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(72) Inventor: Van Wageningen, Jaap
5653 PH Eindhoven (NL)

(74) Representative: Smith, Samuel Leonard
J.A. Kemp & Co.,
14 South Square,
Gray's Inn
London WC1R 5JJ (GB)

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(71) Applicant: Mado Nederland B.V.
NL-5652 AX Eindhoven (NL)

(54) Arm for awning

(57) Arm for an awning comprising a tubular arm profile (15,17,19,21) and an end plug element (37,45,53,59) inserted therein and fixedly attached therewith, wherein

the tubular arm profile (15,17,19,21) is of generally rectangular cross-section with a hollow interior (67) and front (69), back (71), top (73) and bottom (75) walls, each comprising an inner surface;

the end plug element (37,45,53,59) comprises a body (89) and a wedge (107) which together co-operate with an inner surface of at least one of the walls of the hollow interior of the arm profile once inserted therein,

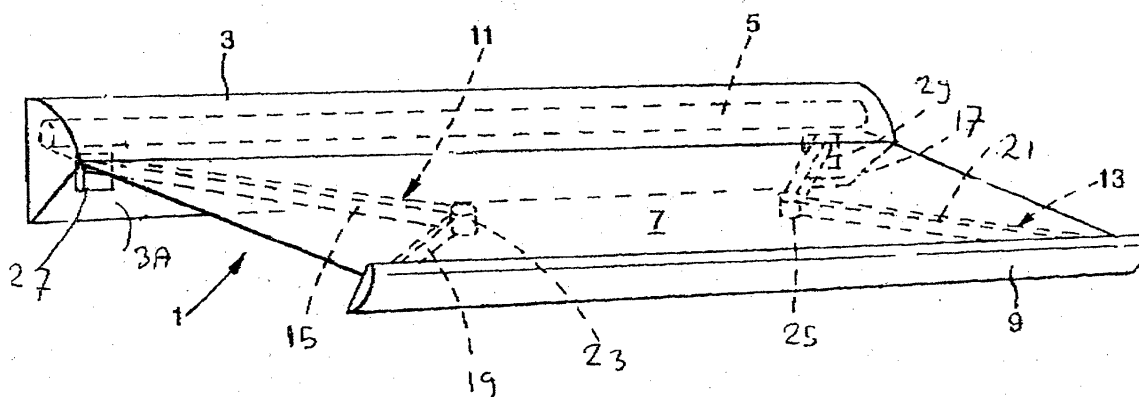
wherein

the body portion comprises an opposite upper support wall (93) comprising a sloping portion (101) which is in contact with a sloping bottom wall (115) of the wedge (107), the wedge further comprising a top wall (113) which is in contact with the inner surface of the top wall (73) of the arm profile (15), and front and back walls (109,111) connecting the top and bottom walls

and wherein

the wedge (107) is adjustably positionable laterally along the upper support wall (93) from the outside of the arm profile.

Fig. 1.



Description

[0001] The present invention relates to retractable awnings or like sun protection window coverings. In such retractable awnings a fabric or cloth sheet material is rolled or unrolled onto or from a roller and a forward end of the fabric, which is attached to a movable front bar, is guided and supported by a pair of articulated and collapsible arms. The articulated arms together with the front bar define a collapsible frame, which is supported by the same structure that also supports the roller. The articulated arms usually comprise two hollow arm profile parts that are hingedly connected by a central swivel pivot. End plugs co-operating with the hollow interior of the arm profiles serve to attach functional outer portions to the arms. This invention further relates to an articulated arm for an awning and specifically to an end plug element for the arm.

[0002] End plug elements of articulated arms for awnings are known from DE 42 00 564, EP 1,063,367 and EP 1,122,378.

[0003] All end plug elements comprise two portions, an outer portion and a plug-in portion. The outer portion of the end plug comprises a functional part for co-operation with a support bracket for hingedly connecting the arm to the bracket, or for attaching the arm to the front bar, or for forming a central swivel pivot in order to make the arm an articulated arm. The plug-in part co-operates with the hollow interior of the arm profile. There are different known methods of attaching the end plug elements to hollow interior of the arm profile.

[0004] In EP 1,063,367 the connection of end plug element to the arm profile relies on a pressure fitted tooth in groove connection, relying on deforming the teeth that fit in the grooves. In EP 1,122,378 an adhesive is applied to the plug-in part. And DE 42 00 564 uses a wedge to fix the plug-in part. From these three known methods only the last one allows for repairs or changing of part, and reuse of parts without destroying the awning arms or the end plug elements.

[0005] However the wedge is adjustable in longitudinal direction of the arm, which makes it impossible to adjust without disassembling the hinge pivot and or without taking the arm away from the mounting bracket or the front bar. This makes on-site repairs difficult and cumbersome. And it also precludes relative simple adjusting of the plug, once the awning is assembled. The plug travels along a threaded bolt into clamping position, but in this case the bolt can become loose and fall out or stick out. Furthermore the position of the wedge and bolt might weaken the connecting web between the outer functional part of the end plug element and the plug-in part, since a hole has been provided in the web for passage of the bolt which pulls the wedge into position.

[0006] The present invention has as an object to eliminate inconveniences of the prior art by providing such an end plug with improved features.

[0007] To this end the invention provides an arm for

an awning comprising a tubular arm profile and an end plug element inserted therein and fixedly attached therewith, wherein the tubular arm profile is of generally rectangular cross-section with a hollow interior and front, back, top and bottom walls each comprising an inner surface,

the end plug element comprises a body portion and a wedge which together co-operate with at least one of the walls of the hollow interior of the arm profile once inserted therein, wherein the body portion comprises an upper support wall which comprises a sloped portion which is in contact with a sloping bottom wall of the wedge, the wedge further comprising a top wall which is in contact with the top wall of the arm profile and front and back walls connecting the top and bottom walls and wherein the wedge is positionable laterally along the upper support wall from the outside of the arm profile.

[0008] Further aspects of the invention will be apparent from the detailed description below of particular embodiments and the drawings thereof, in which

- Figure 1 is a general perspective view of a retractable arm awning of this invention in an extended position,
- Figure 2 is a general perspective view of an arm of a retractable awning;
- Figure 3 is general perspective view of an end plug according to the invention and a cross section of an arm profile
- Figure 4 is a cross-section of the end plug according to the invention when assembled in the arm profile

[0009] Figure 1 shows a retractable arm awning 1 with articulated arms of the general type with which the present invention is concerned. The awning 1 of Figure 1 has a wall mounted cassette 3 housing a roller 5 with a fabric cloth 7 attached to the roller with a rear edge of the fabric, a front bar 9 connected to a front edge of the fabric cloth 7 and a left and right articulated collapsible arms 11, 13 one end of which is attached to the wall and another end is attached to the front bar. The awning fabric is unrolled from the fabric roller when the arms 11, 13 move the front bar away from the wall mounted cassette.

[0010] Each arm comprises a first or upper arm profile 15, 17 and a second or lower arm profile 19, 21. The upper and lower arm profiles 15, 19 of the left awning arm 11 are hingedly connected by a left central pivot swivel 23. For the right arm 13 the arm profiles are hingedly connected by right central pivot swivel 25. The upper arm profile 15 of the left arm 11 is hingedly mounted to a wall or to the cassette from a left arm support bracket 27, and the upper arm profile 21 of the right arm 13 is mounted from right support bracket 29. The lower arm profile of the left arm is hingedly connected to the rear side of the front bar 9 by bracket 31 (not shown). The front bar 9 preferably, but not necessarily, is shaped as a lid to close the opening 3A in the cassette 3 from

which the fabric cloth and collapsible frame extend, when the awning is in a retracted position.

[0011] Each arm profile 15, 17, 19, 21 comprises a profiled length of hollow, tubular profile with an upper and a lower open end. The length of the profile can be of an appropriate length in relation to the desired drop of the awning and the extended length of the awning cloth. The tubular profiles are preferably made from aluminium. The respective open ends of each arm profile are provided with end plug elements. Each end plug element comprising a plug-in end and an outer end. Each outer end of the end plug element is configured according to the function it will have to perform.

[0012] Figure 2 shows the left arm of the awning. To upper or left end 35 of the upper arm profile 15 of the left arm 11 an upper plug element 37 is attached. The upper or left plug element 37 has a forked outer end 39 and a plug-in part 41 (not shown) inserted into the hollow interior of the arm profile. The forked outer end 39 of plug element 37 is to be hingedly connected to the support bracket 27, allowing the left arm 11 of the awning to be hingedly connected to the wall or the cassette 3. At the lower or right end 43 of the upper arm profile 15 of the left arm 11 of the awning, a lower or right end plug element 45 is placed. This plug element also comprises a plug-in part 47 (not shown) inserted to co-operating with the hollow interior of the arm profile. The outer end 49 of this end plug element comprises a first part of the central pivot swivel 23, which in this embodiment is a forked end 49. In order to form the central pivot swivel 23, the forked end 49 of end plug element 45 will co-operate with the outer end 55 shaped as a hinge body of upper or left end plug element 53 plugged into the upper or left end 51 of the lower arm profile 19 of the left arm 11. The upper plug element 53 also comprises a plug-in end 57 (not shown) co-operating with the hollow interior of lower arm profile 19. In order to attach the left arm 11 to the front bar 9, a lower end plug element 59 is placed at the lower end 61 of the lower left arm profile 19. This lower end plug element 59 comprises a plug-in portion 63 (not shown) co-operating with the hollow interior of the arm profile and an outer end portion 65 which is shaped as a hinge body and can co-operate with a mounting plate (not shown) attachable to the front bar 9.

[0013] As is shown in Figure 3, the end plug element according to the invention comprises two parts an outer part and a two-part plug-in part. The invention will be described from end plug element 37. The end plug according to the invention can have any type of outer part, a forked part or a hinge body or another type of functional outer part suitable for attaching the arm to a mounting bracket, forming the central swivel pivot or for attaching the arm to the front bar.

[0014] For any end plug element the two-part plug-in part will be as shown in this figure.

[0015] The end plug element 37 comprises outer part 39 and plug-in part 41.

[0016] The plug-in part 41 extends in longitudinal direction from a back web 40 of the outer part 39 and can be longitudinally inserted in the hollow interior 67 of the arm profile 15.

[0017] The arm profile 15 is a hollow tubular profile which is generally rectangular. Having a longitudinally extending upright back wall 69, an opposite longitudinally extending upright front wall 71, the back and front walls 69, 71 being connected by longitudinally extending lateral top and bottom walls 73, 75. The inner surface of the bottom wall 75 comprises a ramp 77 which laterally extends from the bottom near the back wall 69 towards the front. The ramp 77 has a sloped top 79 which increases in height as it extends laterally towards the front and preferably reaches its maximum height near the lateral middle of the bottom. The ramp 79 then ends in a generally steeply downwardly sloping or vertical wall 81, extending generally parallel to the inner surface of the upright front wall 71. The ramp 77 extends in longitudinal direction along the inner surface of the bottom wall 75 of the arm profile 15. The inner surface of the front upright wall 71 comprises a ridge-like portion 83. It extends a small distance laterally inward from the top of the inner surface of the front upright wall towards the upright back wall 69 and comprises an upright inner surface 85 facing the inner surface of the upright back wall 69 and being generally parallel thereto. The ridge 83 ends in a lateral lower surface 87. The ridge 83 extends in longitudinal direction along the inner surface of the front wall 71 of the arm profile 15, and serves as a thickened portion of the front wall 71 of the arm profile 15.

[0018] The plug-in part 41 of end plug element 37 comprises a body 89 and a wedge 107.

[0019] The body 89 extends in longitudinal direction from a lateral upright back web 40 of the outer part 39 of the end plug element and is formed to fit into the hollow interior 67 of the arm profile 15. The body 89 comprises an upright longitudinally extending back wall 91 and two spaced apart upper and lower support walls 93 and 95 extending laterally inward from the back wall. The support walls 93 and 95 can be separated from each other by a generally U-shaped open channel 97, as is shown in figure 3. Upper support wall 93 has a narrow lateral extending horizontal portion 99. It further comprises an inward and downward sloping portion 101. The lower support wall 95 has a narrow lateral extending horizontal portion 103, it also has an inward and upward sloping portion 105.

When the end-plug element 37 is inserted into the hollow interior of the arm profile 15, horizontal portion 99 of the upper support wall 93 will be in contact with a portion of the inner surface of the top wall 73 and the sloping portion 101 of the upper support wall 93 will carry the wedge 107. Furthermore the horizontal portion 103 of the lower support wall 95 will be in contact with a narrow horizontal portion of the inner surface of the bottom wall 75 between the upright back wall 67 and the ramp 77, and the sloping portion 105 of the lower support wall 95

will rest on the ramp surface 79. The sloping portion 105 of the lower support wall 95 is complementary in slope to the slope of the ramp surface 79. In an alternative embodiment the lower support wall of the body 89 comprises a wide horizontal portion and not a sloping portion. The wide horizontal portion will contact the inner surface of the bottom wall of the profile, which in this case will not have a ramp.

[0020] The wedge 107 is a longitudinally extending generally triangular part. it comprises an upright longitudinally extending back wall 109, an upright, longitudinally extending front wall 111, a top wall 113 extending laterally between back and front wall and connecting the two. The back wall 109 has a smaller height than the front wall 111, and a sloping wall portion 115 connects the lower portions of the back 109 and front walls 111. The sloping wall portion 115 slopes in a lateral direction upward from front to back. The sloping wall 115 of the wedge is complementary in slope to the sloping wall portion 101 of the upper support wall 93. Preferably the wedge 107 also has the same longitudinal length as the upper support wall 93 of the body 89 of the plug-in part 41 of the end plug element 37

[0021] A threaded bore 117 extends horizontally in a lateral direction from upright front wall 111 through the wedge 107 end exits in the sloping wall portion 115. The sloping portion 101 of the upper support wall 93 of the body 89 of the end plug element comprises a blind hole or recess 119 ending in an generally vertical wall portion 121.

[0022] The front wall 71 of the arm profile 15 has a through hole 123 in the ridge 83.

[0023] A flat ended bolt 125 with a head 127 and a screw threaded stem 129 can be screwed in the bore 117. The head 127 of the bolt 125 comprises an inner surface 131 oriented towards the stem 129 and a planar outer surface 133 oriented away from the stem. The bolt when assembled to the wedge will extend through the bore 117 into blind hole or recess 119 of the body 89 of end plug element 37, the end of the stem abutting or almost abutting against vertical wall portion 121 of the blind hole. The two parts 89 and 107 of the end plug are thus pre-assembled and can be inserted into the hollow interior 67 of the arm profile 15. Once inserted, the three holes 117, 119 and 123, and the bolt are aligned. The outer surface 133 of the head 127 of the bolt 125 bolt abuts against the a portion of upright inner surface 85 of ridge 83. The bolt head is effectively captured between the wedge and the front wall of the profile. The bolt head 127 comprises a slot or a hexagonal blind hole for co-operation with the end of a screw-driver or a hexagonal tool, and can be reached by such tools through hole 123 in the profile. When the bolt is turned it will remain in a lateral stationary position but will rotate within the screw-thread of the wedge. If the bolt is now turned in a first direction, the wedge will move in lateral inward direction along the screw thread, towards the end of the bolt. The wedge will travel upward along the sloped por-

tion 101 of the upper support wall 93 and will securely wedge the end plug element 37 in the hollow arm profile 15. If the bolt is turned in the opposite direction, the wedge will travel along the screw thread in the reverse direction, and loosen the connection between plug end element 37 and the profile 15.

[0024] Figure 4 shows a cross section of an assembled plug-in part of an end plug element in a arm profile.

[0025] As can be seen in the assembled situation top wall 113 of wedge 107 is forced against the inner surface of top wall 73 of the arm profile 15. The wedge is also forced against sloping wall portion 101 of upper support wall 93. The wedging forces are thus also directed through body 89 towards back wall 69 of arm profile 15. At the same time sloping wall portion 105 of lower support wall 95 is forced against upper surface 79 of ramp 77. This also results in a wedging force directed towards back wall 69 of the arm profile 15.

[0026] The wedge provides for the wedging forces acting on the upper, lower and back walls of the arm profile firmly securing the end-plug element in the arm profile.

[0027] Although the plug-in part of the end plug element according to the invention is described and shown in the figures as end plug element 37 of the articulated arm. All end plug elements used in the arms of any awning can have a plug-in part comprising a body and a wedge as described above.

[0028] Depending on the forces expected on the outer part of the end plug element, the plug-in element and the wedge can be made longer in longitudinal direction. Additional screw-hole and bolts can be spaced apart along the length of the wedge and the arm profile. Since the wedge extends along the length of the body it has a maximum effective surface. The lateral travel up against the sloping wall portion is relatively small without decreasing the effective wedging force. The head of the bolt is of a larger diameter than the hole in the front wall on the profile. And the dimensions are chosen so that the bolt can travel in vertical direction as the wedge travels upwards against the sloping wall portion.

[0029] In the U-shaped channel 97 as shown in figures 3 and 4 a U-shaped ridge 140 can be placed such that a spring end can be attached to it. So that springs used in conventional retractable and extendable awnings as biasing means acting on the articulated arms to build the collapsible frame can be attached to the end plug elements where required. Or other arrangements such as different forms of flexible elements, such as cables; chains and flexible belts or strips. Of course other attachment means are possible, doing away with the U-shaped channel altogether. The way of attaching springs or other biasing means to the end plug elements does not change the plug-in part according to the invention.

[0030] It is thus believed that the operation and construction of the present invention will be apparent from the foregoing description. The term comprising when

used in this description or the appended claims should not be construed in an exclusive or exhaustive sense but rather in an inclusive sense. Features which are not specifically or explicitly described or claimed may be additionally included in the structure according to the present invention without deviating from its scope.

[0031] Where in the above reference is made to longitudinal or lateral this is in reference to the length or width directions respectively of elements which have an oblong or otherwise elongate appearance in the accompanying drawings. This interpretation however has only been used for ease of reference and should not be construed as a limitation of the shape of such elements. Expressions, such as right, left, horizontal, vertical, above, below, upper, lower, top, bottom or the like if used in reference to the construction as illustrated in the accompanying drawings are relevant only to the relative positions and in a different orientation of the construction should be interpreted in accordance with comparable relative positions.

Claims

1. Arm for an awning comprising a tubular arm profile 15, 17, 19, 21 and an end plug element 37,45,53,59 inserted therein and fixedly attached therewith, wherein

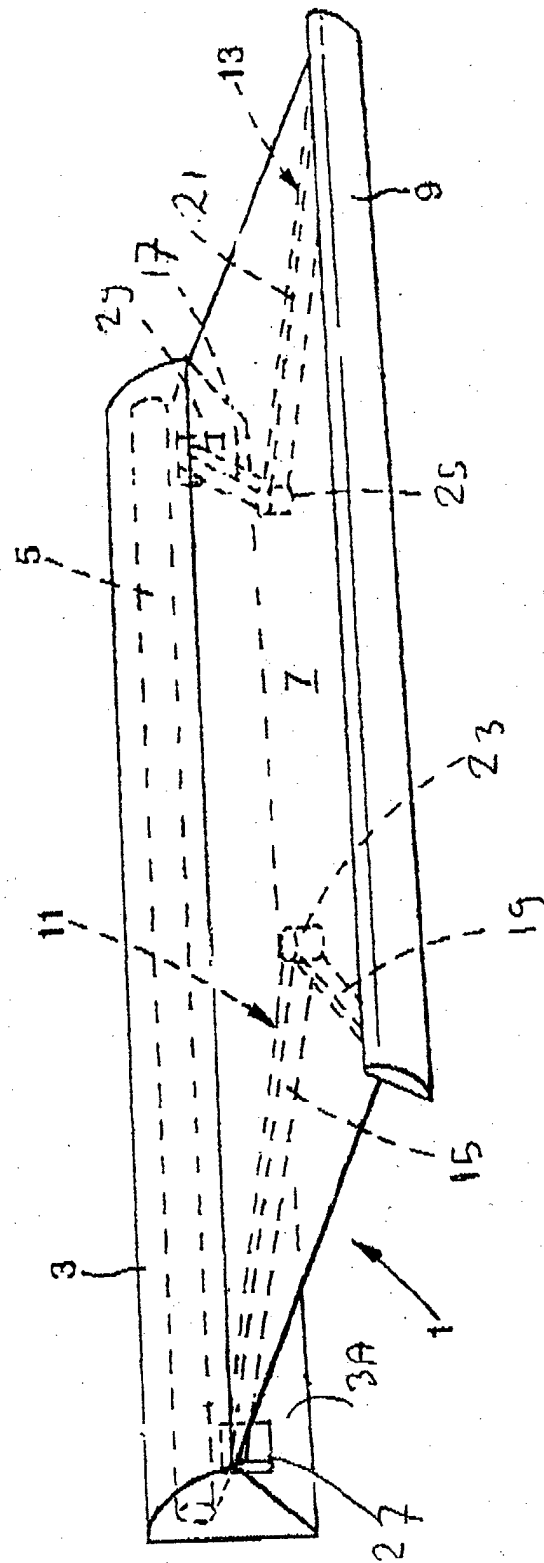
the tubular arm profile 15,17,19,21 is of generally rectangular cross-section with a hollow interior 67 and front 69, back 71, top 73 and bottom 75 walls, each comprising an inner surface: the end plug element 37, 45, 53, 59 comprises a body 89 and a wedge 107 which together cooperate with an inner surface of at least one of the walls of the hollow interior of the arm profile once inserted therein, wherein, the body portion comprises an opposite upper support wall 93 comprising a sloping portion 101 which is in contact with a sloping bottom wall 115 of the wedge 107. the wedge further comprising an top wall 113 which is in contact with the inner surface of the top wall 73 of the arm profile 15, and front and back walls 109, 111 connecting the top and bottom walls and wherein the wedge 107 is adjustably positionable laterally along the upper support wall 93 from the outside of the arm profile.

2. The awning arm of claim 1 , wherein the body portion further comprises a lower support wall 95 which is in contact the inner surface of the bottom wall 75 of the arm profile.
3. The awning arm of claim 1 or 2.

wherein the the lower support wall 95 comprises an inward and upward sloping wall portion 115 which is in contact with a complementary ramp 77 on the inner surface of bottom wall 75 of the arm profile.

4. The awning arm of claim 1, 2 or 3, wherein a screw threaded bolt 125 is engaged in a threaded bore 117 in the wedge 107. the end of the bolt 125 is received in a recess 119 in the upper support wall 93 of the body 89, wherein rotation of the bolt causes lateral displacement of the wedge
5. The awning arm of claim 4, wherein the bolt comprises a head 127 and a screw-threaded stem 129, and the head comprises a planar outer surface 133 and wherein the outer surface 133 of the head 127 abuts against a portion of the inner surface of the front wall 71 of the arm profile 15.
6. The awning arm of claim 4 or 5, wherein the bolt can be rotated using a suitable tool inserted through a hole 123 in front wall 71 of the arm profile
7. An end plug element for use in the awning arm of any of the claims 1-6.

Fig.1.



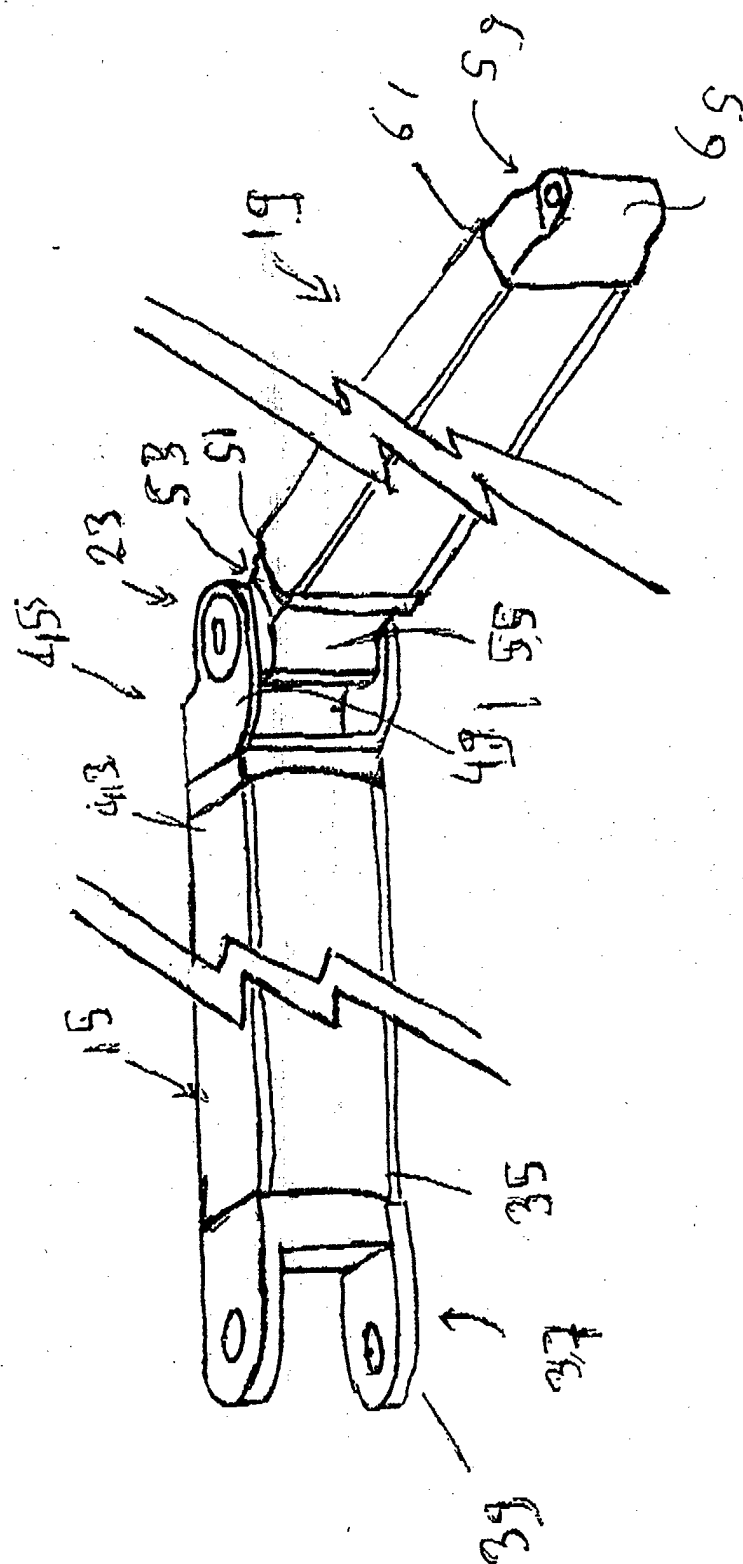
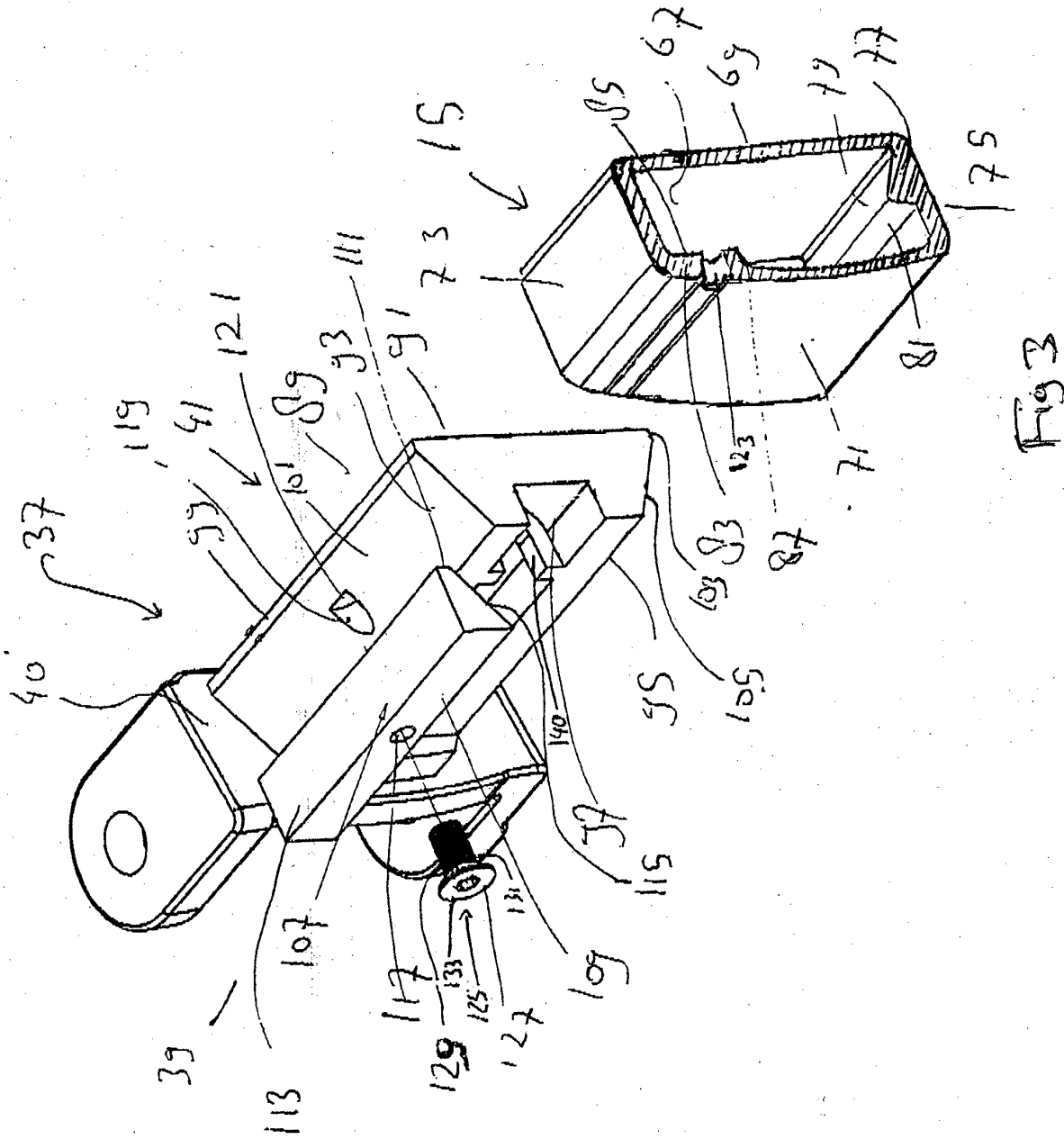


Fig 2



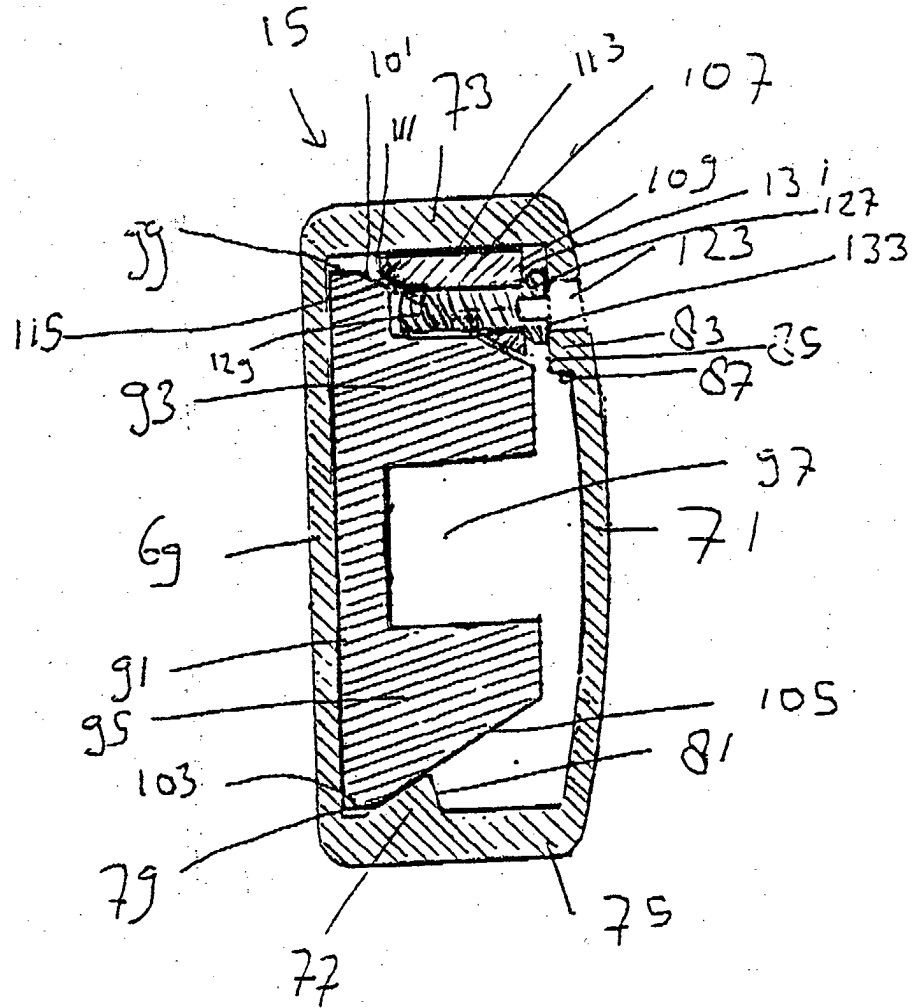


Fig 4