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(54) Guide means to be fitted between two leg members of a telescopic leg

(57) The invention relates to a guide means to be fitted between two leg members of a telescopic leg for a piece of furniture or the like, which leg members are movable in a telescoping direction with respect to each other, which guide means comprises means of attachment for attaching the guide element to one of the two leg members as well as a guide member for guiding cooperation with a counter guide member of the other one of the two leg members, whilst expansion means are provided for expanding the guide element against the counter guide element, as well as fixing means for fixing an expanded state of the guide element, wherein the expansion means are operative as a result of the movement of the leg members relative to each other.

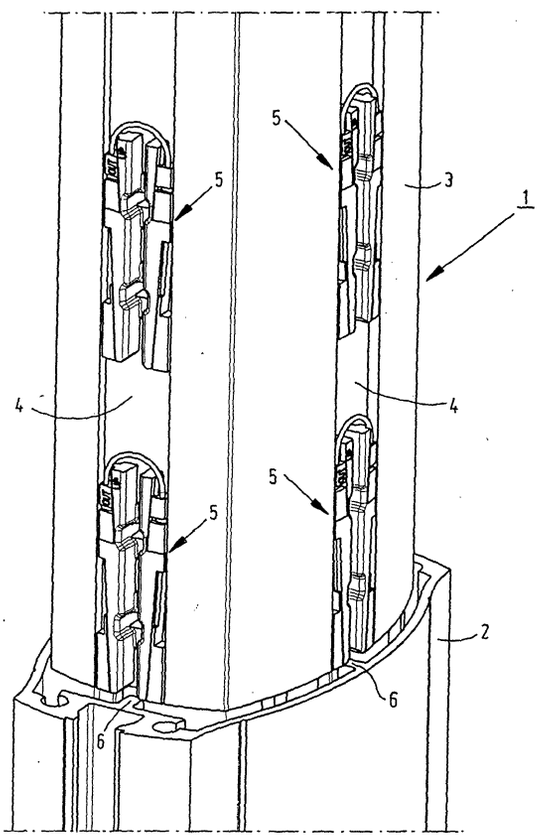

FIG.1

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Description

[0001] The invention relates to a guide means to be fitted between two leg members of a telescopic leg for a piece of furniture or the like, which leg members are movable in a telescoping direction with respect to each other, which guide means comprises means of attachment for attaching the guide element to one of the two leg members, as well as a guide member for guiding cooperation with a counter guide member of the other one of the two leg members, whilst expansion means are provided for expanding the guide element against the counter guide element, as well as fixing means for fixing an expanded state of the guide element.

[0002] Such a guide element is known from German utility model DE 298 12 762 U1. Said document discloses a telescopic lifting arm comprising a number of sliding shoes arranged between the telescopic members. Each sliding shoe comprises two shoe members which are movable in horizontal direction with respect to each other, transversely to the longitudinal direction of the telescopic lifting arm. To this end, two wedge-shaped members are arranged between the movable shoe members, which wedge-shaped members can be moved towards each other or away from each other by means of an adjusting screw, under the influence of which the shoe members will move with respect to each other until a suitable abutment within a vertical guide slot of one of the telescopic members is obtained. The adjustment of the width of such a guide element is time-consuming. In addition to that, there is a risk that the settings of the various guide elements on the circumference of the telescopic members are not the same, which may lead to uneven guidance and loading.

[0003] The object of the invention is to provide a guide means which is in particular suitable for use in a telescopic leg for a piece of furniture or the like, and in which the drawbacks of the above-described adjustable sliding shoes according to the prior art do not obtain. In order to accomplish that objective, the guide element according to the invention is characterized in that said expansion means are operative as a result of the movement of the leg members relative to each other. As a result, the adjustment of guide means can take place autonomously, as it were, upon assembly of the telescopic leg members. There is no need for separate manual, time-consuming adjustment of the guide means.

[0004] According to a very advantageous preferred embodiment, the guide means comprises two guide elements which can be moved in the telescoping direction with respect to each other so as to reach the fixed expanded state. The two guide elements that are movable with respect to each other allow a relatively simple construction.

[0005] A very compact guide means built up of a limited number of parts is obtained if the guide member is arranged on at least one of the guide elements.

[0006] In order to achieve a further reduction of the assembly time of a telescopic leg, the fixation means are preferably operative as a result of the movement of the leg members relative to each other.

[0007] A compact and constructionally simple preferred embodiment is obtained if the expansion means comprise a first wedge surface on a guide element, along which a counter guide member of the other guide element can be guided.

[0008] Preferably, said counter guide member is formed by a second wedge surface, which can move along said first wedge surface, as a result of which an optimum transmission of force and movement can be achieved.

[0009] The fixation means preferably comprise sliding teeth which engage each other. Said teeth are capable of allowing movement in one direction whilst rendering movement in the opposite direction impossible. This makes it possible to fix a desired expanded state immediately upon reaching said state.

[0010] In order to make the adjustment of the guide means even more autonomous, each guide means is preferably provided with engaging means for activating the expansion of the guide means.

[0011] Preferably, said engaging means are designed to be engaged by a leg member, so that separate adjustment of the guide means is not necessary and adjustment can take place simultaneously with the insertion of one leg member into another during assembly.

[0012] To this end, the engaging means will preferably comprise a breaking element which can break as a result of the movement of the leg members relative to each other. The breaking stress associated with a breaking element determines the operative adjustment of the guide means.

[0013] The same results can be achieved if, according to an alternative preferred embodiment, the engaging means can be swung aside, for example out of the path of a leg member that engages the engaging means.

[0014] The invention further relates to a telescopic leg comprising at least two leg members which are movable relative to each other in the telescoping direction, in which at least one guide means according to the invention as described above is arranged between the leg members.

[0015] In addition to that, the invention relates to a piece of furniture provided with such telescopic legs.

[0016] The advantages of such a telescopic leg and such a piece of furniture have already been explained in detail in the description of the guide means according to the invention in conjunction with the preferred embodiments.

[0017] The invention will be explained in more date daily hereinafter by means of the description of two preferred embodiments of guide means according to the invention. By way of illustration, reference will be made to the following figures therein.

[0018] Figure 1 is a perspective view of a first preferred embodiment of a guide means according to the

invention during assembly of a telescopic leg;

Figure 2 is a front view of the fixed guide element of the guide means that is shown in Figure 1;
Figure 3 is a front view of the movable guide element of the guide means that is shown in Figure 1;
Figure 4 is a perspective front view of the guide means that is shown in Figure 1;
Figure 5 is a perspective rear view of the guide element that is shown in Figure 1;
Figure 6 is a perspective view of a second preferred embodiment of a guide means according to the invention during assembly of a telescopic leg;
Figure 7 is a perspective rear view of the fixed guide element of the guide means that is shown in Figure 6;
Figure 8 is a side elevation of the fixed guide element that is shown in Figure 6;
Figure 9 is a perspective front view of the movable guide element of the guide means that is shown in Figure 6;
Figure 10 is a perspective rear view of the guide means that is shown in Figure 6; and
Figure 11 shows the guide means of Figure 10 in swung-open position.

[0019] Figure 1 shows a telescopic leg 1 during assembly thereof. The telescopic leg 1 has a lower leg member 2, into which an upper leg member 3 can be slid. The leg members 2 and 3 are extruded aluminium sections of substantially rectangular cross-section. Slots 4 extending in longitudinal direction are present on the outer sides of the upper leg member 3. Two guide means 5 are arranged in each longitudinal slot 4. The guide means 5 will be explained in more detail yet with reference to Figures 2 - 5. The guide means 5 are intended to mate with ridges 6, which extend centrally inside the lower leg member 2, in the longitudinal direction thereof. In the position that is shown in Figure 1, the bottom side of the lower leg member 3 is positioned at the same vertical level as the upper side of the lower leg member 2.

[0020] The guide means 5 consists of a fixed guide element 7 (Figure 2) and a movable guide element 8 (Figure 3). The two guide elements 7 and 8 are injection-moulded plastic products. At its rear side, the fixed guide element 7 is provided with two connecting elements 9 and 10 (Figure 5). Each connecting element 9,10 is made up of two semi-circular stubs 11, 12 and 13, 14, respectively, disposed opposite each other, between which two elastic retaining hooks 15, 16 and 17, 18, respectively, are present. Each connecting element 9, 10 has an outer circumference in the shape of an elongated circle. This shape corresponds to the shape of holes in the inner wall of the longitudinal slots 4, so that the connecting elements 9, 10 can be received in said holes, with the fixed guide element 7 being fixedly connected to the upper leg member 3 as a result of the action of the retaining hooks 15 - 18.

[0021] The connecting elements 9 and 10 form the connection between guide members 29, 30 extending in the longitudinal direction, as a result of which the fixed guide element 7 is substantially of U-shaped section, seen in top plan view or bottom plan view, with the legs of said U-shape being formed by the guide members 29 and 30. The space between the guide members 29 and 30 is intended for receiving the ridges 6 of the lower leg member 2. To this end, the sides of the guide members 29 and 30 that face each other form sliding surfaces 31, 32. On the outer sides of the guide members 29, 30, the fixed guide element 7 is provided with conical guide surfaces 19, 20 comprising guides 21, 22. Said guide surfaces 19, 20 extend along the entire length of the fixed guide element 7. Upwardly extending teeth 23, 24 are centrally arranged on the guide surfaces 19, 20, between the front retaining surfaces 25, 26 and rear retaining surfaces 27, 28.

[0022] The movable guide element 8 consists of two expansion members 33, 34, which are interconnected by a U-shaped breakcord 35 at the upper side. The expansion members 33 and 34 are provided with upper guide blocks 36, 37 at their upper sides and with lower guide blocks 38, 39 at their lower sides. Grooves 40, 41 are present in the sides of the upper guide blocks 36 and 37 that face each other. The bottoms of said grooves form the ends of guide surfaces 42, 43. Said guide surfaces 42, 43, which are intended for guiding cooperation with conical guide surfaces 19, 20 of the fixed guide element 7, extend conically towards each other in downward direction along the entire length of the expansion members 33, 34. Inwardly extending sliding teeth 44, 45 are centrally provided on the guide surfaces 42, 43. Said sliding teeth 44, 45 are designed to mesh with teeth 23, 24, and because the teeth 44, 45 extend in downward direction and the teeth 23, 24 extend in upward direction, movement of the movable guide element 8 in the direction indicated by arrow 46 is possible, whilst movement of said element in the reverse direction is not possible. The upper guide blocks 36, 37 and the lower guide blocks 38, 39 are externally provided with abutting surfaces 47, 48 and 49, 50, respectively, which surfaces extend parallel to the longitudinal direction of the movable guide element 8. The abutting surfaces 47, 48, 49, 50 are to abut against the edges of the longitudinal slot 4.

[0023] The operation of the guide means 5 during assembly of the telescopic leg is as follows. From the position that is shown in Figure 1, the inner leg member 3 is slid into the lower leg member 2, with the ridges 6 being received in the space between the sliding surfaces 31 and 32 of the fixed guide element 7. When said downward movement is continued, the upper edge of the ridge 6 will at some point prevent the movable guide element 8 from moving any further, because the upper side of the ridge 6 will come to abut against the inner side of the U-shaped breakcord 35. Further downward

movement of the upper leg member 3 will cause the fixed guide element 7 to move downwards together with the leg member 3, whilst the movable guide element 8 will remain in the same spatial position. As a result, the abutting surfaces 47, 48, 49 and 50 will on the one hand slide along the edges of the longitudinal slots 4, whilst on the other hand the guide surfaces 19 and 20 of the fixed guide element 7 will slide along the guide surfaces 42 and 43 of the movable guide element 8. On account of the conical orientation of said guide surfaces, the guide members 29 and 30 will on the one hand be moved towards each other during this relative movement of the movable guide element 8 with respect to the fixed guide element 7, as a result of which the sliding surfaces 31 and 32 will abut against the ridges 6 with an increased contact pressure, whilst on the other hand the upper guide blocks 36 and 37 and the lower guide blocks 38 and 39 will move outwards, as a result of which the abutting surfaces 47, 48, 49 and 50 will come to abut against the edges of the longitudinal slots 4 with an increased contact pressure. At the same time, the teeth 44, 45 of the movable guide element 8 will slide down the teeth 23, 24 of the fixed guide element 7. To that end, the central areas 51, 52 of the expansion members 33, 34 are relatively thin, as a result of which elastic deformation of the extending members 33, 34 at the location of the teeth 44, 45 is possible. As the relative movement between the fixed guide element 7 and the movable guide element 8 increases, also the frictional force acting between the movable guide element 8 and the edges of the slots 4 on the one hand and between the movable guide element 8 and the fixed guide element 7 on the other hand will increase as a result of the increased contact pressure. This will cause the breakcord 35 to break at some point upon reaching the breaking stress, as a result of which the ridge 6 can slide further between the sliding surfaces 31 and 32 without impediment. No further relative movement will take place between the fixed guide element 7 and the movable guide element 8, also in view of the interlocking cooperation between the teeth 44, 45 and 23, 24. An optimum functionality of the guide means 5 within the telescopic leg 1 can be obtained by adapting the breaking stress of the breakcord 35 to this optimum situation. Separate manual adjustment or fixation of the adjustable sliding means 5 is not necessary, as a result of which the assembly of the telescopic leg 1 can take place significantly faster than in the prior art.

[0024] Figure 6 shows a telescopic leg 101 comprising a lower leg member 102 and an upper leg member 103. The two leg members 102 and 103 are extruded aluminium sections of square cross-section. Two guide means 104 according to a second preferred embodiment thereof are arranged one above another in the centre of each side of the upper leg member 103, on the outer side thereof. It is noted at this stage already that it is also possible to arrange two guide means 104 beside each other near the edges, between the sides of the upper leg member 103, instead of one guide means 104, as a result of which an enhanced torsional and flexural stiffness is obtained.

[0025] The guide means 104 consist of a fixed guide element 105 (Figures 7 and 8) and a movable guide element 106 (Figure 9). The fixed guide element 105 is connected to the upper leg member 103 by means of connecting elements 107, 108 comprising semi-circular discs 109, 110 and 111, 112, respectively, which can be elastically moved towards each other. To this end, the leg member 103 is provided with holes whose shape corresponds to that of the connecting elements 107, 108. At its front side, the fixed guide element 105 includes a sliding surface 113 for sliding cooperation with the inner side of the side of the lower leg member 102 that is disposed opposite the guide means 104. Present at the rear side of the fixed guide element 105 is a guide surface 114 which extends conically in downward direction towards the sliding surface 113. Upwardly extending teeth 115, 116 are arranged on either side of the fixed guide element 105. Slotted holes 117, 118 are provided in the fixed guide element 105, near the teeth 115, 116, which slotted holes enable the teeth 115 and 116 to move out laterally in inward direction.

[0026] The movable guide element 106 (Figure 9) is substantially U-shaped, seen in bottom plan view. Downwardly extending teeth 119, 120 are arranged on the inside of the legs of the U-shape, along the entire length of the movable guide element 106. A central slotted hole 121 extending in longitudinal direction is present in the web of the U-shape, through which hole the connecting elements 107 and 108 extend in the assembled condition. The rear side 122 abuts against the associated outer side of the upper leg member 103. The inner side 123 of the web extends slightly conically towards the rear side 122 with the same taper as the guide surface 114 of the fixed guide element 105.

[0027] A stop element 123 is present at the upper side of the movable guide element 106, which stop element extends horizontally to a position above the sides of the lower leg member 102 prior to the assembly of the telescopic leg 101. The stop element is connected to the rest of the movable guide element 106 by means of a flexible hinge 124. Present on the inner side of the stop element 103 are teeth 125, 126, which engage in the teeth 120, 119 in a closed state as shown in Figure 9.

[0028] The operation of the guide means 104 during assembly is as follows. Starting from the situation that is shown in Figure 6, in which the upper leg member 103 is shown to have been partially slid into the lower leg member 102 already, said downward sliding movement is continued until the upper edge of the sides of the lower leg member 102 comes into contact with the stop element 123 of the movable guide element 106. Upon further downward movement of the upper leg member 103, the movable guide element 106 will slide upwards between the fixed guide element 105 and the respective outer side of the upper leg member 103 with respect to

the fixed guide element 105. Because of the conical orientation of the mating guide surfaces 114 and 123, said relative movement will lead to the fixed guide element 105 being pushed outwards against an inner side of the lower leg member 102. At the same time, the teeth 115, 116 and 119, 120 will slide over each other. As a result of the expansion in outward direction of the fixed guide element 105, an increased contact pressure will on the one hand be obtained between the sliding surface 113 and an inner side of the lower leg member 102, whilst on the other hand an increased contact pressure will exist between the guide surfaces 114 and 123. This leads to additional frictional forces. As the relative movement between the fixed guide element 105 and the movable guide element 106 progresses, the load on the connection between the teeth 125, 126 on the one hand and the teeth 119, 120 on the other hand will increase, and when a critical load is exceeded, said connections will be broken as a result of the stop element 123 pivoting about the flexible hinge 124 to an open, vertical orientation. As soon as the stop element 123 has pivoted to an open position, further movement of the upper leg member 103 in the lower leg member 102 will not result in further relative movement between the two guide elements 105 and 106. Due to the shape of the teeth 119, 120 of the movable guide element 106 and the teeth 115 of the fixed guide element 105, the relative position between the fixed guide element 105 and the movable guide element 106 will not change during the telescopic adjustment of the leg 101 during use thereof.

Claims

1. A guide means to be fitted between two leg members of a telescopic leg for a piece of furniture or the like, which leg members are movable in a telescoping direction with respect to each other, which guide means comprises means of attachment for attaching the guide element to one of the two leg members as well as a guide member for guiding cooperation with a counter guide member of the other one of the two leg members, whilst expansion means are provided for expanding the guide element against the counter guide element, as well as fixing means for fixing an expanded state of the guide element, **characterized in that** said expansion means are operative as a result of the movement of the leg members relative to each other.

2. A guide means according to claim 1, **characterized in that** the guide means comprises two guide elements which can be moved in the telescoping direction with respect to each other so as to reach the fixed expanded position.

3. A guide means according to claim 2, **characterized in that** the guide member is arranged on at least one of the guide elements.

4. A guide means according to claim 1, 2 or 3, **characterized in that** the fixation means are operative as a result of the movement of the leg members relative to each other.

5. A guide means according to claim 2, 3 or 4, **characterized in that** the expansion means comprise a first wedge surface on a guide element, along which a counter guide member of the other guide element can be guided.

6. A guide means according to claim 5, **characterized in that** said counter guide member is formed by a second wedge surface, which can move along said first wedge surface.

7. A guide means according to any one of the preceding claims, **characterized in that** the fixation means comprise sliding teeth which engage each other.

8. A guide means according to any one of the preceding claims, **characterized in that** said guide means is provided with engaging means for activating the expansion of the guide means.

9. A guide means according to claim 8, **characterized in that** said engaging means are designed to be engaged by a leg member.

10. A guide means according to claim 8 or 9, **characterized in that** the engaging means comprise a breaking element which can break as a result of the movement of the leg members relative to each other.

11. A guide means according to claim 8 or 9, **characterized in that** said engaging means can be swung aside.

12. A telescopic leg comprising at least two leg members which are movable relative to each other in the telescoping direction, **characterized in that** at least one guide means in accordance with any one of the preceding claims is arranged between the leg members.

13. A piece of furniture, **characterized in that** said piece of furniture is provided with telescopic legs according to claim 10.

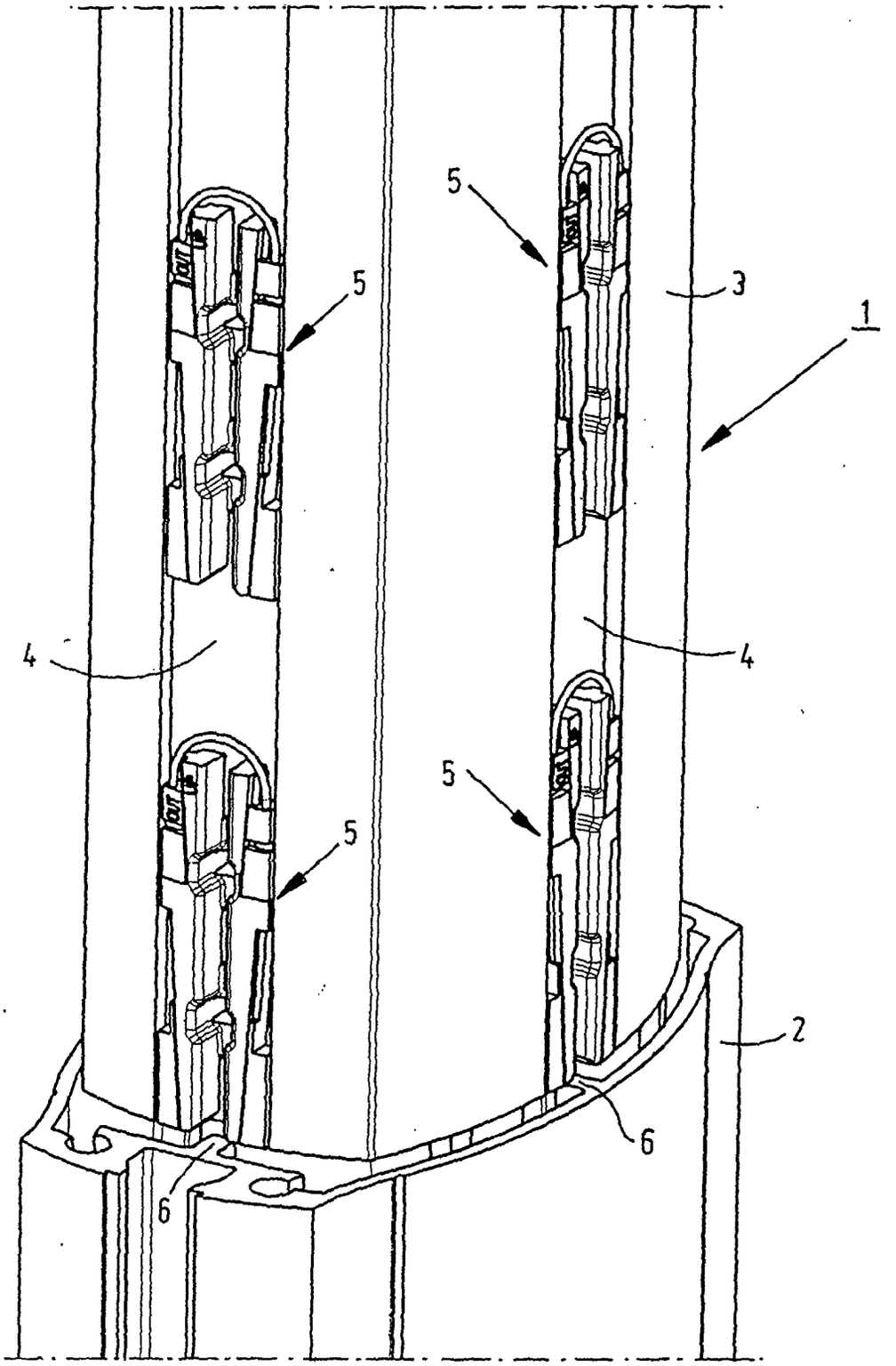

FIG. 1

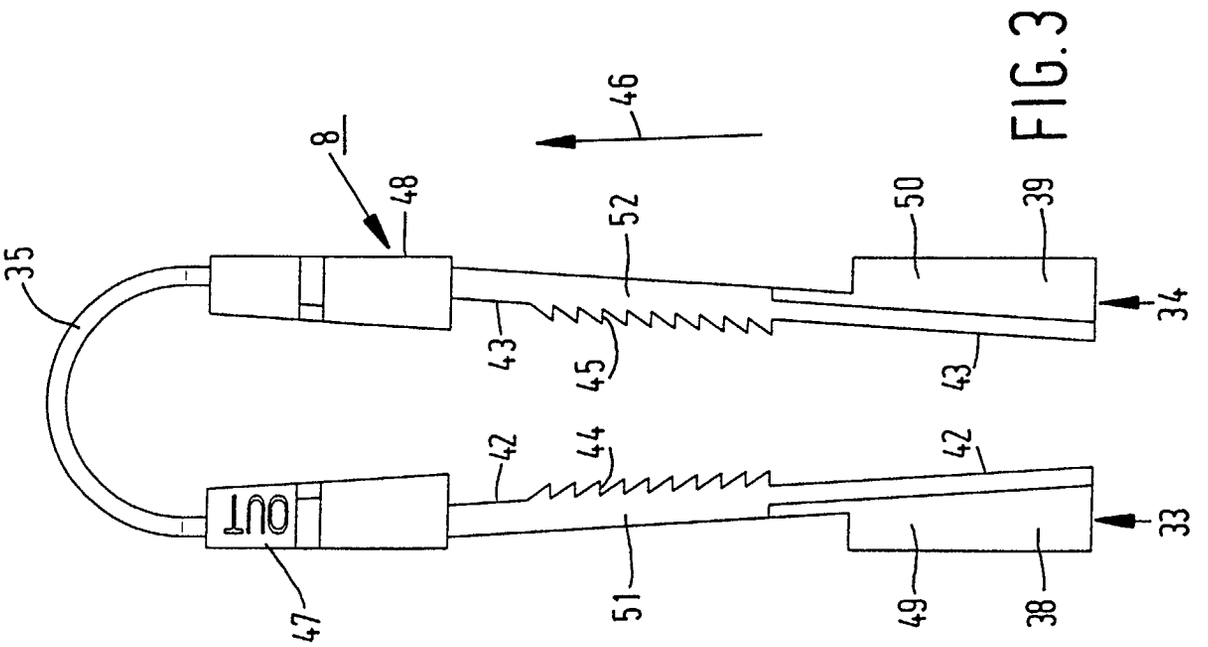
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FIG.3

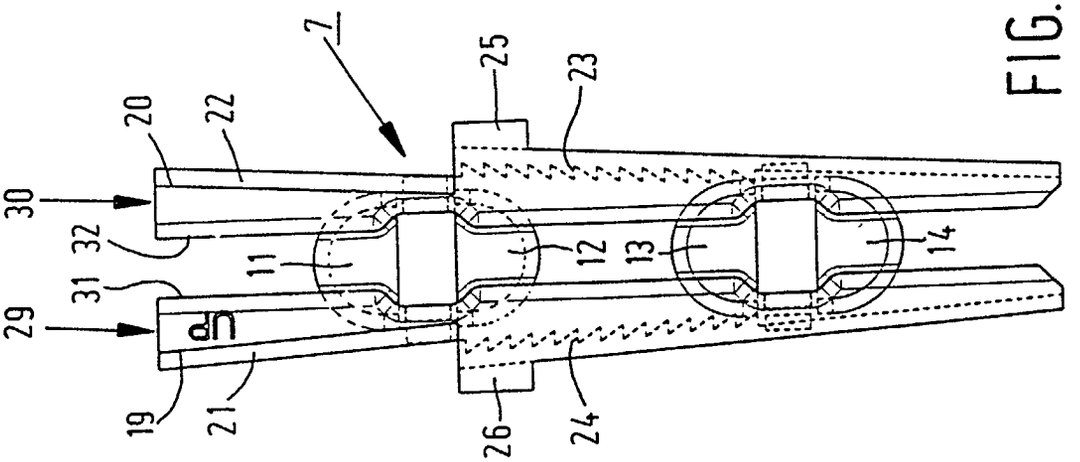
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FIG.2

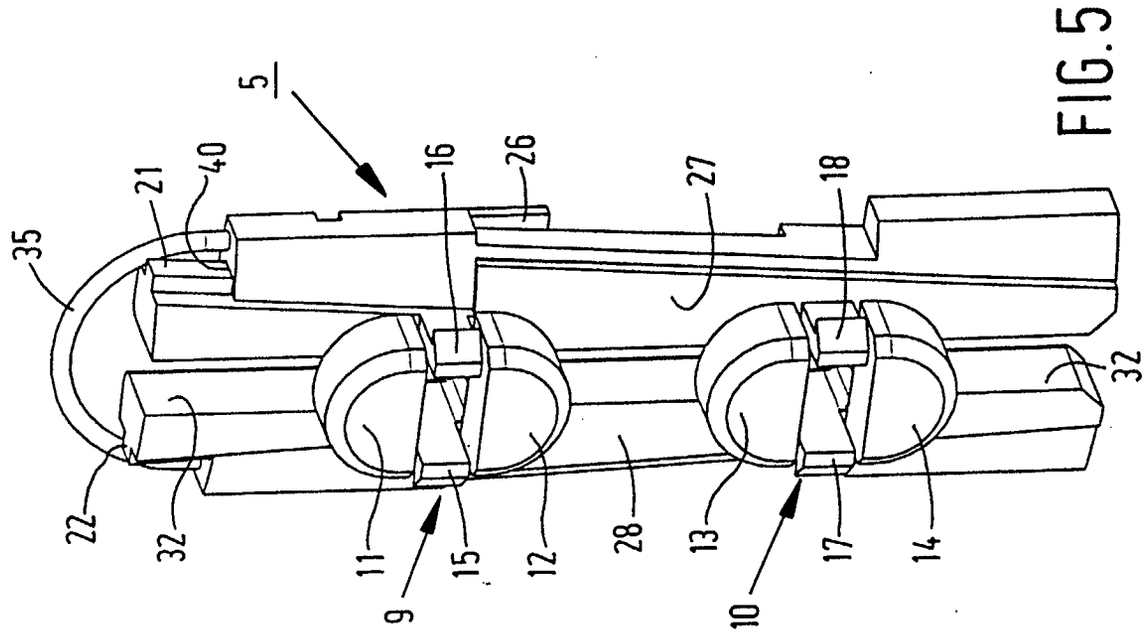
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FIG.5

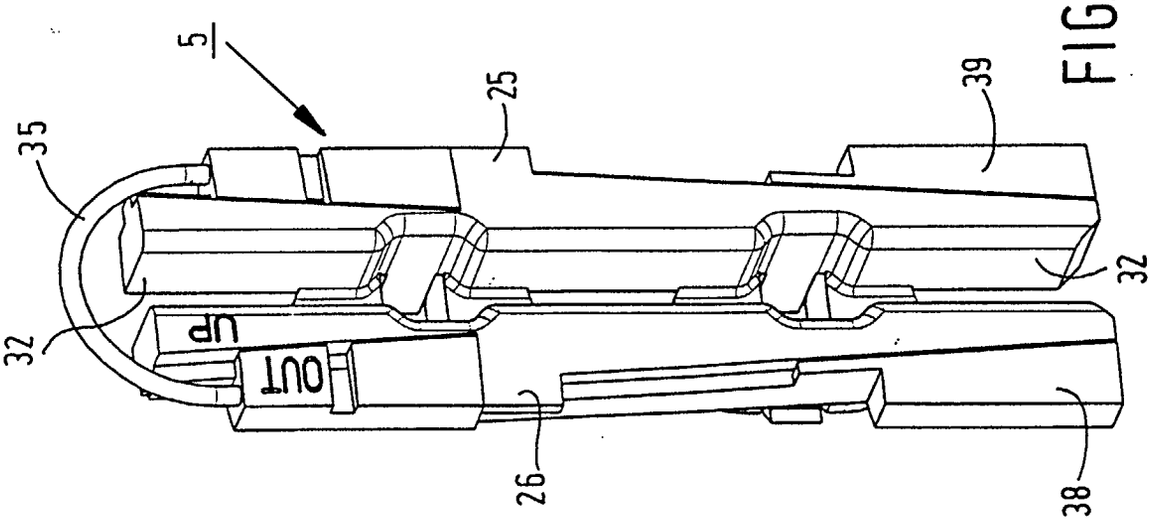
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FIG.4

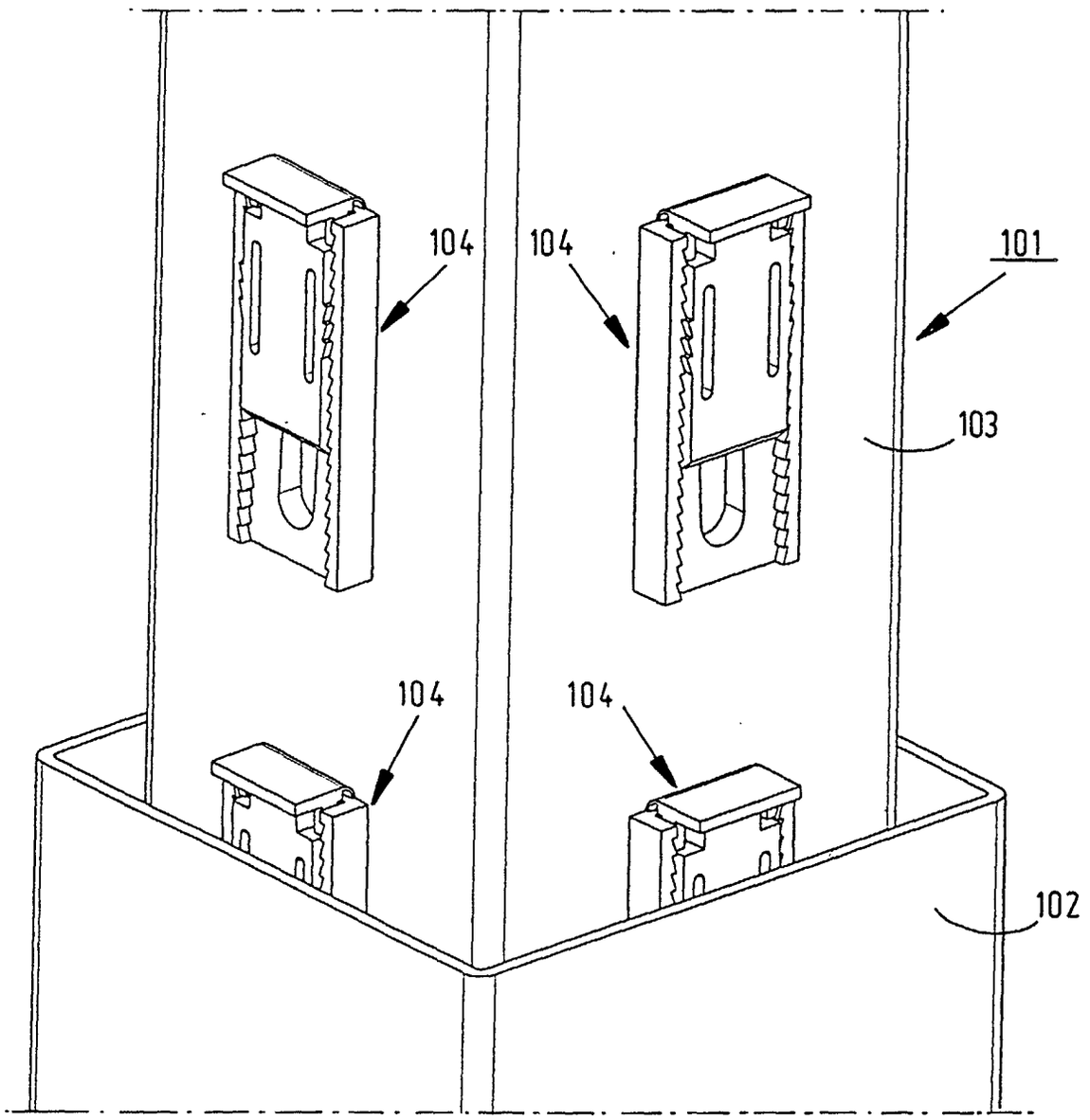

FIG. 6

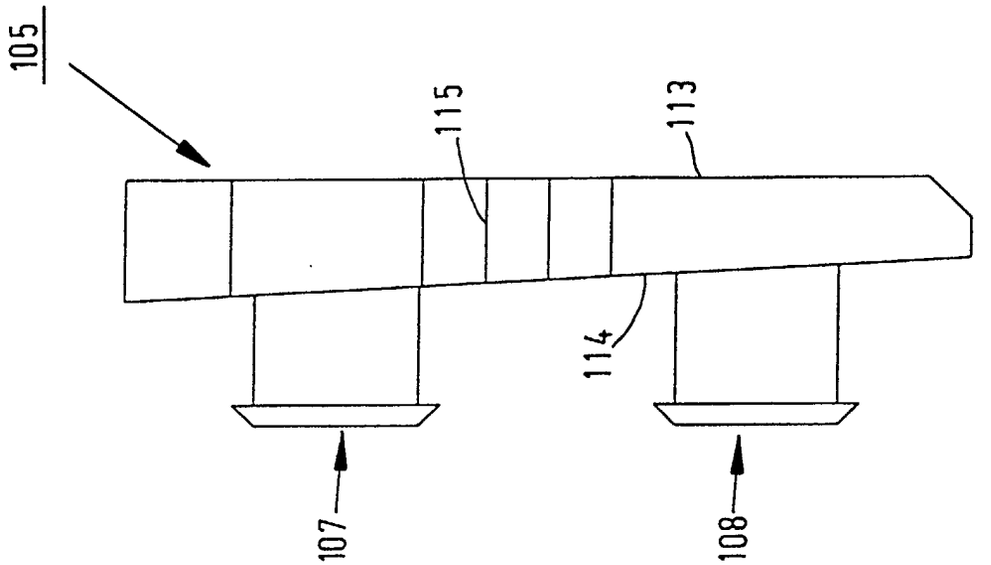
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FIG. 8

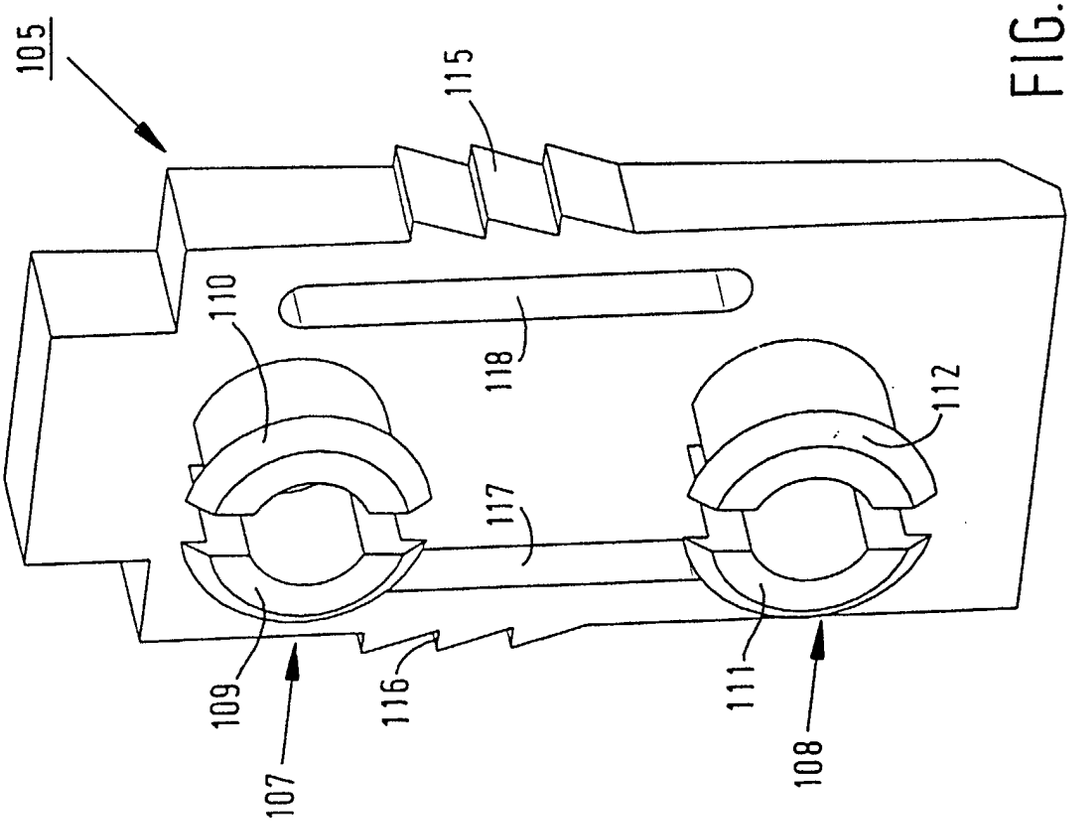
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FIG. 7

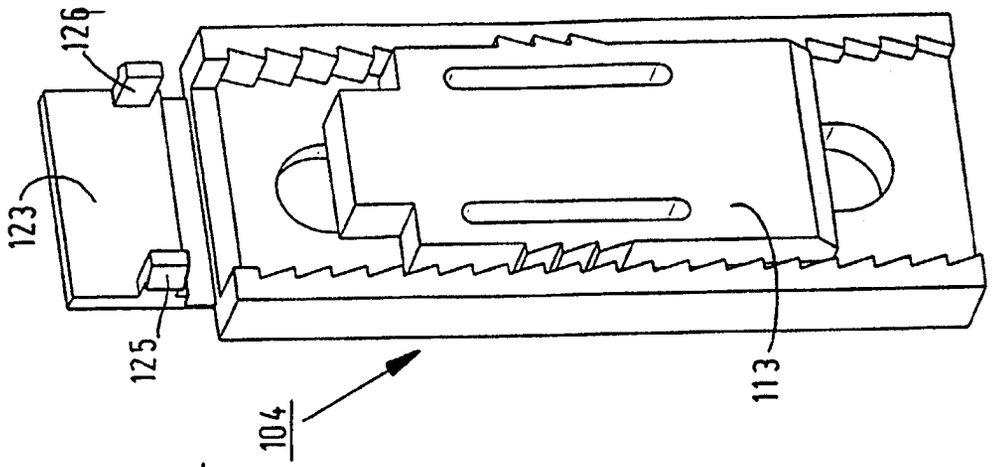

FIG.11

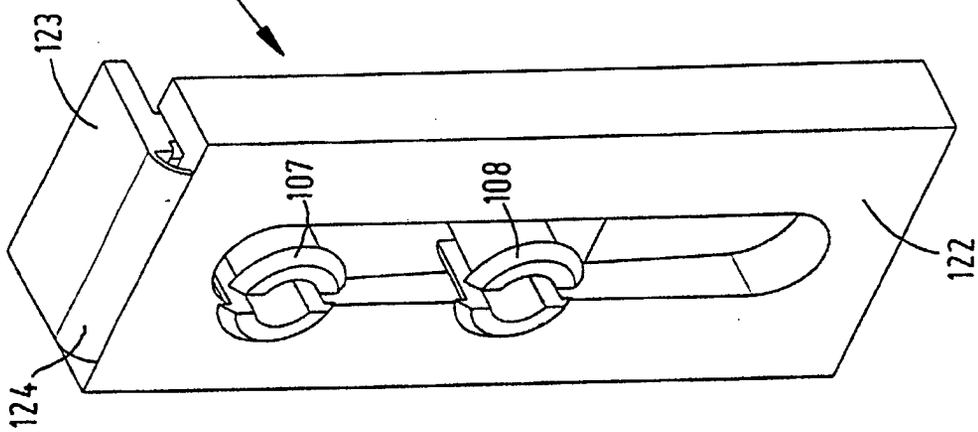

FIG. 10

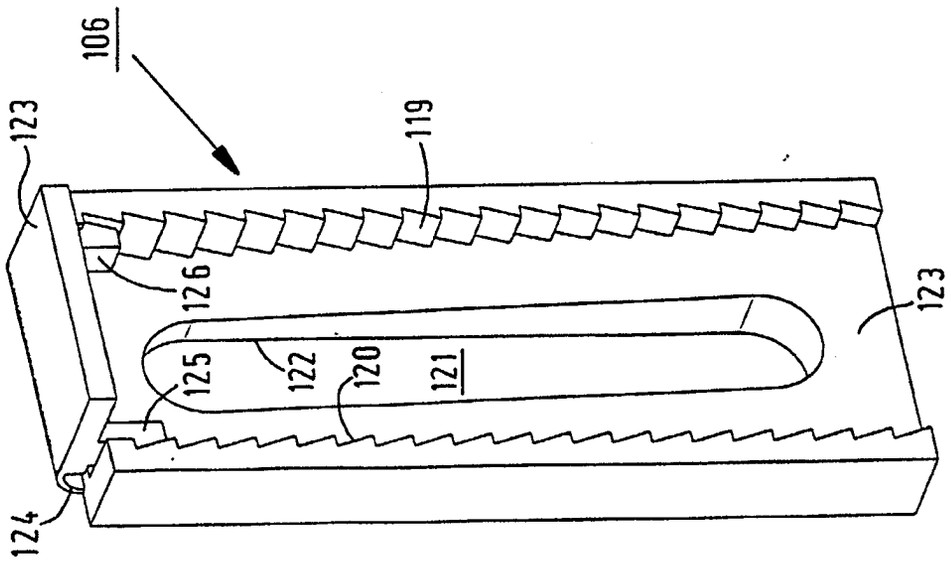

FIG.9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 02 07 6328

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
D,A	DE 298 12 762 U (PHOENIX MECANO KOMPONENTEN AG) 17 September 1998 (1998-09-17) * figures *	1-13	A47B9/20
A	DE 74 08 117 U (REINHARD HÖRNLEIN KG) 12 June 1974 (1974-06-12) * the whole document *	1-13	
A	EP 0 681 891 A (OTTO KIND AG) 15 November 1995 (1995-11-15) * abstract; figures *	1-13	
A	DE 33 40 087 A (KONRAD MERKT GMBH & CO KG) 15 May 1985 (1985-05-15) * abstract; figures *	1-13	

TECHNICAL FIELDS SEARCHED (Int.Cl.7)

A47B
A47C
F16M

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	24 July 2002	Ottesen, R

CATEGORY OF CITED DOCUMENTS

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 02 07 6328

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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24-07-2002

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