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(54) **Recessed hinging device for mobile structures such as door or window frames, panels of furniture or suchlike**

(57) Hinging device for doors, windows or furniture, having a first structure (12) articulated with respect to a second structure (13), comprising first hinging means of the male type (20) suitable to be associated with one of the structures (12, 13) and second hinging means of the female type (36, 45, 38) suitable to be associated with the other of the structures (13, 12), wherein the second hinging means of the female type comprise a support element (36) having a front structure (45) and are provided with at least a first cavity (38) suitable to couple with the hinging means of the male type (20). The support element (36) also comprises a groove (46) that puts the first cavity (38) into communication with the front surface (45), and a snap-in closing element (40) is suitable to selectively close the groove (46).

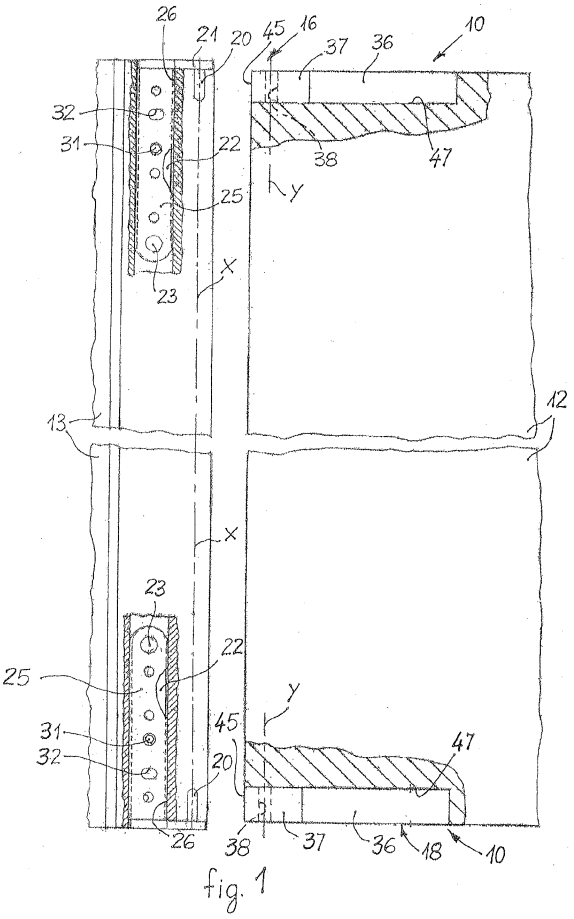

fig. 1

EP 2 468 993 A1

Description

FIELD OF THE INVENTION

[0001] The present invention concerns a hinging device of the recessed type, to hinge a mobile structure, such as a door or window frame, a panel of a piece of furniture or suchlike, with respect to a fixed structure, such as a door or window jamb, or the frame of a piece of furniture.

BACKGROUND OF THE INVENTION

[0002] In the field of door and window frames and furniture, in particular to hinge mobile structures such as doors, big doors or panels, hinging devices are known that comprise two hinging groups, one above and one below, which are connectable on one side, one to the lower end and the other to the upper end of the mobile structure to be hinged, and on the other side to corresponding points on the fixed structure. Each of the two hinging groups comprises a pintle or pin, mounted on a support element, which is associable in an adjustable manner to the fixed structure, and a female element which is associable, also an adjustable manner, to the mobile structure.

[0003] Documents EP-A-0.887.502, DE-B-1559934, DE-A-4018771 and FR-A-2.623.553 describe hinging devices of a known type.

[0004] Known hinging devices have the disadvantage that, for both hinging groups, each pintle must be inserted into the corresponding female element before the latter is mounted on the mobile structure, and therefore the relative assembly and adjustments are difficult to carry out and take a long time, and are therefore expensive.

[0005] One purpose of the present invention is to achieve a hinging device to hinge a mobile structure with respect to a fixed structure, which is simple to achieve and easy to instal, and in which it is possible to carry out the hinging adjustments even when the device has been installed into the relative structures.

[0006] Another purpose of the present invention is to achieve a hinging device in which the elements that make it up are as identical to each other as possible, so as to render the device in its entirety less expensive and easy to assemble.

[0007] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

SUMMARY OF THE INVENTION

[0008] The present invention is set forth and characterized in the independent claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0009] In accordance with the above purposes, a hinging device according to the present invention for hinging door and window frames or furniture, having a first structure articulated with respect to a second structure, comprises first hinging means of the male type able to be associated with one of the above structures, and second hinging means of the female type suitable to be associated with the other of the above structures. In particular, the second hinging means of the female type are provided with means suitable to couple with the hinging means of the male type.

[0010] In accordance with the present invention, a support element of the second hinging means comprises a groove that puts in communication a first cavity, able to couple with the hinging means of the male type, with a front surface of the support element; moreover, a snap-in closing element is suitable to selectively close the groove.

[0011] According to one feature of the present invention, the first cavity comprises a first through hole made in proximity to a lateral edge of the support element, and the snap-in closing element is pivoted in the support element in an opposite position with respect to that of the first through hole, so as to be able to rotate between a closed position and an open position of the groove.

[0012] In variant embodiments of the present invention, elastic means, for example consisting of a spring, keep the snap-in closing element constantly thrust toward the closed position of the groove.

[0013] In a variant embodiment, the snap-in closing element is inserted into a second cavity of the support element, adjacent to the first cavity.

[0014] According to another embodiment of the present invention, the snap-in closing element is suitable to be driven by a first pintle belonging to the first hinging means of the male type, so as to rotate toward the open position, against the action of the elastic means.

[0015] According to one embodiment of the present invention, the second hinging means of the female type also comprise first adjustment means suitable to adjust the position of the first cavity with respect to the corresponding structure on which the support element is mounted.

[0016] According to another embodiment of the present invention, second adjustment means are provided to adjust the position of the first pintle with respect to a nominal position thereof.

[0017] According to another embodiment of the present invention, further adjustment means are provided in order to adjust the position of a second pintle, which is suitable to be mounted on the same structure on which the first pintle is mounted.

[0018] The hinging device also comprises, according to some embodiments of the present invention, further hinging means of the female type, provided with a corresponding cavity able to couple with the second pintle, and other adjustment means to adjust the position of this last cavity with respect to the structure on which the other hinging means of the female type are mounted.

[0019] According to some embodiments of the present invention, the first, second and possible other adjustment means are suitable to be driven even while the corresponding hinging means are mounted on the above-mentioned structures.

BRIEF DESCRIPTION OF THE DRAWINGS

[0020] These and other characteristics of the present invention will become apparent from the following description of some forms of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- fig. 1 is a side view, partly in section, of a recessed hinging device according to the present invention;
- fig. 2 is a first three-dimensional view, from above and the right, of a hinging device according to the present invention;
- fig. 3 is a view from above of the hinging device in fig. 2;
- fig. 4 is a front view of the hinging device in fig. 2;
- fig. 5 is a left side view of the hinging device in fig. 4;
- fig. 6 is a second three-dimensional view, from below and the right, of the hinging device in fig. 2;
- fig. 7 is a variant to the solution in fig. 6;
- fig. 8 represents an application of the variant in fig. 7;
- fig. 9 represents a method of assembling a mobile structure hinged on a fixed structure and which uses the variant in fig. 7;
- fig. 10 is a view from above, partly in section, of a detail of a first hinging group of the hinging device in fig. 2, in the closed position;
- fig. 11 is a view from above, partly in section, of the detail in fig. 10, in the open position.

DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT

[0021] With reference to fig. 1, a hinging device 10,of the recessed type, according to the present invention, is used to articulate a mobile structure 12, for example a panel, with respect to a fixed structure 13, for example a frame.

[0022] In this case, the hinging device 10 is mounted on the structures 12 and 13 so that the mobile structure 12 is hinged on its left side. The device 10 can be mounted on the opposite side, that is, so that the mobile structure 12 is hinged on its right side. The device 10 is therefore reversible.

[0023] The device 10 comprises a first hinging group 16, in this case able to be recessed in the upper parts of the mobile structure 12 and the fixed structure 13, and a second hinging group 18, able to be recessed in the lower parts of the structures 12 and 13.

[0024] In fig. 1 and the figures connected to it, the first hinging group 16 comprises first hinging means of the male type which comprise, in this case, a first pintle 20, or upper pintle, which has a central hinging axis X.

[0025] In the variant shown in figs. 1 to 6, the first pintle 20 is attached vertically, downward, on a horizontal fin 21 of a vertical plate 22, which pivots horizontally on a pin 23, inserted in a corresponding through hole of another vertical plate 25. The two plates 22 and 25 are substantially parallel to each other and are suitable both to be inserted into the upper part of a vertical groove 26 of the fixed structure 13. In this way, the central pivoting axis X of the first pintle 20 and the plane on which the plates 22, 25 lie are parallel. The plate 22 is also provided with second adjustment means, in this case comprising a cam 29, which is rotatable inside a corresponding through hole 30 of the plate 25 and is provided with a front hollow 31, for example with a hexagonal section. By means of the front hollow 31 it is possible to rotate the cam 29 and oblige the plate 22 to make little oscillations with respect to the pin 23 which, in order to adjust its position, determine the movement of the pintle 20 up to more or less a few millimeters with respect to a nominal central position thereof. A clamping screw, also not shown in the drawings, is suitable to be inserted with its shaft into a through eyelet 32 of the plate 25 and screwed into a threaded hole of the plate 22, so as to clamp together the two plates 22 and 25 in the desired position.

[0026] The first hinging group 16 also comprises second hinging means of the female type, which comprise a first support element 36, in the form of a block, having a wider head 37, in which, near a lateral edge 44 thereof, a through hole or cavity 38 is made, having an axis Y and suitable to accommodate the first pintle 20.

[0027] In particular, the head 37 is shaped so as to have an internal cavity 39 adjacent to the through hole 38 and into which, according to one feature of the present invention, a snap-in closing element or cut-off 40 is inserted. The latter is pivoted on a pin 41 disposed in an opposite position with respect to that of the through hole 38 and is constantly thrust by a spring 42 toward a shoulder 43 of the same head 37, that is, in a clockwise direction in figs. 10 and 11. The cut-off 40 is suitable to be driven by the first pintle 20, or manually, and can be rotated by a predetermined angle inside the cavity 39, against the action of the spring 42.

[0028] This rotation puts the through hole 38 in communication with a front surface 45 of the head 37, through an arched groove 46, passing through the internal cavity 39. The arched groove 46 has a development like the arc of a circle with its center in the pin 41, while the cut-off 40 comprises an arched surface 49 having a constant distance from the pin 41, so as to be able to rotate between a closed position of the arched groove 46 and an open position thereof.

[0029] The first support element 36 is suitable to be recessed in a corresponding horizontal channel 47 made in the upper part of the mobile structure 12.

[0030] The first support element 36 has an oblong part that comprises a longitudinal cavity 48 into which a guide 50 with a central body is slidingly inserted. The guide 50

is provided with through holes 51, by means of which it is suitable to be attached to the mobile structure 12 with normal attachment screws.

[0031] The first support element 36 slides with respect to the guide 50 by means of two lower shoulders 52 and four upper shoulders 53, and can be driven by first adjustment means, such as for example an adjustment screw 55, to adjust the position of the through hole 38 with respect to the corresponding structure 12 on which the support element 36 is mounted.

[0032] In this case, the adjustment screw 55 has its shaft screwed onto a threaded hole 56 of the guide 50 and a cylindrical head 58 guided in a rib 59 of the first support element 36. The head 58 of the adjustment screw 55 is provided with a front hollow 60, for example with a hexagonal section, by means of which, through a through hole 61 of the cut-off 40, when the latter is in a closed position, and a corresponding hole 62 made in the head 37, it is possible to rotate the adjustment screw 55 and make the first support element 36 perform longitudinal adjustment movements with respect to the guide 50 and therefore with respect to the mobile structure 12, up to more or less a few millimeters with respect to a nominal central position thereof. In this way, as stated, it is possible to move the axis Y of the through hole 38 with respect to the mobile structure 12.

[0033] The second hinging group 18 may be the same as the first hinging group 16, or it may lack the snap-in closing element or cut-off 40 and/or everything connected with it.

[0034] Figs. 7 to 9 show a variant embodiment of the hinging device 10 according to the present invention, in which the same reference numbers are used for the same parts.

[0035] In this variant, referring to the first hinging group 16, the first support element 36 is substantially as already described with reference to figs. 1 to 6, and thus provides that the cut-off 40 is elastically contrasted, and can therefore selectively free access of the first pintle 20 inside the corresponding through hole 38.

[0036] On the other hand, unlike what is shown in figs. 1 to 6, in the variant shown in figs. 7 to 9, the first pintle 20, having a central hinging axis X, is attached vertically, downward, on a horizontal fin 121 of a horizontal plate 122 able to be associated with the fixed structure 13, by means of a second support element 136 which is attached in a suitable horizontal groove 147 of the same fixed structure 13.

[0037] The horizontal fin 121 is formed by a first segment or arm 121 a, from which the first pintle 20 extends downward, and a second segment or arm 121b that extends transversely, in this case orthogonally, from the first segment 121a so as to connect it to the horizontal plate 122, thus making the firs pintle 20 solid with the horizontal plate 122. In this way, the central hinging axis X of the first pintle 20 and the lying plane of the horizontal plate 122 are transverse, in this case orthogonal, with respect to each other.

[0038] The horizontal plate 122 is positioned on the second support element 136, in particular inserted slidingly in a longitudinal cavity 148 of an oblong part of the same second support element 136.

[0039] The horizontal plate 122 is provided with through holes 151, by means of which inserting through it ordinary attachment screws for constraining the underlying second support element 136 to the fixed structure 13. The horizontal plate 122, as said before, slides linearly with respect to the second support element 136 and is driven by means of second adjustment means, such as for example an adjustment screw 155.

[0040] Lateral holding means 123, for example shaped like a tooth or dovetail shaped, are provided on the second support element 136, on the sides of the longitudinal cavity 148, to hold the horizontal plate 122 in the same longitudinal cavity 148, impeding a lateral, or from above, removal, while permitting the linear sliding thereof.

[0041] Moreover, the second adjustment means, in this case the adjustment screw 155, once the desired position of the horizontal plate 122 is adjusted and determined, defines the stable positioning thereof cooperating with a slit, not shown in the drawings, of the horizontal plate 122.

[0042] Consequently, the position of the first pintle 20 is adjustable linearly, up to more or less a few millimeters with respect to a nominal reference position thereof, by means of the linear sliding of the horizontal plate 122 in a plane that is transverse, in this case orthogonal, to the hinging axis associated with the first pintle 20.

[0043] In this variant too, the second hinging group 18 can be the same as the first hinging group 16, or can lack the snap-in closing element or cut-off 40 and/or anything connected with it.

[0044] With reference to the variant shown in figs. 1-6, the assembly and adjustments of the hinging device 10 as described heretofore occur as follows. The two pairs of plates 22, 25 of the two hinging groups 16, 18 are recessed in the vertical grooves 26 so that the corresponding two pintles, upper and lower, 20 protrude from the fixed structure 13, opposite and lying on the axis X. Then the plates 25 are attached to the fixed structure 13 by means of ordinary attachment screws, not shown in the drawings.

[0045] Then, if necessary, the positions of the two pintles 20 are adjusted, acting on the two cams 29. Then the plates 22 are clamped to the plates 25 by means of two clamping screws, not shown in the drawings, disposed in the eyelets 32 and screwed into the threaded holes 33. This adjustment of the pintles 20 may advantageously be carried out even in a successive step, when the mobile structure 12 is already hinged on the fixed structure 13, and can be repeated every time that it is deemed necessary, even later on in time.

[0046] At this point, the two support elements 36 are recessed in the horizontal grooves 47 so that the two through holes 38 are aligned and lying on the axis Y. In particular, the front surface 45 of the heads 37 are dis-

posed flush with the hinging edge of the mobile structure 12.

[0047] Then the guides 50 are attached to the mobile structure 12, each by means of attachment screws inserted into the holes 51. Then the longitudinal position of each of the two support elements 36 is adjusted with respect to the guides 50, driving the adjustment screws 55. In this way it is possible to move the position of each through hole 38 and hence to adjust the position of the axis Y with respect to the mobile structure 12.

[0048] This adjustment of the position of each hole 38 may also be advantageously carried out either in this step or in a subsequent step, when the mobile structure 12 is already hinged to the fixed structure 13, and can be repeated every time it is thought necessary, even later on in time.

[0049] The mobile structure 12 is then assembled on the fixed structure 13.

[0050] In particular, first the mobile structure 12 is positioned on the lower pintle 20, keeping it slightly inclined so as to facilitate insertion, so that the latter is inserted into the corresponding through hole 38 and so that the corresponding axis Y coincides with the axis X.

[0051] At this point, with all the weight of the mobile structure 12 weighing on the lower pintle 20, the mobile structure 12 is vertically straightened until the upper pintle 20 is inserted into the arched groove 46 of the head 37 of the first support element 36. With another movement of the mobile structure 12 toward the upper pintle 20, the latter thrusts the cut-off 40 and makes it rotate anti-clockwise as far as its position of maximum opening (fig. 10), against the action of the spring 42, until the upper pintle 20 is positioned in the through hole 38, after having passed through the whole arched groove 46. At this point, the cut-off 40 automatically returns, in snap-in manner, to its closed position (fig. 11), thrust clockwise by the spring 42, and keeps the upper pintle 20 in the position reached, inside the through hole 38.

[0052] At the end of this simple assembly operation, the axis Y of the through hole 38 also coincides with the hinging axis X and the mobile structure 12 is hinged with respect to the fixed structure 13.

[0053] The mobile structure 12, in its position of maximum opening, is rotated by more than 90° with respect to when it is in its closed position, against a packing of the fixed structure 13. Furthermore, in this last position, the device 10 is almost completely inside the structures 12 and 13 and therefore, for the most part, not visible from the outside.

[0054] As has been pointed out already, the adjustments of the position of each pintle 20 with respect to the fixed structure 13 and that of each through hole 38 with respect to the mobile structure 12, can also be carried out after the latter has been hinged.

[0055] Removing the mobile structure 12 from the fixed structure 13 is equally easy. Indeed, with the mobile structure 12 in the open position it is enough to make the cut-off 40 rotate anti-clockwise toward its open position, against the action of the spring 42, using a tool like a screwdriver for example, and to make the upper pintle 20 come out of the through hole 38, through the arched groove 46. After this, the mobile structure 12 is also removed from the lower pintle 20.

[0056] With reference to the variant shown in figs. 7-9, the assembly and adjustments of the hinging device 10 as described heretofore are substantially the same as those described above, with the difference that the combination of the horizontal plate 122 and the second support element 136 of the two hinging groups 16, 18 is recessed and attached in the horizontal grooves 147 so that the corresponding two pintles 20 protrude from the fixed structure 13, opposite and lying on the axis X.

[0057] Then, if necessary, the positions are adjusted of the two pintles 20, acting on the corresponding adjustment screw 155 which causes the horizontal plate 122 to linear slide with respect to the second support element 136. This adjustment of the pintles 20 can also be carried out advantageously in a subsequent step, when the mobile structure 12 is already hinged on the fixed structure 13 and can be repeated every time it is deemed necessary, even later on in time. The positioning, adjustment and clamping of the first support elements 36 with respect to the mobile structure 12 occurs as already described for figs. 1-6.

[0058] From the foregoing description it is clear that the hinging device 10 according to the present invention is the recessed type, reversible, and allows to carry out: an easy hinging of the mobile structure 12 with respect to the fixed structure 13; an easy adjustment of the positions of the hinging means of the male type 20 and of the female type 36, even when the mobile structure 12 is hinged to the fixed structure 13; and also an easy dismantling of the mobile structure 12 from the fixed structure 13.

Claims

1. Hinging device for door or window frames or furniture, having a first structure (12) articulated with respect to a second structure (13), comprising first hinging means of the male type (20) suitable to be associated with one of said structures (12, 13), and second hinging means of the female type (36, 45, 38) suitable to be associated with the other of said structures (13, 12), wherein said second hinging means of the female type comprise a support element (36) having a front surface (45) and are provided with at least a first cavity (38) suitable to couple with said hinging means of the male type (20), said support element (36) also comprising a groove (46) that puts said first cavity (38) into communication with said front surface (45), a snap-in closing element (40) being suitable to selectively close said groove (46), **characterized in that** said first cavity comprises a first through hole (38) made in proximity

with a lateral edge (44) of said support element (36) **and in that** said snap-in closing element (40) is pivoted in said support element (36) in an opposite position with respect to that of said first through hole (38) so as to be able to rotate between a closed position and an open position of said groove (46).

2. Hinging device as in claim 1, **characterized in that** said first hinging means of the male type comprise a first pintle (20), which is attached vertically, downward, on a horizontal fin (121) associated with a horizontal plate (122), wherein a central pivoting axis (X) of the first pintle (20) and a lying plane of the horizontal plate (122) are transverse to each other.

3. Hinging device as in claim 2, **characterized in that** the horizontal fin (121) is formed by a first segment (121a), from which the first pintle (20) extends downward, and a second segment (121b) which extends transverse from the first segment (121a) to connect it to the horizontal plate (122).

4. Hinging device as in claim 2 or 3, **characterized in that** the horizontal plate (122) is inserted slidingly in a longitudinal cavity (148) of an oblong part of a second support element (136) able to be attached in a horizontal groove (147) of the corresponding one of said structures (13, 12).

5. Hinging device as in claim 4, **characterized in that** the horizontal plate (122) cooperates with holding means (123) of the second support element (136).

6. Hinging device as in claim 4, **characterized in that** the position of the linearly sliding horizontal plate (122) is adjustable with respect to the second support element (136) by means of second adjustment means (155).

7. Hinging device as in any claim hereinbefore, **characterized in that** elastic means (42) are associated with said snap-in closing element (40), configured to determine a constant thrust on said snap-in closing element (40) toward said closed position of said groove (46).

8. Hinging device as in claims 2 and 7, **characterized in that** said snap-in closing element (40) is suitable to be driven by said first pintle (20), to rotate toward said open position against the action of said elastic means (42).

9. Hinging device as in any claim hereinbefore, **characterized in that** said snap-in closing element (40) is pivoted on a pin (41) parallel to said first cavity (38) **and in that** said groove (46) has a development as an arc of a circle with its center in said pin (41).

10. Hinging device as in claim 9, **characterized in that** said snap-in closing element (40) comprises an arched surface (49) having a constant distance from said pin (41).

11. Hinging device as in any claim hereinbefore, **characterized in that** said second hinging means of the female type also comprise first adjustment means (55) suitable to adjust the position of said first cavity (38) with respect to the corresponding structure (12) on which said support element (36) is mounted.

12. Hinging device as in claim 11, **characterized in that** said first adjustment means comprise an adjustment screw (55) suitable to selectively move said support element (36) with respect to a guide element (55) suitable to be attached to said corresponding structure (12).

13. Hinging device as in claim 11 or 12, **characterized in that** said snap-in closing element (40) is provided with a second through hole (61) through which it is possible to drive said first adjustment means (55).

14. Hinging device as in any claim hereinbefore, **characterized in that** said first hinging means of the male type (20) and said second hinging means of the female type (36) belong to a first hinging group (16) and wherein a second hinging group (18), also able to be associated with said structures (12, 13), comprises second hinging means of the male type (20), opposite and configured to be positioned substantially coaxial to said first hinging means of the male type (20), wherein said second hinging group (18) comprises further hinging means of the female type (36), provided with a corresponding cavity (38) able to couple with said second hinging means of the male type (20).

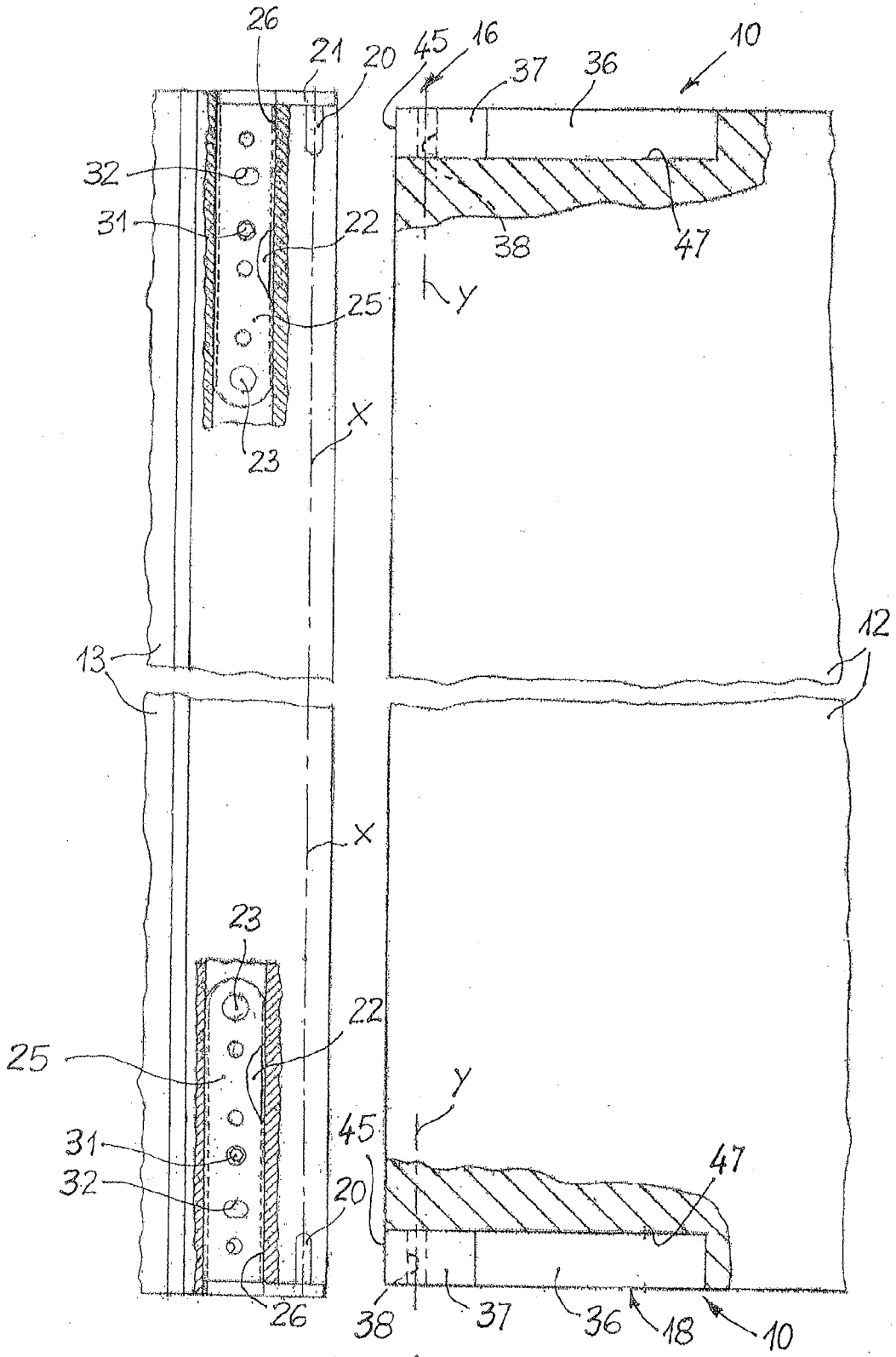
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fig. 1

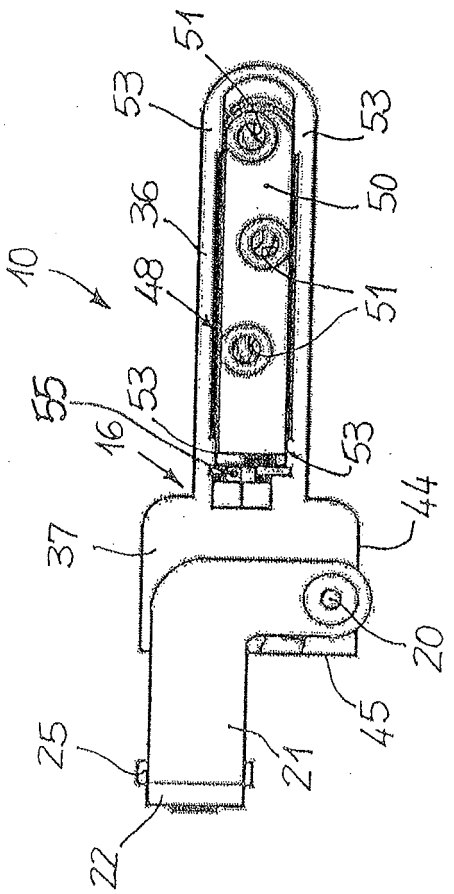
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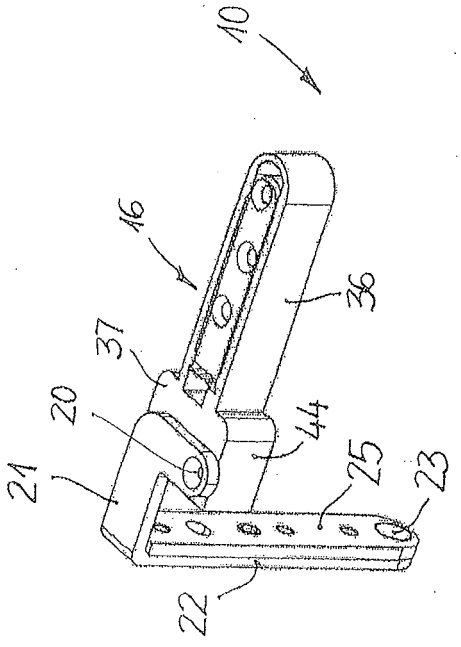
fig. 3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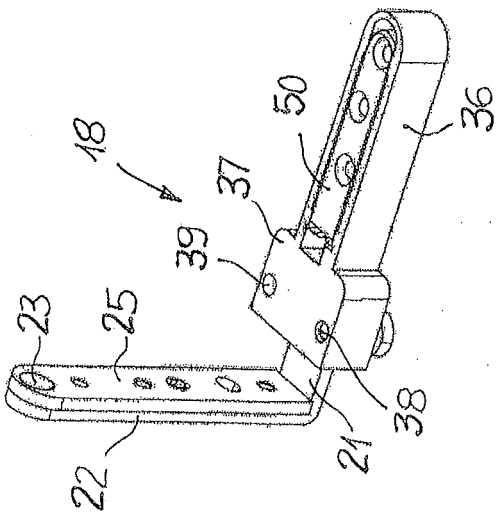
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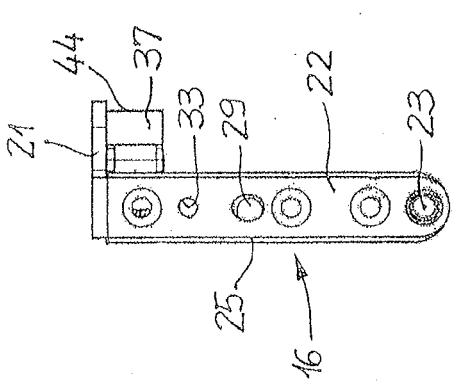
fig. 2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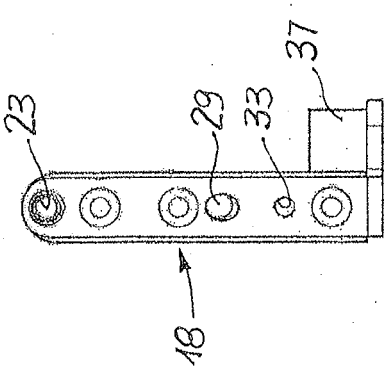
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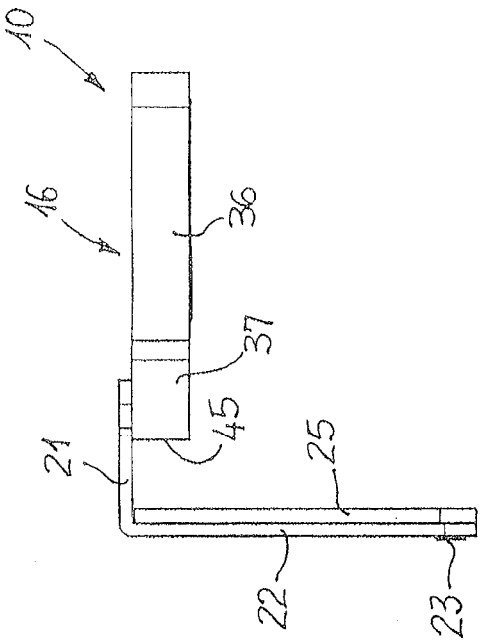
fig. 5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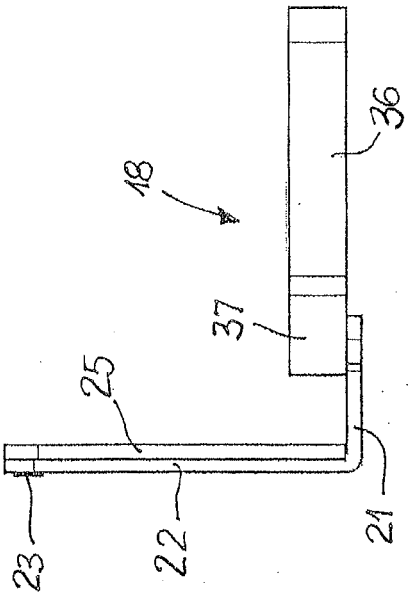
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fig. 4

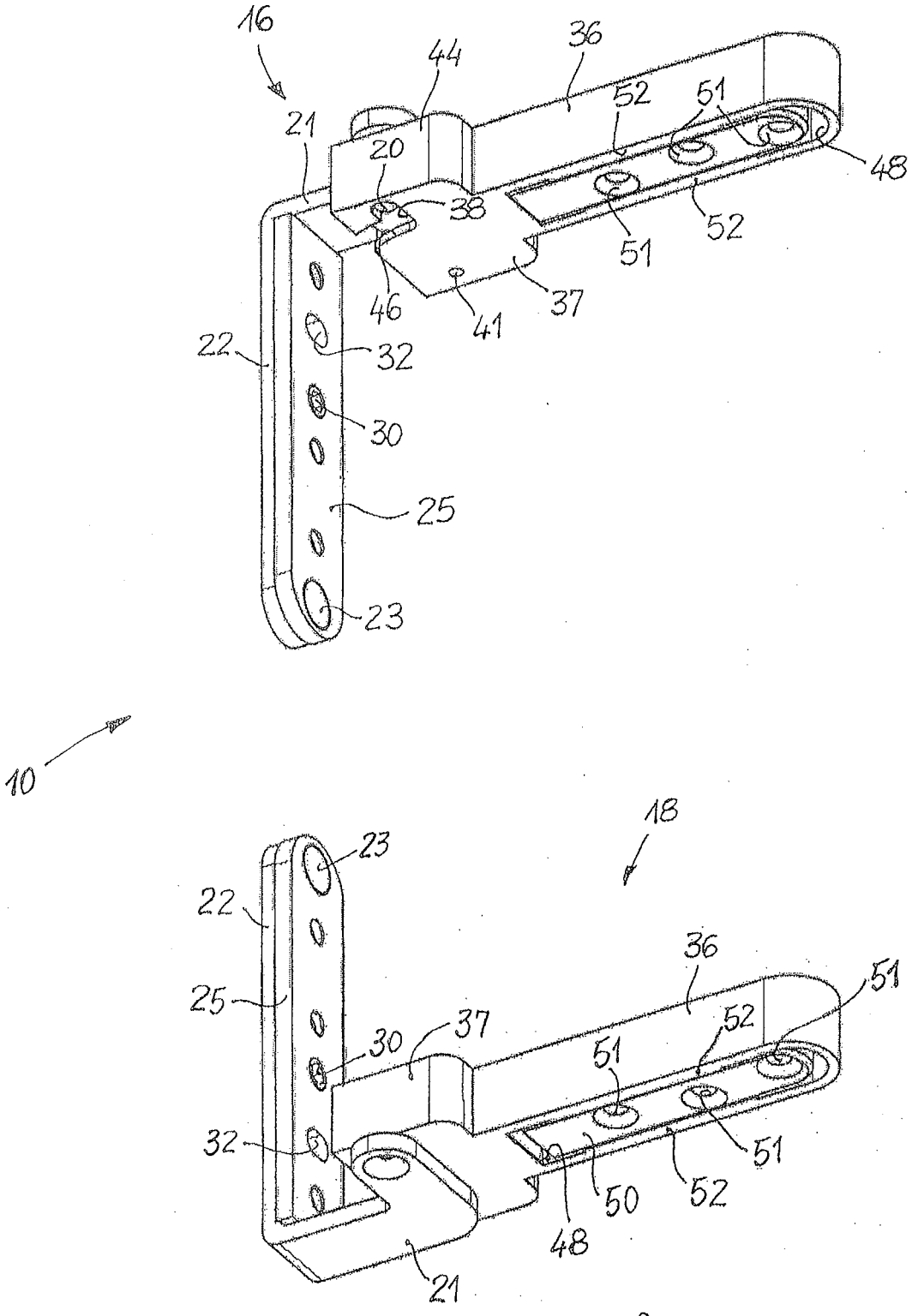
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fig. 6

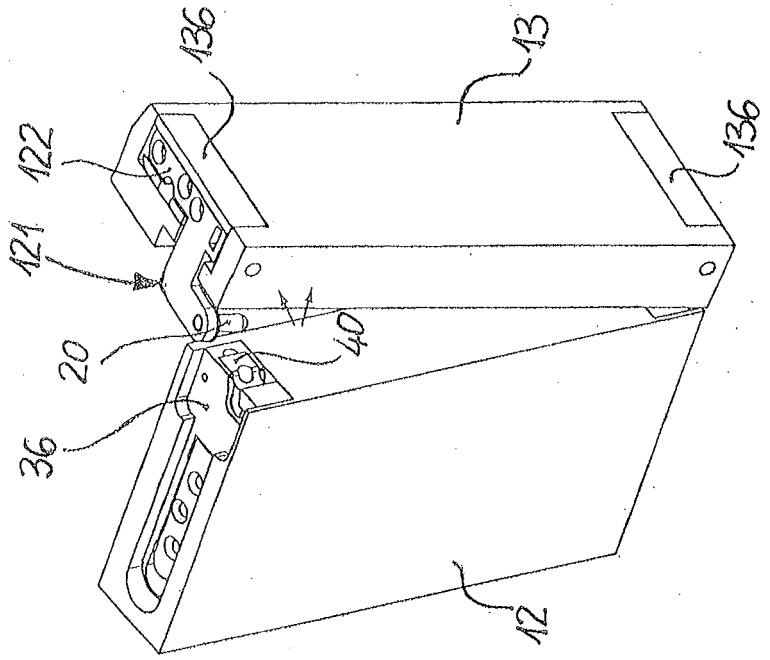

fig. 9

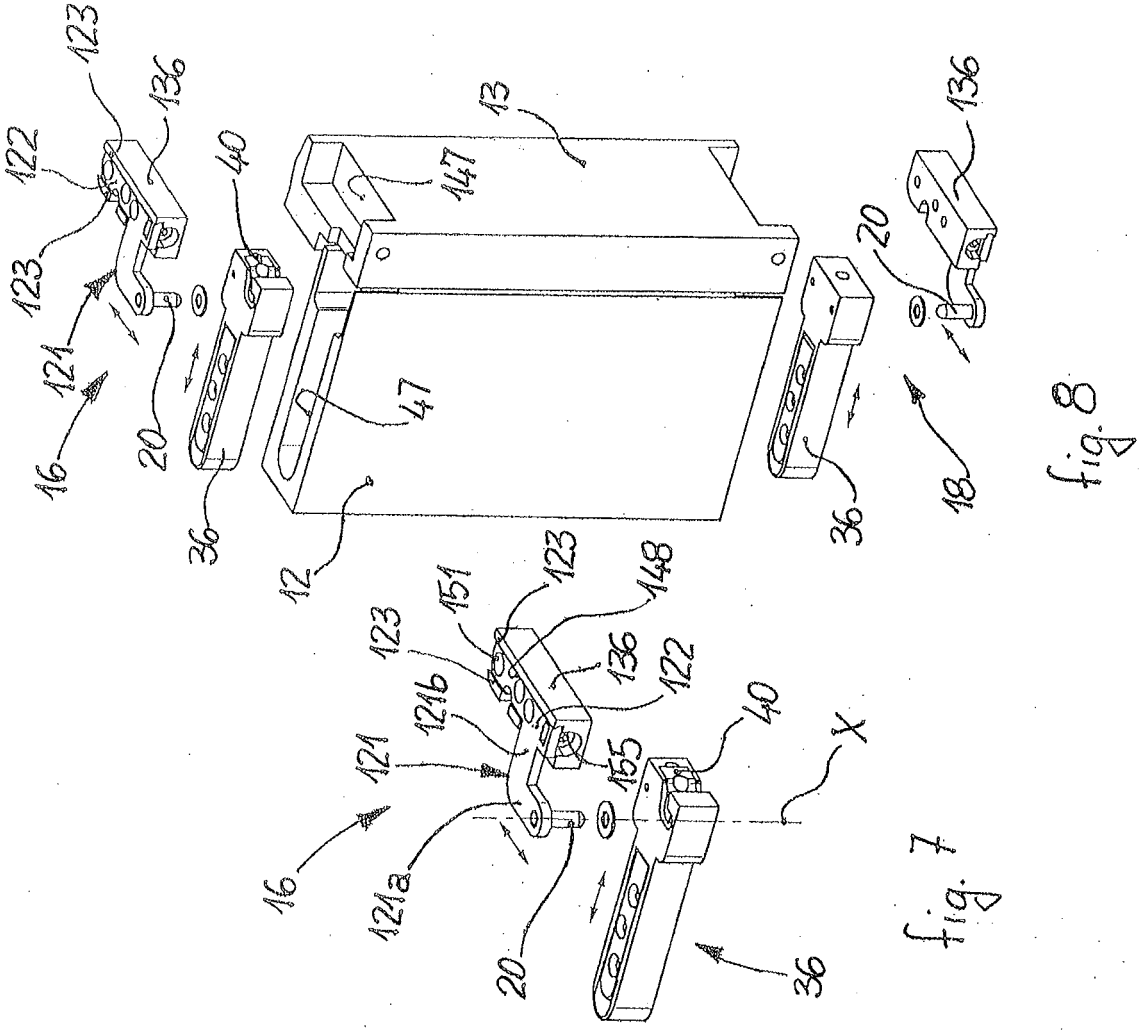

fig. 8

fig. 7

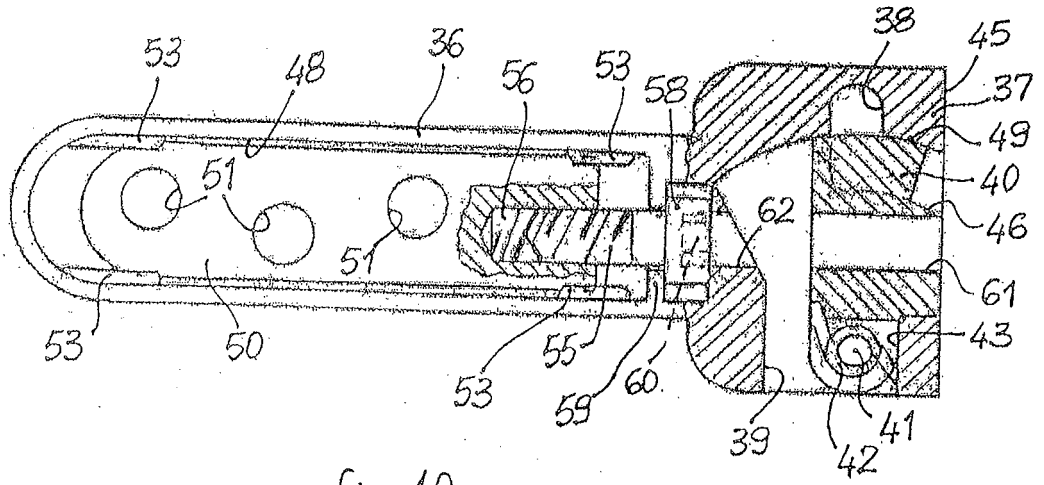
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fig. 10

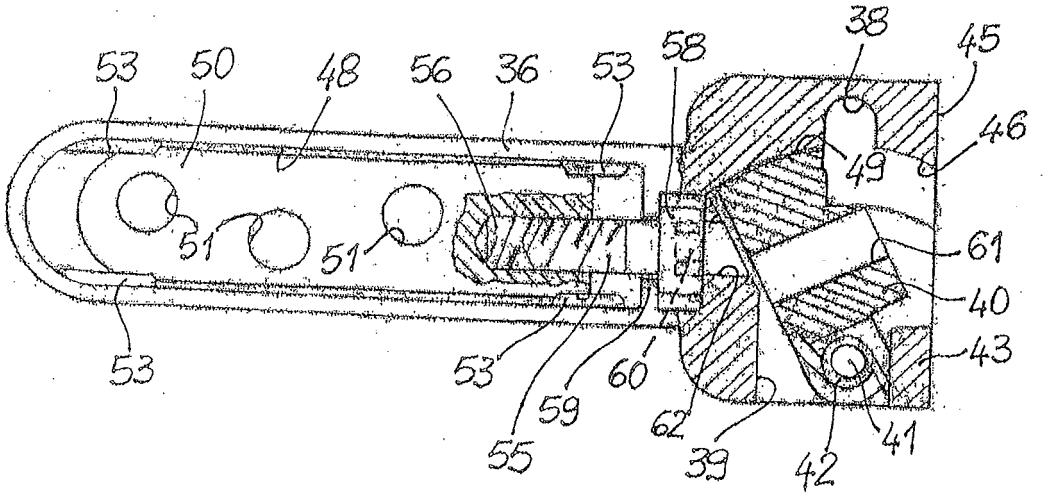
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fig. 11

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EUROPEAN SEARCH REPORT

Application Number
EP 11 19 5119

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X A	EP 0 887 502 A1 (SIRANDRE SA [FR]) 30 December 1998 (1998-12-30) * column 1, line 2848 * * column 2, lines 43-55 * * figures 4,6,7 *	1 2-14	INV. E05D5/12 E05D7/10
X	DE 15 59 934 B1 (J & H KRAMER) 25 February 1971 (1971-02-25) * column 1, lines 22-36 * * column 2, lines 9-26 * * figure 3 *	1	
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	21 March 2012	Klemke, Beate

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21-03-2012

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