handle at one end and an adjustable connection at the other end to the skylight window. The adjustable connection comprises a bush connected to the window frame, inside which a journal having the end of the wire rope connected thereto is arranged, the bush being fixed in a desired position by means of two counter nuts screwed to the ends of the bush.

**[0017]** The aim of the present invention is to solve the problems noted in known shutter movement actuators.

**[0018]** Within this aim, an object of the present invention is to provide a device for anchoring to a shutter the free end of a flexible element associated with an actuator for moving the shutter that allows to perform simply and rapidly a fine adjustment of the closing of the shutter.

**[0019]** Another object of the present invention is to provide a device for anchoring to a shutter the free end of a flexible element associated with an actuator for moving said shutter that allows to disengage in a simple manner the engagement terminal of the device from the corresponding block for engagement on the shutter.

**[0020]** A further object of the present invention is to provide a device for anchoring to a shutter the free end of a flexible element associated with an actuator for moving said shutter that allows to avoid the sudden collapse of the chain and the consequent uncontrolled closing of the shutter.

**[0021]** A still further object of the present invention is to provide a device for anchoring to a shutter the free end of a flexible element associated with an actuator for moving said shutter that can be manufactured with known systems and technologies.

**[0022]** In accordance with the invention, there is provided an anchoring device as defined in the appended claims.

**[0023]** Further characteristics and advantages of the present invention will become better apparent from the following detailed description of some preferred but not

exclusive embodiments thereof, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a schematic side view of a shutter to which a shutter movement actuator is applied, an anchoring device according to the invention being associated therewith;

Figure 2 is an exploded perspective view of said engagement terminal of an anchoring device according to the invention;

Figure 3 is a sectional side view of said engagement terminal of the anchoring device of Figure 2;

Figure 4 is a sectional plan view of said engagement terminal of the anchoring device of Figure 2;

Figure 5 is a front sectional view of said engagement terminal of the anchoring device of Figure 2;

Figure 6 is an exploded perspective view of the engagement block with said engagement terminal of an anchoring device according to the invention;

Figure 7 is a partially sectional perspective view of said engagement block with said engagement terminal of an anchoring device according to the invention;

Figure 8 is an exploded perspective view of the engagement block with said engagement terminal of the anchoring device according to the invention, in a different embodiment with respect to the preceding figures;

Figure 9 is a sectional plan view of said engagement terminal with said engagement block of the anchoring device of Figure 8;

Figure 10 is an exploded perspective view of the engagement block with said engagement terminal of the anchoring device according to the invention, in a different embodiment with respect to the preceding figures;

Figure 11 is a perspective view of the engagement block with said engagement terminal of the anchoring device of Figure 10;

Figure 12 is a sectional plan view of the engagement terminal with said engagement block of an anchoring device according to the invention, illustrating a particular arrangement of the engagement terminal in the engagement block;

Figure 13 is another exploded perspective view of the engagement block with said engagement terminal of the anchoring device according to the invention, in the embodiment illustrated in Figure 10.

**[0024]** With reference to Figures 1 to 5, an anchoring device according to the invention is generally designated by the reference numeral 10.

**[0025]** The anchoring device 10 allows to anchor a shutter 11 to a free end 12 of a flexible element 13, such as a chain 14 that is slidably associated with an actuator 15 for moving the shutter 11, of a per se known type.

**[0026]** The anchoring device 10 comprises an engagement terminal 16, which is rigidly fixed to the free end of

the chain 14, and a complementary engagement block 17, which can be coupled to the engagement terminal 16 and is rigidly fixed to the shutter 11.

**[0027]** The engagement terminal 16 comprises two bodies, respectively a first body 18 and a second body 19, which are coupled so that they can slide with respect to each other in the direction of the main action of the chain 14 (the substantially rectilinear direction of exit from the box-like container of the movement actuator), and corresponding means 20 for reversibly locking the relative sliding in preset positions of the first body 18 with respect to the second body 19, described in greater detail hereinafter.

**[0028]** In particular, in this embodiment, the first body 18 is rigidly fixed to the free end 12 of the chain 14, while the second body 19 can be coupled to the complementary engagement block 17.

**[0029]** Both the first body 18 and the second body 19 are shaped like a parallelepiped that is elongated in the sliding direction; in particular, the second body 19 is larger than the first body 18 and has a cavity 21 that is open toward the end 12 of the chain 14 and is shaped complementarily with respect to the first body 18; the first body 18 is slidably inserted in the cavity 21.

**[0030]** The means 20 for reversible locking of relative sliding in preset positions for the two bodies 18 and 19 comprise a bolt element 22, which is composed of a screw with a head 23 and of a female thread 24 that is constituted by a hexagonal nut.

**[0031]** The bolt 22 crosses a through slot 25, which is formed in the first body 18 in the direction of said relative sliding.

**[0032]** The second body 19 has, at the slot 25, a hole 26 that passes fully through it; the bolt 22 is arranged in the hole 26 so that the head of the screw 23 rests on an abutment 27.

**[0033]** The portion 28 of the hole 26 that lies on the opposite side of the abutment 27 with respect to the cavity 21 is shaped complementarily to the female thread 24 and therefore in this embodiment has an hexagonal shape.

**[0034]** The female thread 24 is also arranged on part of a receptacle 29 that is formed within the first body 18 substantially along the edges 25a of the through slot 25.

**[0035]** The female thread 24 is partially shaped complementarily to a rack-like portion 30 formed along the side of the receptacle 29, particularly on opposite sides with respect to the slot 25 of said side.

**[0036]** In this embodiment, the teeth of the rack-like portion 30 are of the cusp-shaped type and form a series of alternated peaks and troughs.

**[0037]** In this embodiment, the female thread 24 is in fact a hexagonal nut, which is provided with mutually opposite corner portions that are interlocked between mutually opposite rack-like portions.

**[0038]** It is evident that, in different embodiments, the rack-like portion 30, instead of having a cusp-like profile, may have a square or undulated profile or otherwise an-

other functionally similar shape.

**[0039]** The female thread 24, in addition to being coupled to the rack-like portion 30, is partially inserted in the portion 28 of the hole 26 that is arranged at the opposite side of the abutment 27 with respect to the cavity 21.

**[0040]** An engagement terminal such as the one described allows to perform easy fine adjustment of the closure of the shutter to which the movement actuator 15, with which the device 10 is associated, is applied.

**[0041]** The bolt 22 is locked in the direction of said relative sliding with respect to the second body 19; the bolt could slide along the slot 25, allowing the mutual sliding of the bodies 18 and 19.

**[0042]** Since the female thread 24 is engaged in the rack-like portion 30, it prevents the sliding of the bolt 22 along the slot 25 and the corresponding sliding of the bodies 18 and 19.

**[0043]** By partially unscrewing the bolt 22, it is possible to push the female thread 24 along the portion 28 of the hole 26, thus disengaging it from the receptacle 29 and therefore from the rack-like portion 30.

**[0044]** In this manner, the bolt 22 can slide along the slot 25 and accordingly the bodies 18 and 19 also can slide with respect to each other.

**[0045]** The relative mutual stroke of the two bodies 18 and 19 is determined on the basis of the adjustment requirements, i.e., on the basis of the gap that remains between the shutter 11 that is closed on the casing 11a when the chain 14 of the movement actuator 15 has retracted completely.

**[0046]** The adjustment pitch is determined by the pitch of the rack-like portion 30.

**[0047]** In order to adjust the closure, it is therefore necessary to determine the gap and therefore the engagement terminal 16 must be rigidly coupled to the shutter by means of the engagement block 17.

**[0048]** Once the gap has been determined, to perform fine adjustment it is not necessary to disengage the engagement terminal 16, since as mentioned it is possible to act directly on the bolt 22 even when the terminal 16 is coupled to the engagement block 17.

**[0049]** The engagement terminal 16 has, transversely to the direction of the action of the chain 14, mutually opposite portions 31 for coupling to complementary receptacles 32 formed in two mutually opposite elastically deformable wings 33 that belong to the engagement block 17.

**[0050]** The distance between the receptacles 32 is substantially smaller than the distance between the ends of said mutually opposite coupling portions 31.

**[0051]** In the embodiment of the engagement block 17 described above, the elastically deformable mutually opposite wings 33 correspond to the wings of a C-shaped lamina 34, which is fixed by means of its central rib 35 to the shutter 11 by means of, for example, threaded couplings (shown and designated by the reference numeral 235a only in the embodiment shown in Figure 10 and described hereafter).

**[0052]** The engagement block 17 also comprises an outer shell 36, which interlocks reversibly with the wings 33.

**[0053]** The outer shell 36 is functionally C-shaped and therefore forms a central part 37 for accommodating the engagement terminal 16, which is constituted by a bottom 38 and by sides 39 that cover the wings 33.

**[0054]** Access openings 40 for the mutually opposite portions 31 for coupling to the complementary receptacles 32 are formed at the complementary receptacles 32 on the sides 39 of the central part 37 of the shell 36.

**[0055]** The ends of the wings 33 have an outward fold 41.

**[0056]** The fold 41 can be accessed from the outside of the shell through the openings 40.

**[0057]** The mutually opposite coupling portions 31 of the engagement terminal 16 are constituted by the ends of a pivot 42, which is fixed to the engagement terminal 16 at right angles to the direction of the action of the chain 14.

**[0058]** The complementary receptacles 32 are constituted by a first circular receptacle 32a and by a second slot-shaped receptacle 32b, which is orientated in the direction of the action of the chain 14.

**[0059]** In particular, the second slot-shaped receptacle 32b is closer to the bottom 38 of the shell 36 than the first circular receptacle 32a.

**[0060]** The chain 14 is of the type that can flex only in one direction; flexing in the opposite direction is prevented.

**[0061]** In this embodiment, the second slot-shaped receptacle 32b is arranged on the wing 33 that corresponds to the flexing direction of the chain 14.

**[0062]** In this manner, the coupling portion 31 of the terminal 16, when the shutter is open, by virtue of the weight of the shutter, tends to advance in the second slot-shaped receptacle 32b, thus keeping the chain 14 loaded in the direction in which it cannot flex, facilitating the overall rigidity of the chain and thus preventing gusts of wind or accidental impacts from causing the chain 14 to collapse and close the shutter. Reference should be made in this regard to Figure 12 (which, however, illustrates a terminal 16a that is different from the one described).

**[0063]** The engagement terminal 16 is inserted by lateral elastic deformation of the wings 33 and by insertion of the ends of the pivot 42 in the respective receptacles 32.

**[0064]** Once the ends of the pivot 42 are inside the receptacles 32, the wings 33 return to the original position.

**[0065]** In this embodiment, locking of the terminal 16 by the block 17 occurs easily by inserting a punch, or the head of a screwdriver, in one of the openings 40 in order to push outward the corresponding fold 41 at the end of the corresponding wing 33.

**[0066]** A different embodiment of the engagement block, now designated by the reference numeral 117, is

shown in Figures 8 and 9.

**[0067]** The engagement block 117 also comprises an outer shell 136, which couples to the elastically deformable wings 133 and is also fixed to the shutter 111.

**[0068]** In this case, the elastically deformable mutually opposite wings 133 are formed by two L-shaped laminas 134, which are inserted and locked within the shell 136 (which acts as a support for the laminas), which is fixed to the shutter 111.

**[0069]** The L-shaped laminas 134 are further locked in a sandwich-like configuration between the shell 136 and the shutter.

**[0070]** The outer shell 136 is functionally C-shaped and therefore forms a central part 137 for accommodating the engagement terminal 116 (which in these figures is of a different type with respect to the one shown in the previous embodiment and is suitable for actuators for moving shutters in which fine adjustment is not required), constituted by a bottom 138 and by sides 139 that cover the wings 133.

**[0071]** Access openings 140 for the mutually opposite portions 131 for coupling to the complementary receptacles 132 are formed at the complementary receptacles 132 on the sides 139 of the central part 137 of the shell 136.

**[0072]** Access openings 140a are formed at the upper corner of the sides 139 for the insertion of a punch or of the head of a screwdriver in order to release the terminal 116 from the block 117 by opening the corresponding wing 133 outward.

**[0073]** In particular, the punch pushes a fold 141 that is formed at the ends of the elastically deformable wings 133; the fold 141 can indeed be accessed from the outside of the shell through the access openings 140a.

**[0074]** In this embodiment also, the complementary receptacles 132 are constituted by a first circular receptacle 132a and by a second slotted receptacle 132b, which is orientated in the direction of the action of the chain 114.

**[0075]** This engagement block 117 can be rotated through 180° for application to actuators in which the outlet of the chain is symmetrically opposite.

**[0076]** Another embodiment of the engagement block, now designated by the reference numeral 217, is illustrated in Figures 10, 11 and 13.

**[0077]** The engagement block 217 comprises an outer shell 236, in which elastically deformable wings 233 are inserted symmetrically; said wings are formed here by two L-shaped laminas 234. The shell 236 is then fixed to the shutter.

**[0078]** Advantageously, the lateral portions of the wings 233 are monolithically connected to each other by a release bridge 235, which is curved and has its concavity directed toward the terminal 216 when it is engaged.

**[0079]** Each one of the laminas 234 has a second slot 261 on the wing 260 that is adjacent to the shutter.

**[0080]** Symmetric and coaxial transverse slots 262 extend inwards from the inner ends of both of the second

slots 261.

**[0081]** Corresponding guiding tabs 263 are inserted in the slots 262 and extend from the inside of the shell 236.

**[0082]** The coupling of the plate-like guiding tabs 263 in the corresponding slots 262 allows each of the laminas 234, actuated by the action of a user on the bridge 235, to move with a simply rectilinear motion.

**[0083]** At each one of the second slots 261, two pairs of elastically deformable semicylindrical tabs 264 also protrude downward from the shell 236 and act as a guide for the threaded elements 235a for fixing to the shutter.

**[0084]** The semicylindrical tabs 264 of each pair have respective facing concavities, so as to form a substantially cylindrical guide for the threaded element 235a.

**[0085]** The second slots 261 are each suitable to accommodate one of said pairs of semicylindrical tabs 264.

**[0086]** Each one of the semicylindrical tabs 264 has, at its end, an interlocking tooth 265, which is suitable to reversibly engage in the corresponding second slot 261.

**[0087]** The plate-like tabs 263 and the pairs of semicylindrical tabs 264 therefore allow to rigidly couple the outer shell 236 to the laminas 234, at the same time allowing said laminas to follow a rectilinear path in the operations for engaging/disengaging the terminal 216.

**[0088]** The outer shell 236 is functionally C-shaped and therefore forms a central part 237 for accommodating the engagement terminal 216 (which in these figures is of a different type with respect to the one shown in the first described embodiment), constituted by a bottom 238 and by sides 239 that cover the wings 233.

**[0089]** The release bridge 235 protrudes from the shell 217 so that it is available to a user.

**[0090]** Access openings 240 for the mutually opposite portions 231 for coupling to the complementary receptacles 232 are formed at said complementary receptacles 232 on the sides 239 of the central part 237 of the shell 236.

**[0091]** In this embodiment also, the complementary receptacles 232 are constituted by a first circular receptacle 232a and by a second slot-shaped receptacle 232b that is orientated in the direction of the action of the chain 214.

**[0092]** In this embodiment, the release of the terminal 216 from the block 217 occurs by pressing the release button 235 toward the terminal 216; in this manner, the wings 233 diverge, freeing the mutually opposite coupling portions 231 from the complementary receptacles 232.

**[0093]** In practice it has been found that the invention thus described solves the problems noted in known types of shutter movement actuator; in particular, the present invention provides a device for anchoring to a shutter the free end of a flexible element that is associated with an actuator for moving the shutter that allows to perform fine adjustment of shutter closure simply and quickly.

**[0094]** The simple unscrewing of the bolt 22 and its easy movement in fact allow to adjust, according to a preset pitch, the distance of the engagement terminal from the chain, and therefore to eliminate any gap between the casing and the shutter.

[0095] In view of the simplicity of the operation, this adjustment can be performed easily even without disengaging the engagement terminal from the corresponding engagement block.

[0096] Moreover, the present invention provides a device for anchoring to a shutter the free end of a flexible element that is associated with an actuator for moving said shutter that allows to disengage in a simple manner the engagement terminal of the device from the corresponding engagement block on the shutter.

[0097] It is in fact sufficient to use a screwdriver as a punch or simply to press a "button" in order to space the wings that keep the engagement terminal locked.

[0098] Moreover, the present invention provides a device for anchoring to a shutter the free end of a flexible element that is associated with an actuator for moving the shutter that allows to avoid the sudden collapse of the chain and the consequent uncontrolled closing of the shutter.

[0099] The use of a slotted receptacle for the end of the pivot of the engagement terminal in fact allows to force the action of the load that acts on the chain in the direction of the non-flexible side.

[0100] The invention thus conceived is susceptible of numerous modifications and variations falling within the scope of the appended claims.

[0101] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

## Claims

1. A device for anchoring to a shutter (11) the free end (12) of a flexible element (13) associated with an actuator (15) for moving said shutter (11), comprising an engagement terminal (16), which is rigidly fixable to the free end (12) of said flexible element (13), and a complementary engagement block (17, 117, 217), which can be coupled to said engagement terminal (16) and is rigidly fixable to the shutter (11), said engagement terminal (16) comprising two bodies (18, 19), which are mutually coupled so that they can slide with respect to each other in the direction of the main action of said flexible element (13), and corresponding means for the reversible locking of said relative sliding in preset positions (20), one (18) of said two bodies (18, 19) being rigidly fixable to said free end (12) of said flexible element (13), the other body (19) being associable with said complementary engagement block (17, 117, 217), **characterized in that** said means for the reversible locking of said relative sliding in preset positions (20) for said two bodies (18, 19) comprises at least one bolt element

(22), which is composed of a screw provided with a head (23) and of a female thread (24), which is arranged so as to cross a through slot (25) that is formed in the direction of said relative sliding in a first one (18) of said two bodies (18, 19), said female thread (24) being arranged partially in a hole (26) passing through the second body (19) and in a receptacle (29) that is formed within said first body (18) substantially along the edges (25a) of said through slot (25), said female thread (24) being shaped at least partially complementarily to a rack-like portion (30) formed along the side of said receptacle (29), said bolt element (22) comprising, between said head (23) and said female thread (24) at least part of the second (19) of said two bodies (18, 19).

2. The anchoring device according to claim 1, **characterized in that** said engagement terminal (16, 116, 216) has, transversely to the direction of the main action of said flexible element (13), mutually opposite portions (31, 131, 231) for coupling to complementary receptacles (32, 132, 232) formed in two elastically deformable and mutually opposite wings (33, 133, 233) that belong to said engagement block (17, 117, 217), the distance between said complementary receptacles (32, 132, 232) being substantially shorter than the distance between the ends of said mutually opposite coupling portions (31, 131, 231).
3. The anchoring device according to claims 1, **characterized in that** both said first body (18) and said second body (19), have a shape that is elongated in the direction of their mutual sliding, said second body (19) being larger than said first body (18) and having a cavity (21) that is open toward said end (12) of said flexible element (13) and is shaped complementarily to said first body (18), said first body being inserted so that it can slide in said cavity (21), said means for reversible locking of the relative sliding in preset positions (20) for said two bodies (18, 19) comprising a bolt element (22), which is composed of a screw with a head (23) and of a hexagonal female thread (24), said bolt (22) being arranged across a through slot (25) that is formed in said first body (18) in the direction of said relative sliding, said second body (19) having, at said slot (25), a hole (26) that passes fully through it, said bolt (22) being arranged in said hole (26) so that the head of said screw (23) rests on an abutment (27), the portion (28) of said hole (26) that lies on the opposite side of said abutment (27) with respect to said cavity (21) being shaped complementarily to the female thread (24), said female thread (24) being arranged also on part of a receptacle (29) that is formed within said first body (18) substantially along the edges (25a) of said through slot (25), said female thread (24) being shaped partially complementarily to a rack-like portion (30) formed along the side of said receptacle

(29).

4. The anchoring device according to claim 2, **characterized in that** said engagement block (17, 117, 217) also comprises an outer shell (36, 136, 236) that detachably interlocks with said elastically deformable wings (33, 133, 233), said outer shell (36, 136, 236) being shaped so as to form a central part (37, 137, 237) for accommodating said engagement terminal (16, 116, 216), which is constituted by a bottom (38, 138, 238) and by sides (39, 139, 239) that cover said elastically deformable wings (33, 133, 233), access openings (40, 140, 240) for said mutually opposite portions (31, 131, 231) for coupling to said complementary receptacles (32, 132, 232) being formed at said complementary receptacles (32, 132, 232) on said sides (39, 139, 239) of said central part (37, 137, 237) of said outer shell (36, 136, 236).
5. The anchoring device according to claim 4, **characterized in that** said elastically deformable mutually opposite wings (33) correspond to the wings of a C-shaped lamina (34), which is fixed by means of a corresponding central rib (35) to said shutter (11), the ends of said elastically deformable wings (33) having an outward fold (41), which can be accessed from the outside of said shell through said openings (40).
6. The anchoring device according to claim 4, **characterized in that** said elastically deformable wings (133) are formed by two L-shaped laminas (134), which are inserted and locked in said outer shell (136), which in turn is fixed to said shutter (111), the ends of said elastically deformable wings (133) having an outward fold (141), which is accessible from the outside of said shell through access openings (140a).
7. The anchoring device according to claim 4, **characterized in that** the lateral portions of said elastically deformable wings (233) are monolithically connected to each other by a release bridge (235), which is curved so that its concavity is directed toward said terminal (216) when it is engaged with said block (217), said release bridge (235) protruding from said shell (217) so that it is available to a user.
8. The anchoring device according to claim 2, **characterized in that** said flexible element (13) is constituted by a chain (14) of the type that can flex only in one direction, said flexing being prevented in the opposite direction, said complementary receptacles (32, 132, 232) being constituted by a first circular receptacle (32a, 132a, 232a) and by a second slot-shaped receptacle (32b, 132b, 232b) orientated in the direction of the action of said chain (14), said second slot-shaped receptacle (32b, 132b, 232b)

being closer to said shutter (11, 111) with respect to said first circular receptacle (32a, 132a, 232a), said second slot-shaped receptacle (32b, 132b, 232b) being arranged on the elastically deformable wing (33, 133, 233) that corresponds to the direction of flexing of said chain (14).

9. The anchoring device according to claim 8, **characterized in that** said mutually opposite coupling portions (31, 131, 231) of said engagement terminal (16, 116, 216) are constituted by the ends of a pivot (42), which is fixed to said engagement terminal (16, 116, 216) at right angles to the direction of the action of said chain (14).

#### Patentansprüche

1. Eine Vorrichtung zur Verankerung des freien Endes (12) eines biegsamen Elements (13), das mit einem Antrieb (15) zum Bewegen eines Klappladens (11) verbunden ist, an dem Klappladen (11); einen Eingriffsanschluss (16) umfassend, der starr am freien Ende (12) des biegsamen Elements (13) befestigt werden kann, und einen komplementären Eingriffsblock (17, 117, 217), der mit dem Eingriffsanschluss (16) gekoppelt und starr am Klappladen (11) befestigt werden kann; wobei der Eingriffsanschluss (16) zwei Körper (18, 19) umfasst, die so miteinander gekoppelt sind, dass sie im Verhältnis zueinander in Richtung der Hauptwirkung des biegsamen Elements (13) gleiten können, und entsprechende Mittel zur reversiblen Blockierung des relativen Gleitens in voreingestellten Positionen (20), wobei einer (18) der beiden Körper (18, 19) starr an dem freien Ende (12) des biegsamen Elements (13) befestigt werden kann, wobei der andere Körper (19) mit dem komplementären Eingriffsblock (17, 117, 217) verbindbar ist; **dadurch gekennzeichnet, dass** das Mittel zum reversiblen Blockieren des relativen Gleitens in voreingestellten Positionen (20) für die beiden Körper (18, 19) mindestens ein Bolzenelement (22) umfasst, das aus einer mit einem Kopf (23) versehenen Schraube und einem Innengewinde (24) besteht, das so angeordnet ist, dass es einen durchgehenden Schlitz (25) durchquert, der in die Richtung des relativen Gleitens in einem ersten (18) der beiden Körper (18, 19) geformt ist, wobei das Innengewinde (24) teilweise in einer Bohrung (26) angeordnet ist, die durch den zweiten Körper (19) verläuft, und in einer Aufnahme (29), die innerhalb des ersten Körpers (18) im Wesentlichen entlang den Rändern (25a) des durchgehenden Schlitzes (25) geformt ist, wobei das Innengewinde (24) zumindest teilweise komplementär zu einem zahnstangenähnlichen Abschnitt (30) geformt ist, der entlang der Seite der Aufnahme (29) bestimmt ist, wobei das Bolzenelement (22) zwischen dem Kopf (23) und dem Innen-

gewinde (24) mindestens einen Teil des zweiten (19) der beiden Körper (18, 19) umfasst.

2. Die Verankerungsvorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der Eingriffsanschluss (16, 116, 216) quer zur Richtung der Hauptwirkung des biegsamen Elements (13) einander gegenüberliegende Abschnitte (31, 131, 231) zur Kopplung mit komplementären Aufnahmen (32, 132, 232) hat, die in zwei elastisch verformbaren und einander gegenüberliegenden Flügeln (33, 133, 233) geformt sind, welche zu dem Eingriffsblock (17, 117, 217) gehören, wobei der Abstand zwischen den komplementären Aufnahmen (32, 132, 232) wesentlich kürzer ist als der Abstand zwischen den Enden der einander gegenüberliegenden Kopplungsabschnitte (31, 131, 231). 5
  
3. Die Verankerungsvorrichtung gemäß Anspruch 1, **dadurch gekennzeichnet, dass** sowohl der erste Körper (18) als auch der zweite Körper (19) eine Form haben, die in der Richtung ihres Gleitens zueinander länglich ist, wobei der zweite Körper (19) größer ist als der erste Körper (18) und einen Hohlraum (21) hat, welcher zu dem Ende (12) des biegsamen Elements (13) hin offen und komplementär zu dem ersten Körper (18) geformt ist, wobei der erste Körper verschiebbar in den Hohlraum (21) eingesetzt ist, wobei die Mittel zum reversiblen Blockieren des relativen Gleitens in voreingestellten Positionen (20) für die beiden Körper (18, 19) ein Bolzelement (22) umfassen, das aus einer Schraube mit einem Kopf (23) und einem sechseckigen Innengewinde (24) besteht, wobei der Bolzen (22) quer über einen durchgehenden Schlitz (25) angeordnet ist, der in dem ersten Körper (18) in Richtung des relativen Gleitens geformt ist, wobei der zweite Körper (19) an dem Schlitz (25) eine Bohrung (26) hat, die vollständig durch ihn verläuft, wobei der Bolzen (22) so in der Bohrung (26) angeordnet ist, dass der Kopf der Schraube (23) an einem Widerlager (27) anliegt, wobei der Abschnitt (28) der Bohrung (26), der, mit Bezug auf den Hohlraum (21), auf der gegenüberliegenden Seite des Widerlagers (27) liegt, komplementär zum Innengewinde (24) geformt ist, wobei das Innengewinde (24) auch an einem Teil einer Aufnahme (29) angeordnet ist, die innerhalb des ersten Körpers (18), im Wesentlichen entlang den Rändern (25a) des durchgehenden Schlitzes (25), geformt ist, wobei das Innengewinde (24) teilweise komplementär zu einem zahnstangenähnlichen Abschnitt (30) geformt ist, der entlang der Seite der Aufnahme (29) bestimmt ist. 10  
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4. Die Verankerungsvorrichtung gemäß Anspruch 2, **dadurch gekennzeichnet, dass** der Eingriffsblock (17, 117, 217) auch eine Außenschale (36, 136, 236) umfasst, die lösbar mit den elastisch verformbaren

Flügeln (33, 133, 233) in Eingriff steht, wobei die Außenschale (36, 136, 236) so geformt ist, dass sie einen zentralen Teil (37, 137, 237) zur Aufnahme des Eingriffsanschlusses (16, 116, 216) bildet, der aus einem Boden (38, 138, 238) und aus Seiten (39, 139, 239) besteht, die die elastisch verformbaren Flügel (33, 133, 233) bedecken, wobei Zugangsöffnungen (40, 140, 240) für die einander gegenüberliegenden Abschnitte (31, 131, 231) zur Kopplung mit den komplementären Aufnahmen (32, 132, 232) an den komplementären Aufnahmen (32, 132, 232), an den Seiten (39, 139, 239) des zentralen Teils (37, 137, 237) der Außenschale (36, 136, 236), geformt sind.

5. Die Verankerungsvorrichtung gemäß Anspruch 4, **dadurch gekennzeichnet, dass** die elastisch verformbaren, einander gegenüberliegenden Flügel (33) den Flügeln eines C-förmigen Plättchens (34) entsprechen, das über eine entsprechende zentrale Rippe (35) an dem Klappladen (11) befestigt ist, wobei die Enden der elastisch verformbaren Flügel (33) einen nach außen gerichteten Knick (41) haben, auf den von der Außenseite der Schale durch die Öffnungen (40) zugegriffen werden kann.
  
6. Die Verankerungsvorrichtung gemäß Anspruch 4, **dadurch gekennzeichnet, dass** die elastisch verformbaren Flügel (133) von zwei L-förmigen Plättchen (134) gebildet werden, die in die Außenschale (136) eingesetzt und blockiert sind, welche wiederum an dem Klappladen (111) befestigt ist, wobei die Enden der elastisch verformbaren Flügel (133) einen nach außen gerichteten Knick (141) haben, auf den von der Außenseite der Schale durch Zugangsöffnungen (140a) zugegriffen werden kann.
  
7. Die Verankerungsvorrichtung gemäß Anspruch 4, **dadurch gekennzeichnet, dass** die Seitenabschnitte der elastisch verformbaren Flügel (233) über eine Lösungsbrücke (235) monolithisch miteinander verbunden sind, welche derart gekrümmt ist, dass ihre Konkavität zu dem Eingriffsanschluss (216) hin gerichtet ist, wenn sie mit dem Block (217) in Eingriff steht, wobei die Lösungsbrücke (235) aus der Schale (217) herausragt, so dass sie einem Benutzer zur Verfügung steht.
  
8. Die Verankerungsvorrichtung gemäß Anspruch 2, **dadurch gekennzeichnet, dass** das biegsame Element (13) aus einer Kette (14) von der Art besteht, die sich nur in eine Richtung biegen kann, weil das Biegen in die entgegengesetzte Richtung verhindert wird; wobei die komplementären Aufnahmen (32, 132, 232) aus einer ersten, kreisförmigen Aufnahme (32a, 132a, 232a) und einer zweiten, schlitzförmigen Aufnahme (32b, 132b, 232b) bestehen, in die Richtung der Wirkung der Kette (14) ausgerichtet, wobei

die zweite, schlitzförmige Aufnahme (32b, 132b, 232b) dem Klappladen (11, 111) näher ist als die erste, kreisförmige Aufnahme (32a, 132a, 232a), wobei die zweite, schlitzförmige Aufnahme (32b, 132b, 232b) auf dem elastisch verformbaren Flügel (33, 133, 233) angeordnet ist, der der Biegeungsrichtung der Kette (14) entspricht.

9. Die Verankerungsvorrichtung gemäß Anspruch 8, **dadurch gekennzeichnet, dass** die einander gegenüberliegenden Kopplungsabschnitte (31, 131, 231) des Eingriffsanschlusses (16, 116, 216) aus den Enden eines Drehzapfens (42) bestehen, der in rechten Winkeln zur Wirkungsrichtung der Kette (14) an dem Eingriffsanschluss (16, 116, 216) befestigt ist.

### Revendications

1. Dispositif destiné à ancrer à un volet (11) l'extrémité libre (12) d'un élément souple (13) associé à un actionneur (15) pour faire bouger ledit volet (11), comportant un embout de prise (16), qui peut être rigidement fixé à l'extrémité libre (12) dudit élément souple (13), et un bloc de prise complémentaire (17, 117, 217), qui peut être couplé audit embout de prise (16) et peut être rigidement fixé au volet (11), ledit embout de prise (16) comportant deux corps (18, 19), qui sont mutuellement couplés de sorte qu'ils peuvent coulisser l'un par rapport à l'autre dans la direction de l'action principale dudit élément souple (13), et des moyens correspondants pour le blocage réversible dudit coulisement relatif dans des positions préétablies (20), l'un (18) desdits deux corps (18, 19) pouvant être rigidement fixé à ladite extrémité libre (12) dudit élément souple (13), l'autre corps (19) pouvant être associé audit bloc de prise complémentaire (17, 117, 217), **caractérisé en ce que** lesdits moyens pour le blocage réversible dudit coulisement relatif dans des positions préétablies (20) pour lesdits deux corps (18, 19) comportent au moins un élément de boulon (22), qui est composé d'une vis pourvue d'une tête (23) et d'un filet femelle (24), qui est agencé de manière à traverser une fente traversante (25) qui est formée dans la direction dudit coulisement relatif dans un premier (18) desdits deux corps (18, 19), ledit filet femelle (24) étant agencé partiellement dans un trou (26) passant à travers le second corps (19) et dans un logement (29) qui est formé à l'intérieur dudit premier corps (18) sensiblement le long des bords (25a) de ladite fente traversante (25), ledit filet femelle (24) étant conformé au moins partiellement de manière complémentaire à une portion analogue à une crémaillère (30) formée le long du côté dudit logement (29), ledit élément de boulon (22) comportant, entre ladite tête (23) et **ledit filet femelle (24), au moins une partie du second**

(19) desdits deux corps (18, 19).

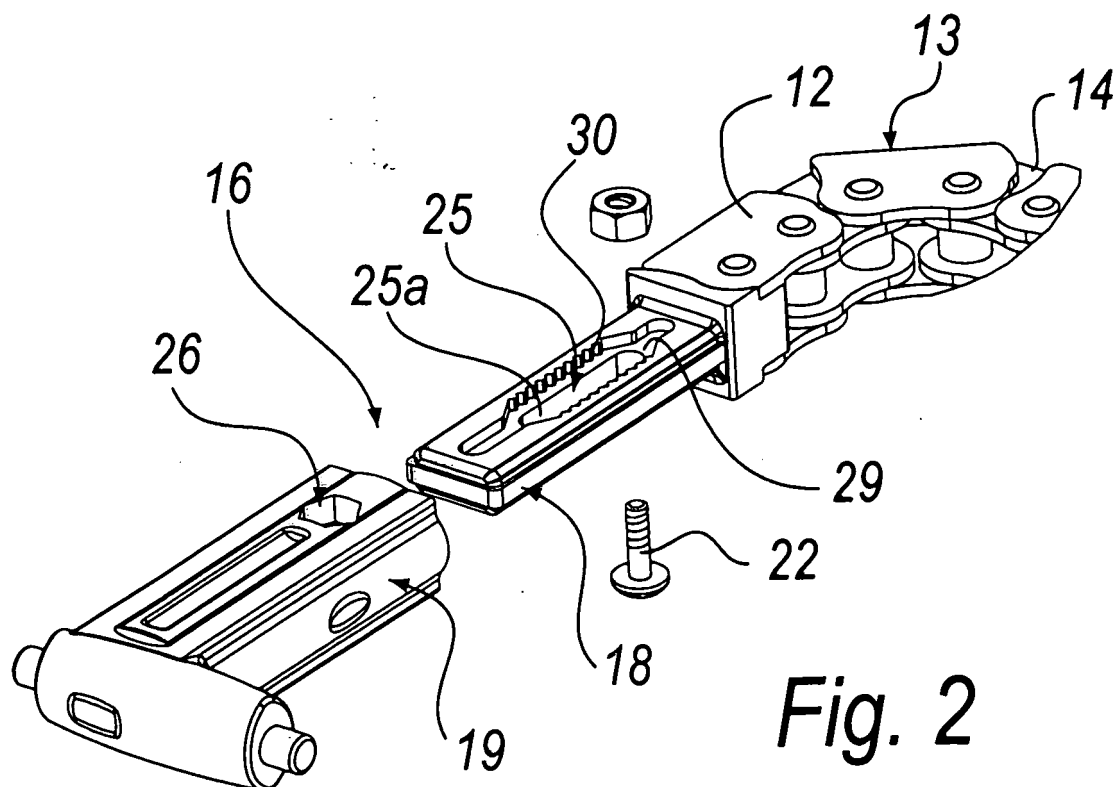
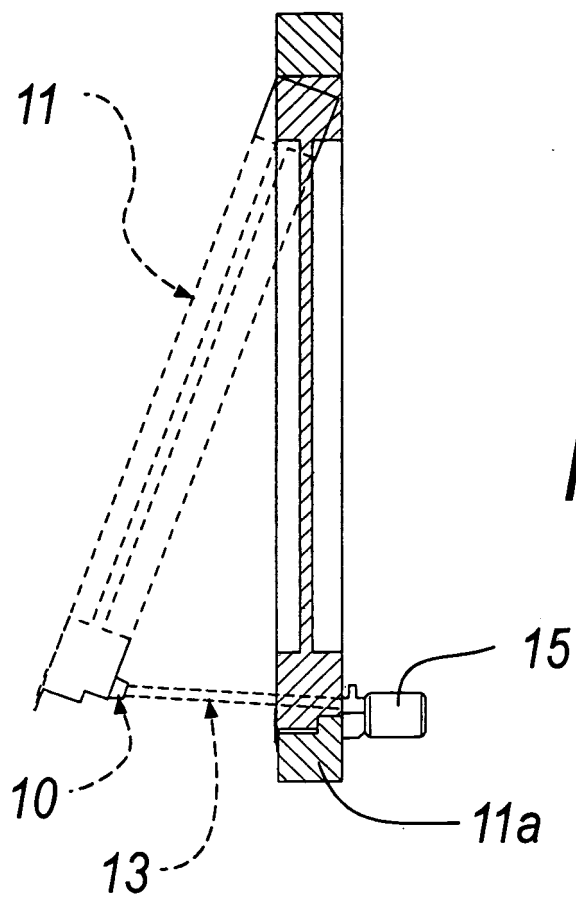
2. Dispositif d'ancrage selon la revendication 1, **caractérisé en ce que** ledit embout de prise (16, 116, 216) a, transversalement à la direction de l'action principale dudit élément souple (13), des portions mutuellement opposées (31, 131, 231) pour un couplage à des logements complémentaires (32, 132, 232) formés dans deux ailes élastiquement déformables et mutuellement opposées (33, 133, 233) qui appartiennent audit bloc de prise (17, 117, 217), la distance entre lesdits logements complémentaires (32, 132, 232) étant sensiblement plus courte que la distance entre les extrémités desdites portions de couplage mutuellement opposées (31, 131, 231).
3. Dispositif d'ancrage selon la revendication 1, **caractérisé en ce qu'à la fois** ledit premier corps (18) et ledit second corps (19) ont une forme qui est allongée dans la direction de leur coulisement mutuel, ledit second corps (19) étant plus grand que ledit premier corps (18) et ayant une cavité (21) qui est ouverte vers ladite extrémité (12) dudit élément souple (13) et est conformée de manière complémentaire audit premiers corps (18), ledit premier corps étant inséré de sorte qu'il peut coulisser dans ladite cavité (21), lesdits moyens de blocage réversible du coulisement relatif dans des positions préétablies (20) pour lesdits deux corps (18, 19) comportant un élément de boulon (22), qui est composé d'une vis ayant une tête (23) et un filet femelle hexagonal (24), ledit boulon (22) étant agencé à travers une fente traversante (25) qui est formée dans ledit premier corps (18) dans la direction dudit coulisement relatif, ledit second corps (19) ayant, au niveau de ladite fente (25), un trou (26) qui passe entièrement à travers lui, ledit boulon (22) étant agencé dans ledit trou (26) de sorte que la tête de ladite vis (23) est en appui sur une butée (27), la portion (28) dudit trou (26) qui se situe sur le côté opposé de la butée (27) par rapport à ladite cavité (21) étant conformée de manière complémentaire au filet femelle (24), ledit filet femelle (24) étant agencé également sur une partie d'un logement (29) qui est formé à l'intérieur dudit premier corps (18) sensiblement le long des bords (25a) de ladite fente traversante (25), ledit filet femelle (24) étant conformé de manière partiellement complémentaire à une portion analogue à une crémaillère (30) formée le long du côté dudit logement (29) .
4. Dispositif d'ancrage selon la revendication 2, **caractérisé en ce que** ledit bloc de prise (17, 117, 217) comporte également une coque extérieure (36, 136, 236) qui s'interverrouille de manière détachable avec lesdites ailes élastiquement déformables (33, 133, 233), ladite coque extérieure (36, 136, 236) étant conformée de manière à former une partie cen-

trale (37, 137, 237) pour recevoir ledit embout de prise (16, 116, 216), qui est constitué d'un fond (38, 138, 238) et par des côtés (39, 139, 239) qui recouvrent lesdites ailes élastiquement déformables (33, 133, 233), des ouvertures d'accès (40, 140, 240) pour lesdites portions mutuellement opposées (31, 131, 231) pour un couplage auxdits logements complémentaires (32, 132, 232) étant formées sur lesdits logements complémentaires (32, 132, 232) sur lesdits côtés (39, 139, 239) de ladite partie centrale (37, 137, 237) de ladite coque extérieure (36, 136, 236).

5. Dispositif d'ancrage selon la revendication 4, **caractérisé en ce que** lesdites ailes mutuellement opposées et élastiquement déformables (33) correspondent aux ailes d'une lamelle en forme de C (34), qui est fixée au moyen d'une nervure centrale (35) correspondante audit volet (11), les extrémités desdites ailes élastiquement déformables (33) ayant un pli vers l'extérieur (41), qui est accessible depuis l'extérieur de ladite coque à travers lesdites ouvertures (40).
6. Dispositif d'ancrage selon la revendication 4, **caractérisé en ce que** lesdites ailes élastiquement déformables (133) sont formées par deux lamelles en forme de L (134), qui sont insérées et bloquées dans ladite coque extérieure (136), qui est à son tour fixée audit volet (111), les extrémités desdites ailes élastiquement déformables (133) ayant un pli vers l'extérieur (141), qui est accessible depuis l'extérieur de ladite coque à travers des ouvertures d'accès (140a).
7. Dispositif d'ancrage selon la revendication 4, **caractérisé en ce que** les portions latérales desdites ailes élastiquement déformables (233) sont reliées d'un seul tenant l'une à l'autre par une entretoise de libération (235), qui est incurvée de sorte que sa concavité est dirigée vers ledit embout (216) lorsqu'elle est en prise avec ledit bloc (217), ladite entretoise de libération (235) faisant saillie à partir de ladite coque (217) de sorte qu'elle est à la disposition d'un utilisateur.
8. Dispositif d'ancrage selon la revendication 2, **caractérisé en ce que** ledit élément souple (13) est constitué d'une chaîne (14) du type qui peut fléchir uniquement dans une direction, ledit fléchissement étant empêché dans la direction opposée, lesdits logements complémentaires (32, 132, 232) étant constitués d'un premier logement circulaire (32a, 132a, 232a) et d'un second logement en forme de fente (32b, 132b, 232b) orienté dans la direction de l'action de ladite chaîne (14), ledit second logement en forme de fente (32b, 132b, 232b) étant rapproché dudit volet (11, 111) par rapport audit premier logement circulaire (32a, 132a, 232a), ledit second loge-

ment en forme de fente (32b, 132b, 232b) étant agencé sur l'aile élastiquement déformable (33, 133, 233) qui correspond à la direction de fléchissement de ladite chaîne (14).

9. Dispositif d'ancrage selon la revendication 8, **caractérisé en ce que** lesdites portions de couplage mutuellement opposées (31, 131, 231) dudit embout de prise (16, 116, 216) sont constituées des extrémités d'un pivot (42), qui est fixé audit embout de prise (16, 116, 216) à angles droits par rapport à la direction de l'action de ladite chaîne (14).



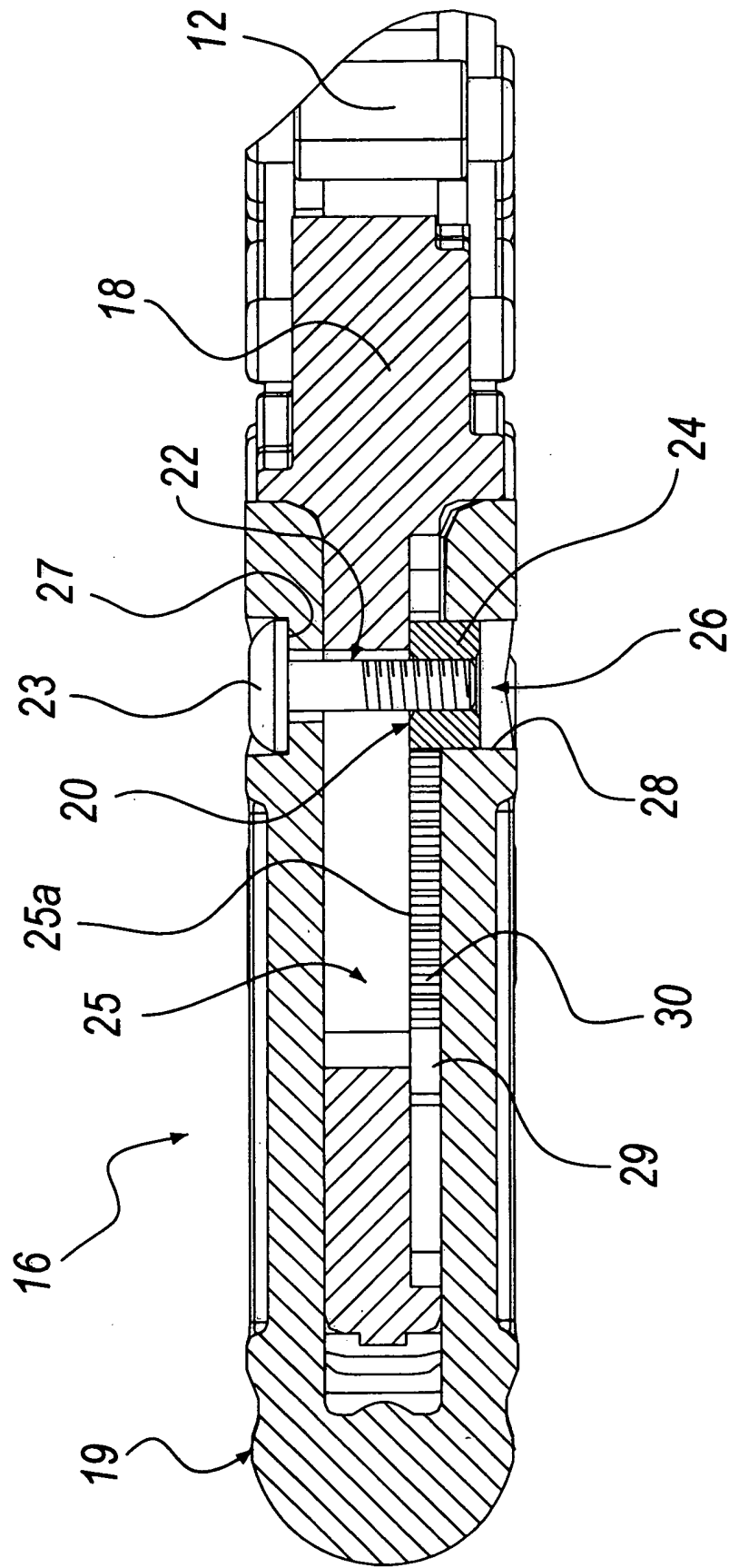


Fig. 3

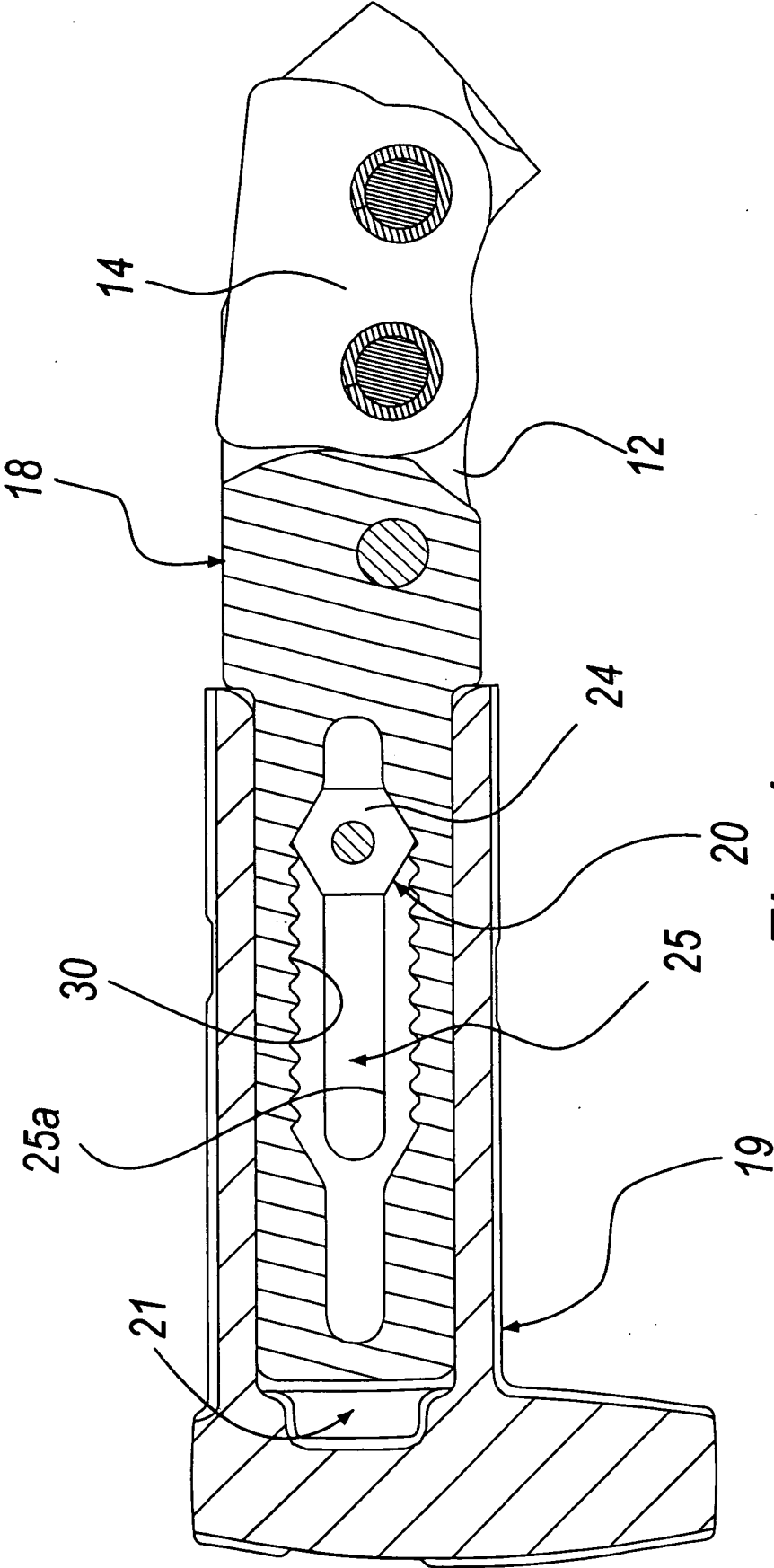
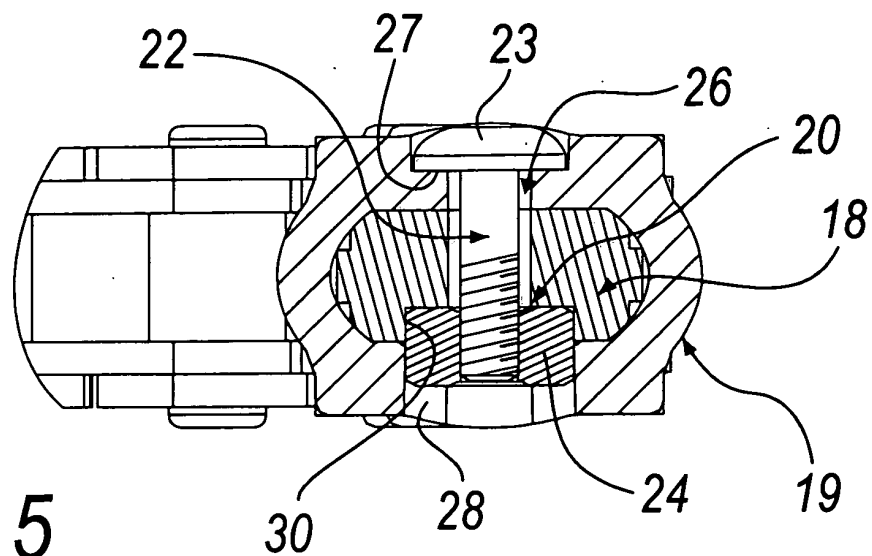
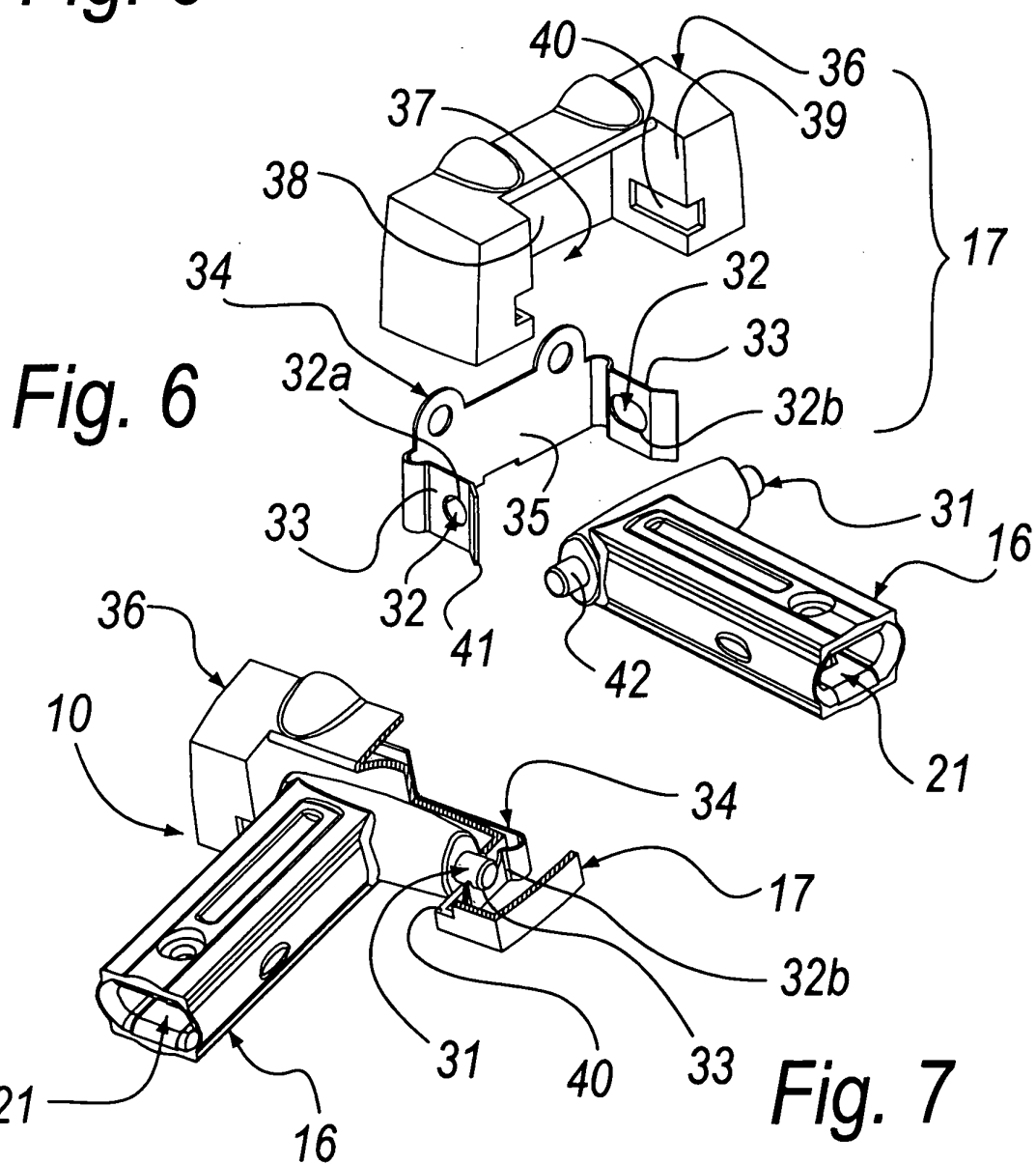


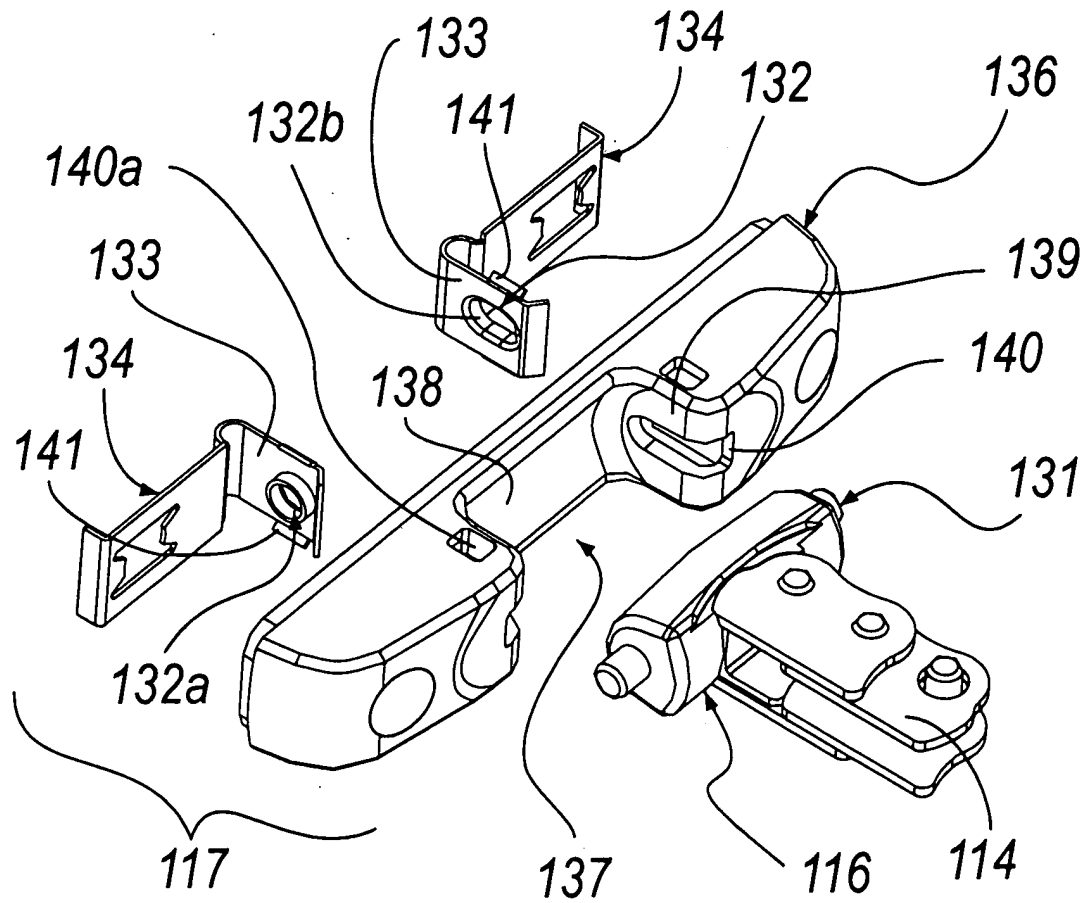
Fig. 4



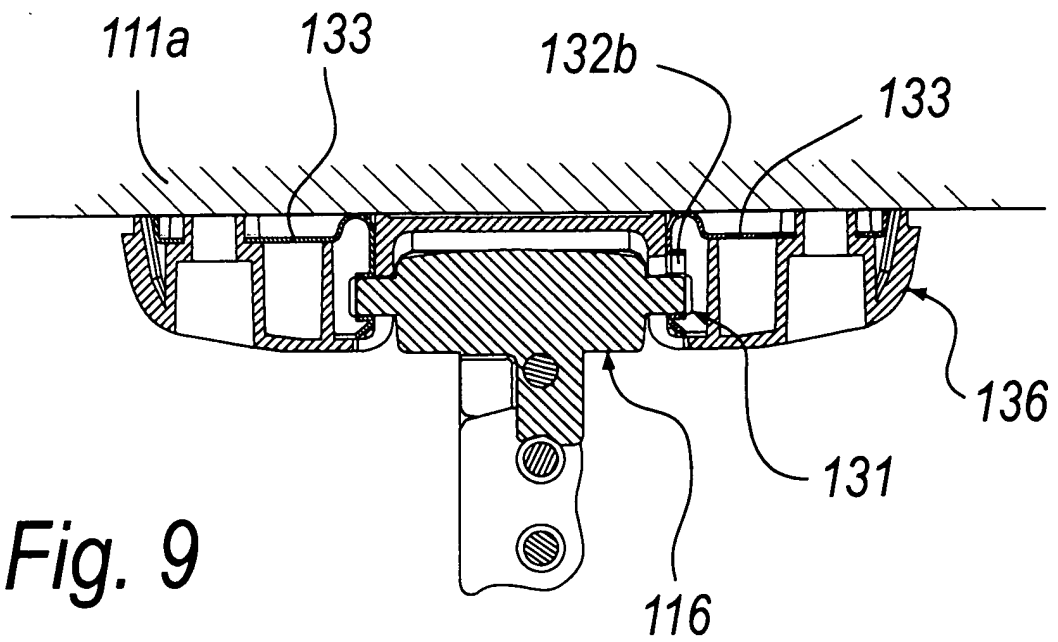
*Fig. 5*



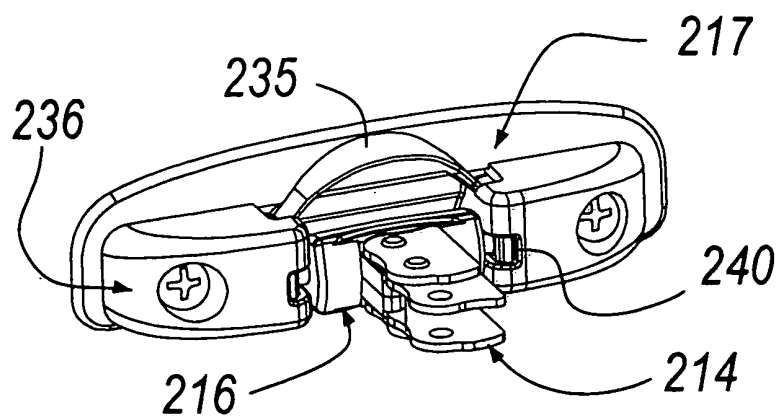
*Fig. 7*



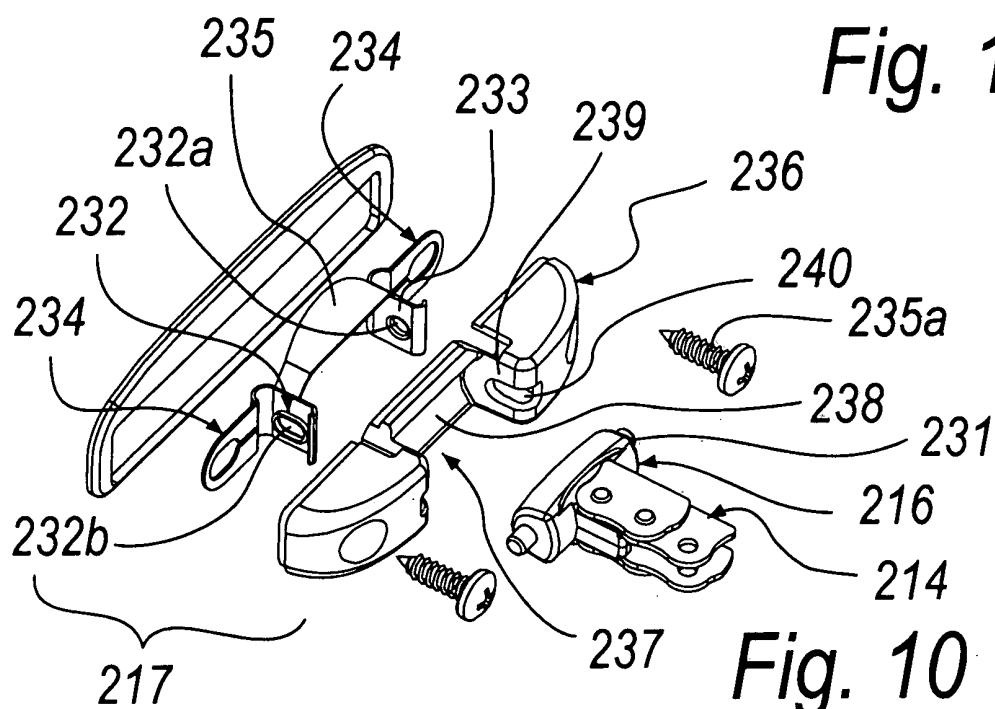
**Fig. 8**



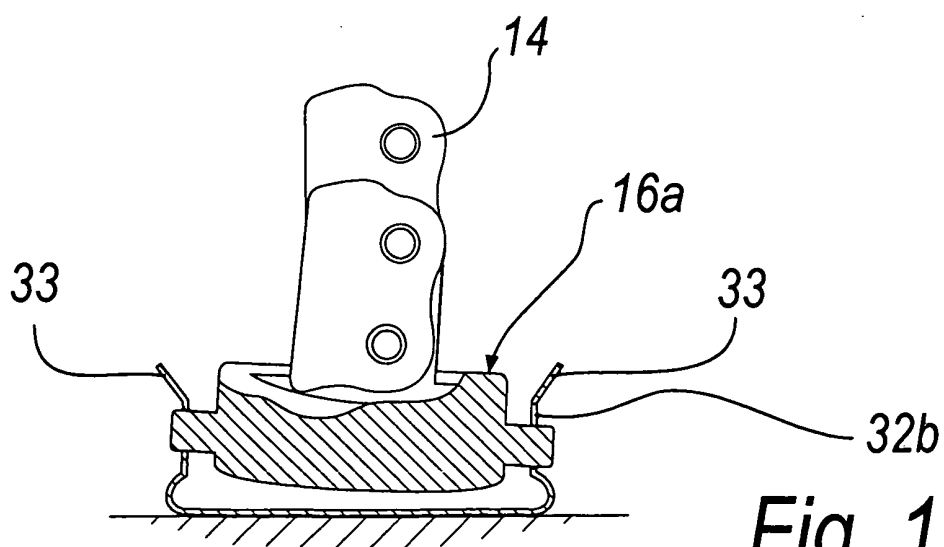
**Fig. 9**



**Fig. 11**



**Fig. 10**



**Fig. 12**

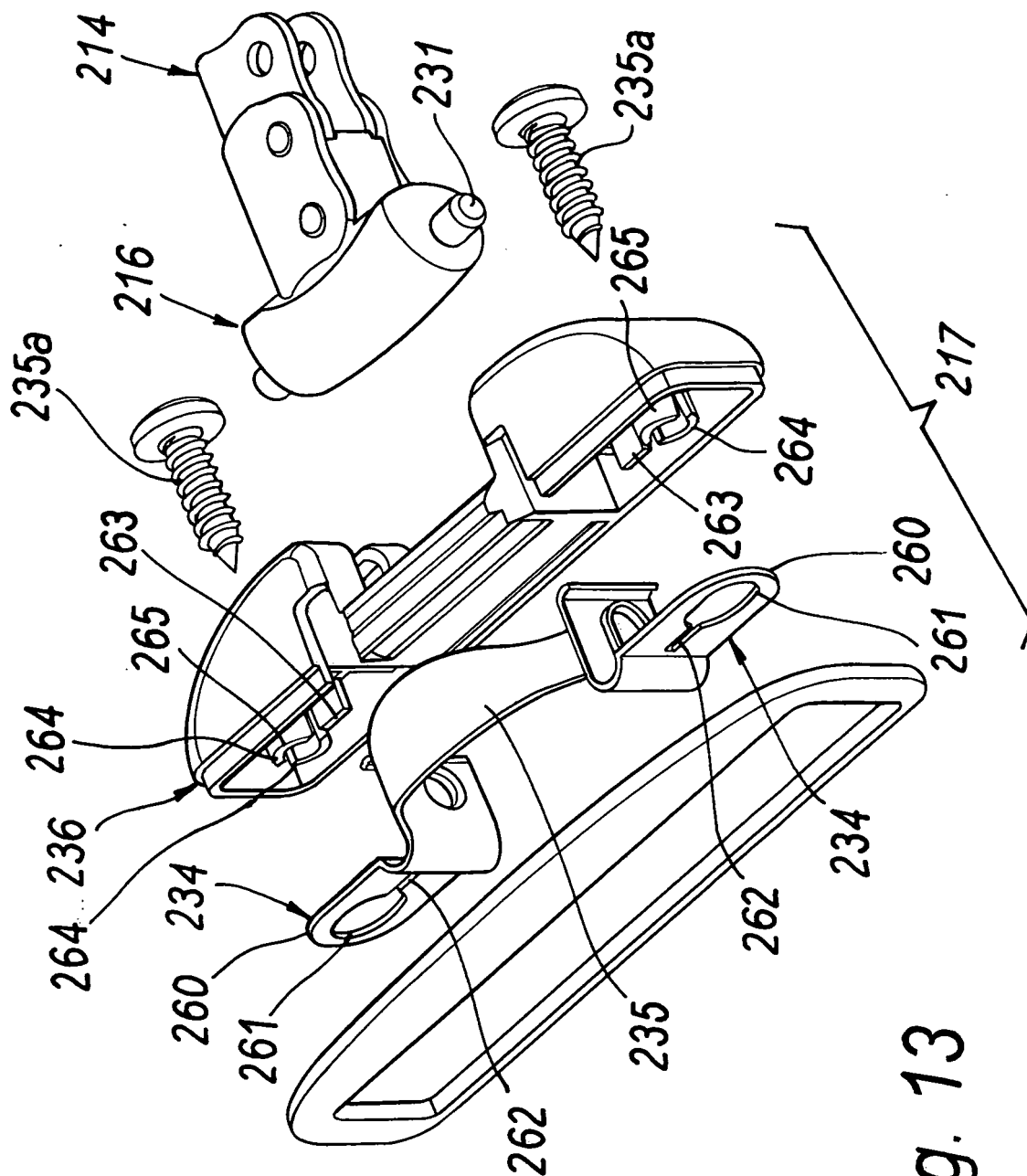


Fig. 13

**REFERENCES CITED IN THE DESCRIPTION**

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**Patent documents cited in the description**

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