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(54) Articulated framework for bed or seat

(57) Slit tubular part (13) of the joint device (5) engages longitudinal member segment (6) belonging to upper leg section of the armature. Slit tubular member (14) engages similarly longitudinal member segment (8) belonging to lower leg section of the armature. The support structure (20) belonging to joint device (5) moves with tubular parts (13, 14) and joint axle (19) when the whole of the joint device is slidingly moved along the longitudinal member (6, 8). The support bars (21 and 22) then slide below intercalar transverse members (11) while supporting them at their ends.

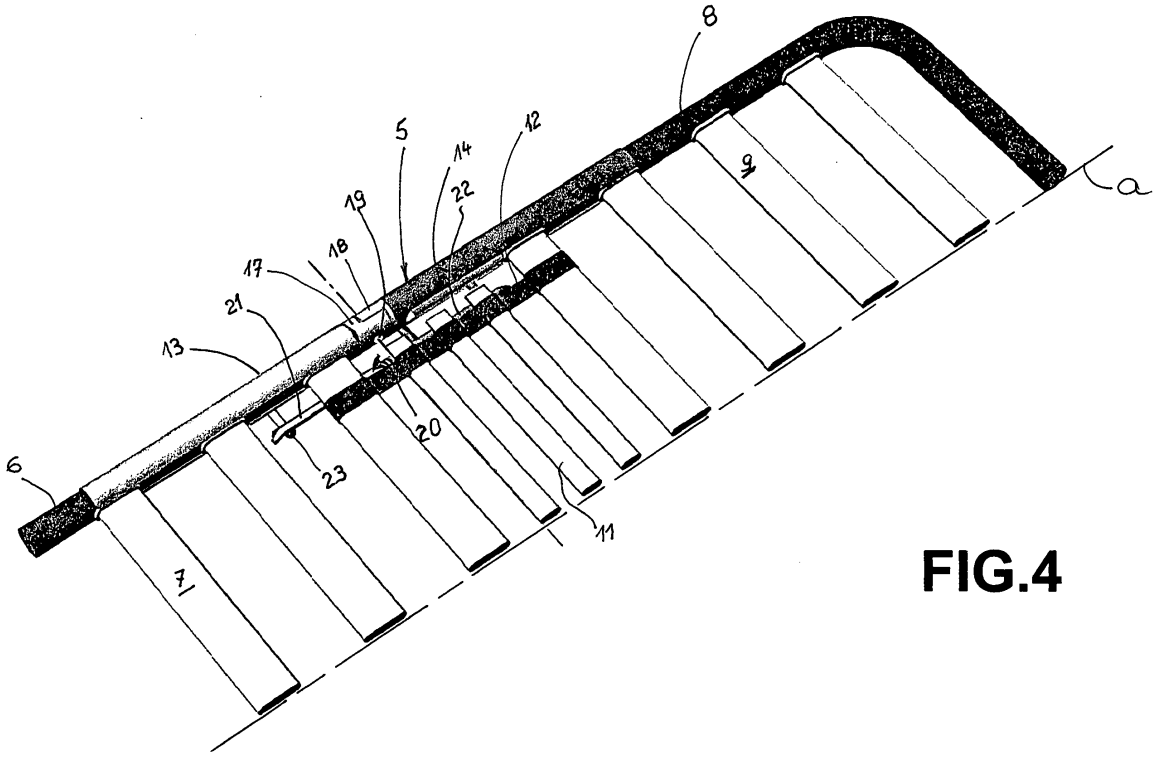

FIG.4

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Description

[0001] The present invention relates to the armatures for beds or seats divided into several sections connected by joint devices.

[0002] Such known armatures permit to adapt at will the inclinations of the different sections according to the wishes of comfort desired by the user. The different sections are usually of fixed lengths, but since there are still many people, as elderly people who are small compared to the average or people who need certain sections being of greater length, it has been proposed to provide such articulated armatures with means for varying the length of some sections at will within certain limits. Such devices are described in WO 01/91689, DE 10245978 and JP 11113973. However the means proposed in said prior art documents are heavy and/or difficult to handle. In particular, they either need the use of tools or are combined with jacks.

[0003] The object of the present invention is therefore to remove these drawbacks and to create an improved articulated armature for bed or seat permitting to vary the relative lengths of some sections easily and rapidly.

[0004] With this end in view the subject matter of the present invention is defined as stated by the appended claims.

[0005] The armature as defined may be mounted on a base or on feet. A schematic example of such arrangement is given below however the mounting arrangement itself does not belong to the invention. Furthermore, mattress or sets of cushions of any kind may be provided for increasing the comfort of the users. Only the means permitting to vary in certain limits the relative lengths of a pair of successive sections is part of the invention.

[0006] A preferred embodiment of the invention and variant embodiments will be described now by way of example with reference to the enclosed drawings.
In the drawings:

- fig. 1 is a schematic view in side elevation of the proposed embodiment;
- fig. 2 is a perspective view partially in section showing two successive sections of the armature with a joint device being represented separately, in a first limit position;
- fig. 3 is a perspective view similar to fig. 2, with the joint device in the opposite limit position;
- fig. 4 is a perspective view similar to fig. 3, with the joint device integrated to the armature sections and placed in the same limit position as in fig. 3;
- fig. 5 is a perspective view similar to fig. 2 with the joint device being in a folded position;
- fig. 6 is a perspective view similar to fig. 3 with the joint device being also in a folded position;
- fig. 7, 8, and 9 are perspective views explaining the functioning of a variant embodiment, and
- fig. 10 is a schematic view in elevation showing a base supporting the articulated armature.

[0007] The articulated armature forming the preferred embodiment of the claimed invention consists, as shown in fig. 1, of four successive sections 1, 2, 3, 4, with a back section 1, a seat section 2 and two leg sections 3 and 4: an upper leg section 3 and a lower leg section 4. Means (not shown) permit of varying and fixing at will the positions of one or several of the sections. They are arranged in such a manner that they do not impair the functioning of the joint devices (not shown in fig. 1) provided between each pair of successive sections.

[0008] Figs 2 to 6 explain the arrangement and the functioning of one of the joint devices provided with the armature. Since the design of the armature is symmetrical through its longitudinal axis a, only one half of the armature is illustrated on the drawings of figs 2 to 6. From fig. 1, it follows that, for example, between sections 3 and 4, two joint devices acting on a same transversal articulation axis will be provided. Figs 2 to 6 show a longitudinal view with one half of sections 3 and 4 and with one of the mentioned joint devices, denoted with reference numeral 5. On fig. 2, device 5 is represented outwardly of and parallel to its functioning position. Sections 3 and 4 lie in flat positions in the same plane, a second joint device (not represented on the drawings) symmetrical to device 5 being provided at the second half of the armature sections 3 and 4.

[0009] Section 3 comprises, as shown, a longitudinal member segment 6 of rectilinear shape formed of a metallic or plastic tubular part, to which are secured a number of transverse members 7 in form of flat metal or plastic bars welded at their ends in the longitudinal member 6 or fixed to the longitudinal member in any suitable manner. Section 4 similarly comprises a longitudinal member segment 8 and a number of flat metal or plastic bars 9 forming a set of transverse members, fixed at their ends into the tubular segment 8 of longitudinal member of any known suitable manner. Section 4 being an end section of the armature and forming the lower leg section, both parallel segments of longitudinal member 8 are rigidly connected to one another through a transverse segment 10 of the armature integral with the longitudinal member segments 8. The tubular parts constituting the longitudinal member 6 can of course be replaced by any other suitable part, not necessarily of tubular shape.

[0010] It follows from fig. 2 that armature sections 3 and 4 are normally maintained with a gap of a definite amplitude between them. Between the last transverse member 7 and the first transverse member 9, a set of intercalar transverse elements 11 are provided in form of flat bars narrower than the members 7 and 9, parallelly

disposed and connected by a pair of bonds 12, here made of flexible strips, for example of fabric or plastic. Bonds 12 extend from the last transverse member 7 to the first transverse member 9 and so they determine the amplitude of the gap between the armature sections 3 and 4.

[0011] The relative dimensions and positions of joint device 5 appear from figs 2 to 6. The device 5 comprises two tubular parts 13 and 14, each provided with a longitudinal slit 15, 16 extending onto a major portion of the length of the part. One end of parts 13, 14 is open, whereas the other end is closed by a cylindrical stopper 17, 18, which for example may be drawn within the end portion of part 13 or 14. It appears from figs 2, 3, 4, and more clearly also from figs 5 and 6, that the stoppers 17, 18 are worked in such a manner that their end parts are divided along their medium longitudinal plan and a half of such end part is cut off, so that the half remaining hemi-cylinder part of the stopper 17 cooperates with the half remaining hemi-cylinder part of the other stopper 18. These hemi-cylinder parts extend for each stopper from a free end of the stopper towards its other end, the latter being of cylindrical shape and engaging the full tubular portion of part 13 or 14 to which the stopper is secured. A spindle part 19 engages each of the hemi-cylindrical remaining parts of the stoppers 17 and 18, thus forming an articulation axle diametrically traversing both tubular parts of the joint device 5.

[0012] According to a variant, not represented on the drawings, the stopper 17 has a central diametral slit arranged for receiving a central diametral projection protruding from stopper 18. In this variant, the spindle part 19 engages the slit and projection parts of stoppers 17 and 18 thus forming the articulation axle diametrically traversing both tubular parts of the joint device 5.

[0013] Joint device 5 finally still comprises a support structure 20 comprising two straight bars 21, 22, each rigidly secured by straps 23 to one of the tubular parts 13 or 14. The support bars 21 and 22 extend parallel to the tubular parts 13, 14 at a height immediately below the height of the lower edge of the slits 15, 16. The bars 21 and 22 are of the same length. Their ends located towards the articulation axis of joint 5 are positioned a short distance from one another in direct proximity of the axis of spindle 19. One notices that with the parts 13, 14 in the positions shown in fig. 2, the axis of the articulation determined by joint 5 coincides with the axis of spindle 19 and, if prolonged, extends exactly along the front edge of the first intercalar element 11 towards armature section 4.

[0014] Figs 3 to 6 explain the functioning of the armature described. The same parts as described in relation to fig. 2 are shown again in these figures. They are denoted with the same reference numerals.

[0015] Fig. 3 shows the parts exactly as they appeared in fig. 2, with the only difference that the joint device 5 is shown parallelly displaced towards armature section 3, in such a manner that the articulation axis determined by the axis of spindle 19 now extends along the rear edge of the first intercalar member 11. This displacement does not change the total length of the armature, only the location of the articulation axis has changed.

[0016] Assembling the joint device with the armature constituent parts gives the result shown in fig. 4, issued from the positions shown in fig. 3. The tubular parts 13 and 14 engage the longitudinal segments 6 and 8 respectively. The connections between transverse segments 7 and longitudinal segment 6, as well as between segments 9 and segment 8, are situated within the slits 15 and 16 respectively. The position of articulation axis of the joint device 5 is coincident with the rear edge of the rearmost intercalar element 11 and all the intercalar elements 11 lie with their ends on support bar 22. Obviously, with the flat arrangement of sections 3 and 4 shown in fig. 3 and 4, the joint device 5 could be slidably displaced towards the right on fig. 4, which would change nothing to the arrangement of the armature. The bar 21 would come to lie under the intercalar elements 11 and the bar 22 would slide under the rearmost one of segments 9, the latter being now located against the end of slit 16.

[0017] Figs. 5 and 6 now show both end positions of joint device 5 with respect to armature sections 3 and 4 when upper 3 and lower 4 leg sections of the armature are placed as shown in fig. 1. Obviously, the length of upper leg section 3 will be greater than that of lower leg section 4 when the positions are those of fig. 5. For modifying the relative lengths of sections 3 and 4, it suffices to place both armature sections in a same plane, as shown in fig. 4, for example, to slide the joint devices simultaneously in the desired direction and then to give to the sections 3 and 4 the desired inclination again. Fig. 6 shows the other extreme possible relative position. Although the joint device can be positioned at any place between its two above-defined limit positions, said position should preferably be chosen so that the axis of the spindle is situated in an interval between two intercalar members 11.

[0018] Same joint devices 5 can of course also be provided at any other articulations of the armature.

[0019] As described above, all elements of the armature can be metallic, for example in aluminium, but a part or all of these elements can also be in wood or plastic.

[0020] Fig. 7, 8 and 9 refer to an alternative embodiment wherein the joint arrangements between the different sections of the armature differ from what has been described in reference to Fig. 2 to 6. Fig. 7 and 8 show the constitution of an interconnected means which, when assembled with other such means into a set of identical means, forms a joint arrangement as shown in Fig. 9. This arrangement permits to modify the position of an axis of articulation between two adjacent sections of the armature. Two short longitudinal member segments 24 formed of tubular metal or plastic elements are provided each at one end with a cylindrical stopper 26, 27, split diametrically to determine two complementary hemi-cylindrical finger parts as already explained with reference

to Fig. 2. A central transversal bore 28 receives a bolt or spindle (not shown) which forms an axle of articulation between the pair of short members 24. In addition thereto, auxiliary bores 29, 30 are drilled in parallel directions to bore 28 on each side thereof thus permitting a U-shaped locking wire part 31 to be inserted in such a manner that when this locking member is inserted in bores 29, 30 the interconnected means 24 are rigidly held in a straight position whereas, when the locking member is removed, the articulation defined by the axle bolt or spindle in bore 28 is free to rotate.

[0021] Fig. 9 shows a folded position of the armature in the same manner as Fig. 5 or 6. Two armature sections 32, 33 are connected together by a joint arrangement here formed of a set of interconnected pairs of means 24 one of which has been unlocked by removing U-shaped wire part 31. A transverse member 34 of the armature is secured to each one of the longitudinal short members 24 and the main longitudinal members 35, 36 of sections 32 and 33 also support transverse members 34, these members being similar throughout the armature.

[0022] Finally, Fig. 10 shows an example of a support base 37 able to receive an armature such as the one shown in Fig 1. Each of the sections 1, 2, 3 or 4 may lie on a single or a pair of adjustable supports 38 comprising each a rigid arm of definite length pivoting in a control device and provided at its upper end with a transverse bar. The longitudinal members of the sections are supported at the ends of the transverse bars. They can slide on the transverse bars or they could also be locked. Fig. 10 shows how the arrangement of sections 3 and 4 can be modified without changing the positions of supports 38 by merely displacing the articulation axis between these sections.

Claims

1. Articulated armature for bed or seat, comprising a plurality of sections (3, 4) with longitudinal members (6, 8), transverse members (7, 9) secured to the longitudinal members and joint arrangements (5) between said sections, defining axis of articulation of the armature, perpendicular to the longitudinal members, **characterized in that** each joint arrangement (5) comprises a set of interconnected means mounted between two longitudinal members belonging to two successive sections (3, 4), and is able to be operated by hand for displacing the said axis of articulation parallely to itself thus modifying the respective length of the sections in such a manner that the total length of the armature remains unchanged.

2. Articulated armature according to claim 1, **characterized in that** each joint arrangement consists of joint devices (5) slidingly arranged along two segments (6, 8) of a longitudinal member for displacing the articulation axis parallelly to itself on a given distance, and a set of intercalar transverse members (11) are disposed between the said segments of longitudinal members (6, 8), these intercalar members being connected to transverse members (7, 9) belonging to both successive sections (3, 4) of the armature and being supported by a support structure (20) belonging to the joint device (5).

3. Articulated armature according to claim 2, **characterized in that** said joint device (5) comprises two tubular parts (13, 14) connected to one another by a joint axle (19), each tubular part (13, 14) slidably engaging one of said segments (6, 8) of longitudinal members, each of said tubular parts (13, 14) being further provided with a support part (21, 22) belonging to the support structure (20).

4. Armature according to claim 3, **characterized in that** said set of intercalar transverse members (11) are connected by deformable means (12) to transverse members (7, 9) belonging to both said armature sections (3, 4) and said deformable means are arranged in such a manner that progressive sliding of said tubular parts (13, 14) on both said longitudinal members segments (6, 8) connected by the joint device (5) permits to adjust the position of said articulation axis by modifying the number of intercalar transverse members (11) located on each side of said articulation axis respectively, the ends of said intercalar members (11) lying on said support parts (21, 22).

5. Armature according to claim 3, **characterized in that** said transverse members (7, 9) are rigidly connected through their ends to inner side portions of said longitudinal members segments (6, 8), said tubular parts of each said joint device (13, 14) having longitudinal slits (15, 16) allowing free sliding of that parts (13, 14) without striking against the transverse members (7, 9).

6. Armature according to claim 3, **characterized in that** each said support part (21, 22) of said support structure (20) is a bar section rigidly secured lengthwise along the corresponding tubular part (13, 14) of the joint device (5) at a height situated beneath the slit (15 or 16) of that tubular part.

7. Armature according to claim 1, **characterized in that** each joint arrangement comprises a plurality of short longitudinal member segments having protruding finger parts at their ends, articulation bolts traversing interconnected finger parts of each pair of adjacent short member segments, and removable U-shaped locking wire parts transversally engaging the finger parts traversed by a bolt in each pair of interconnected adjacent short segments, for rigidly securing said pair of adjacent short segments in

straight positions, one of said U-shaped wire being removed for localizing an articulation axis of said armature.

FIG.1

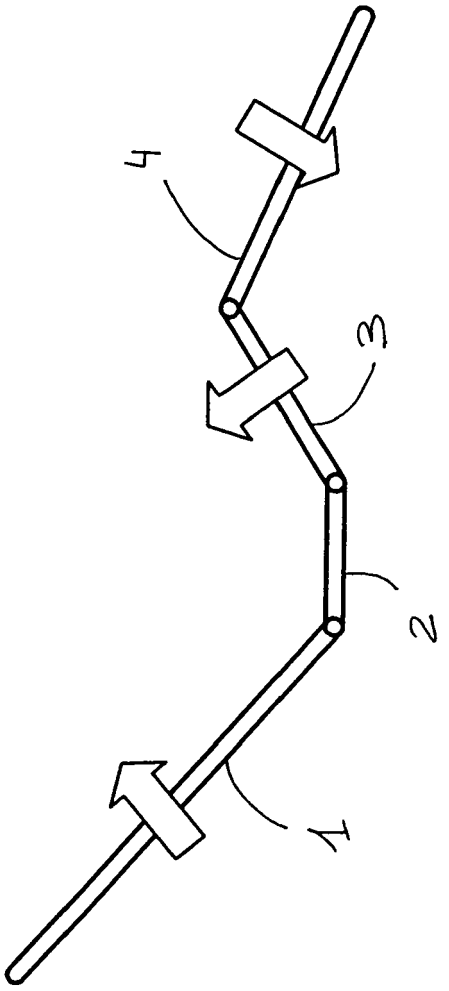
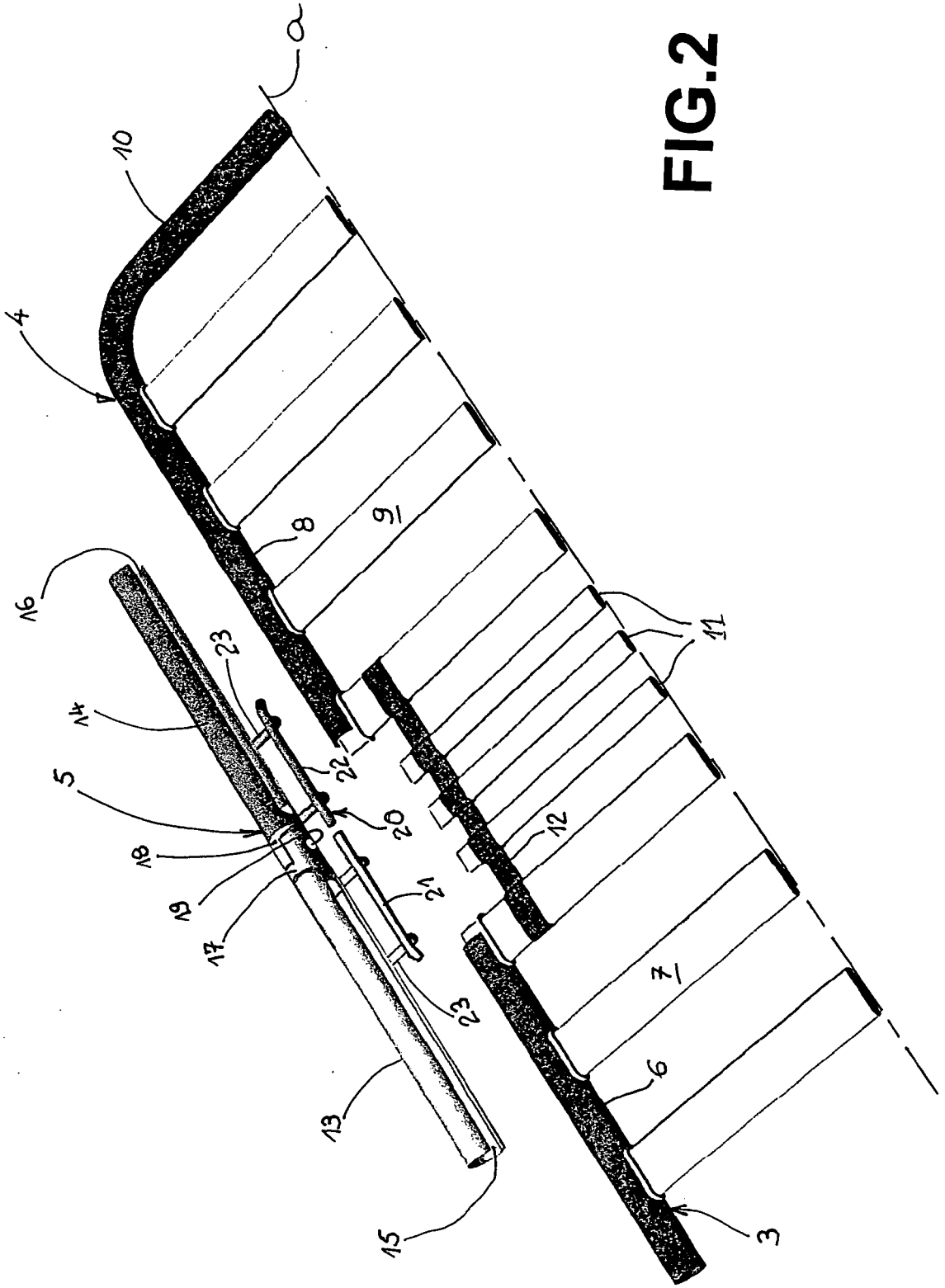


FIG.2



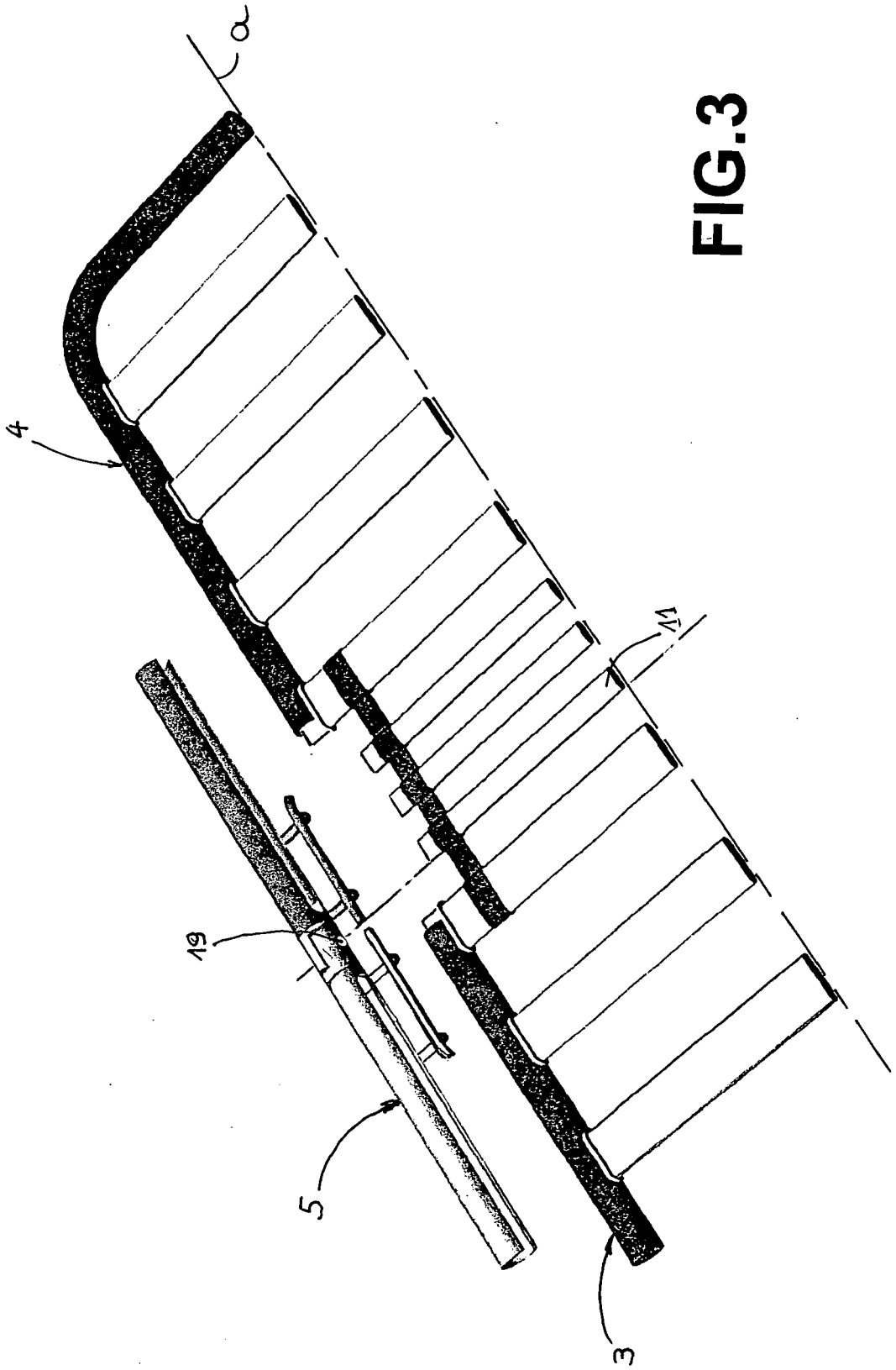


FIG.3

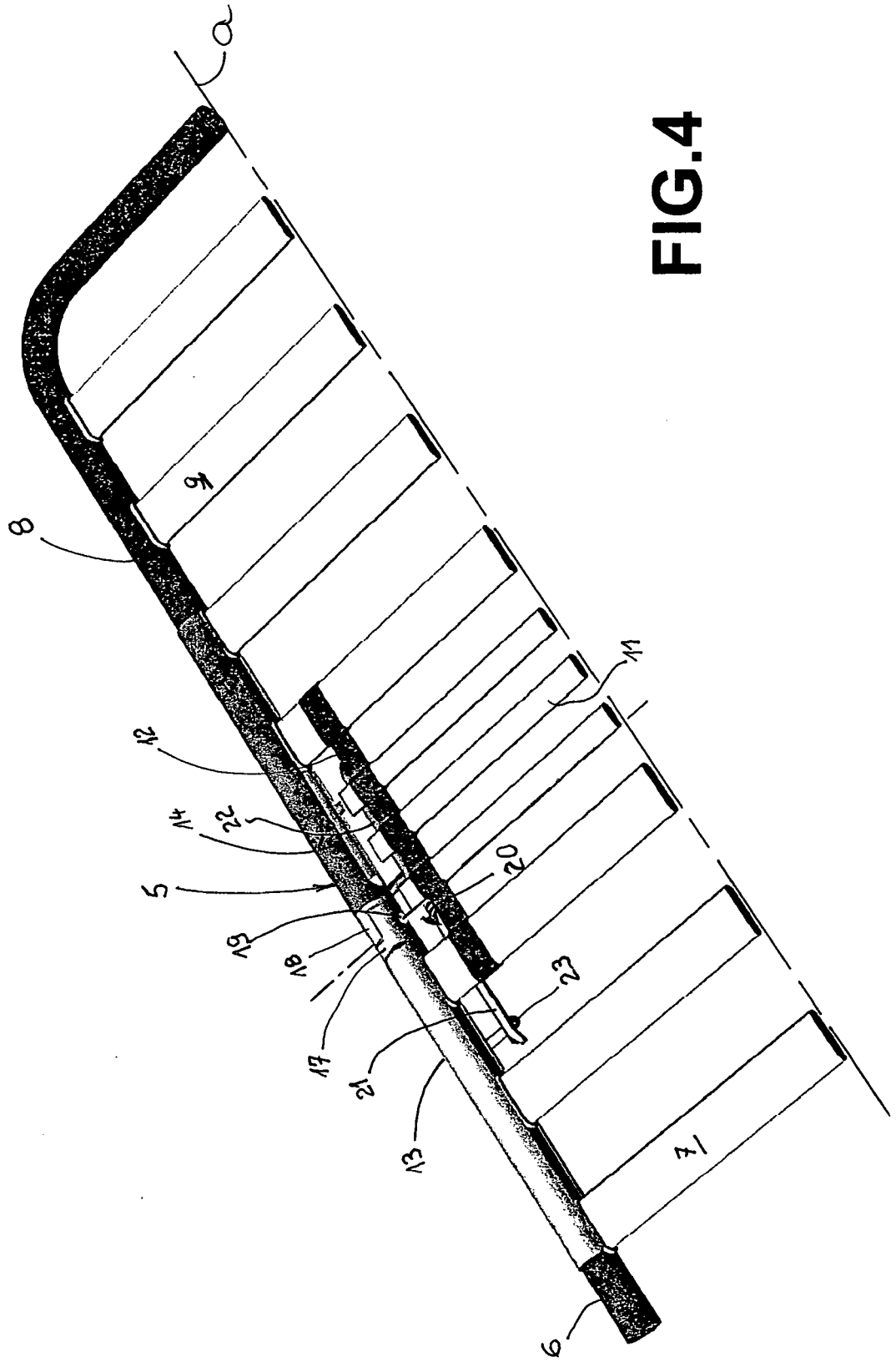


FIG.4

FIG.5

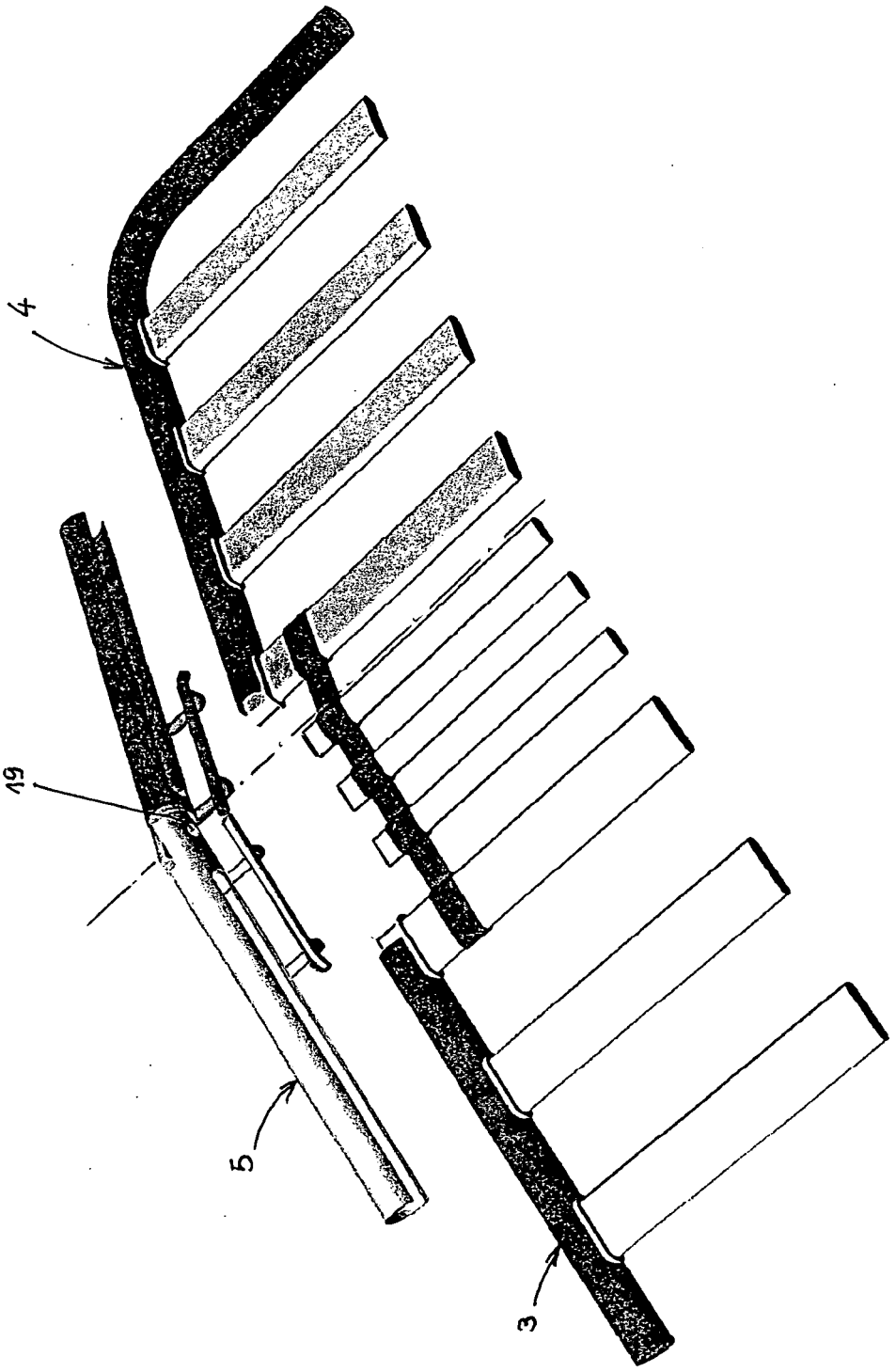


FIG.6

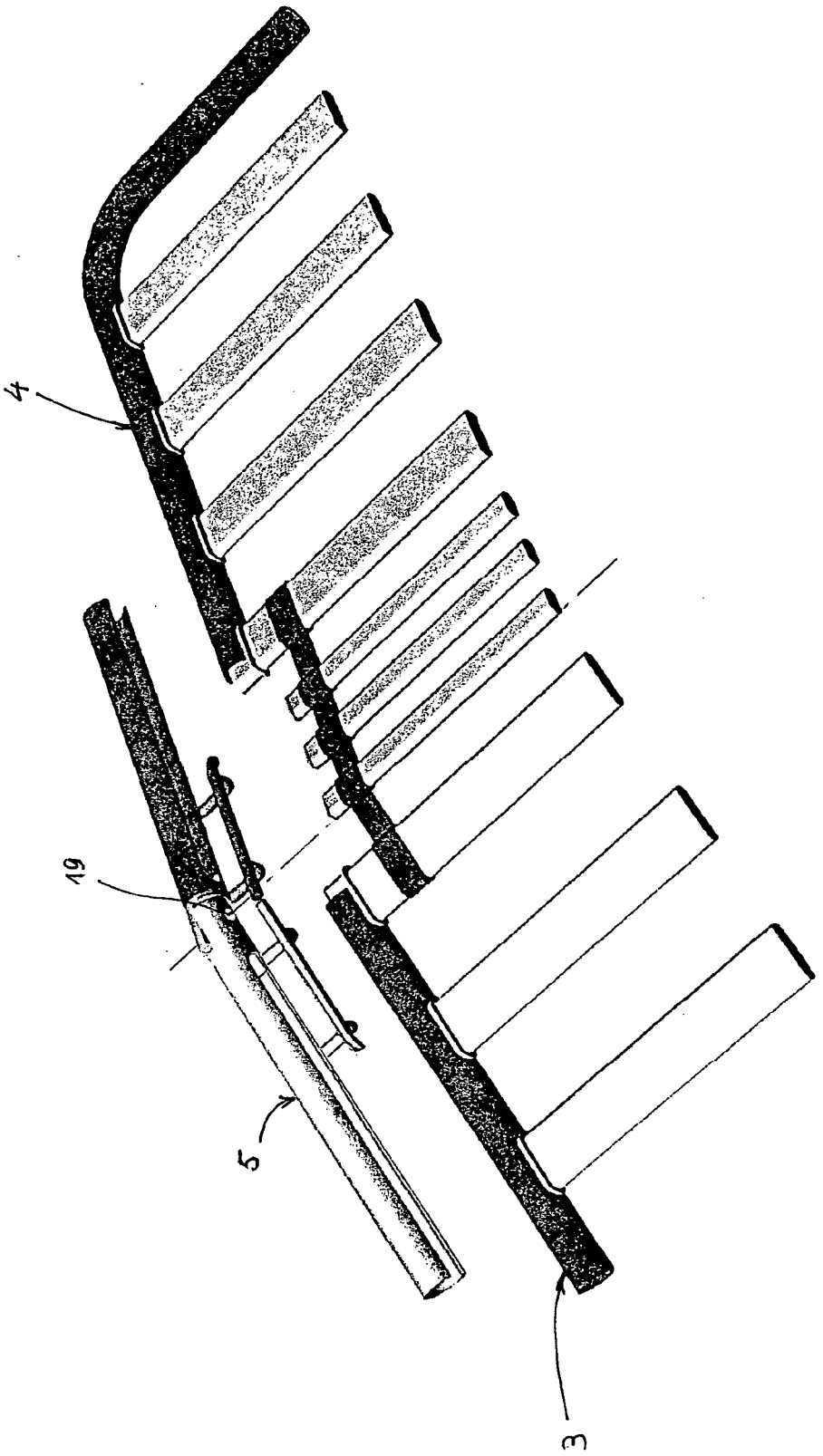


FIG.7

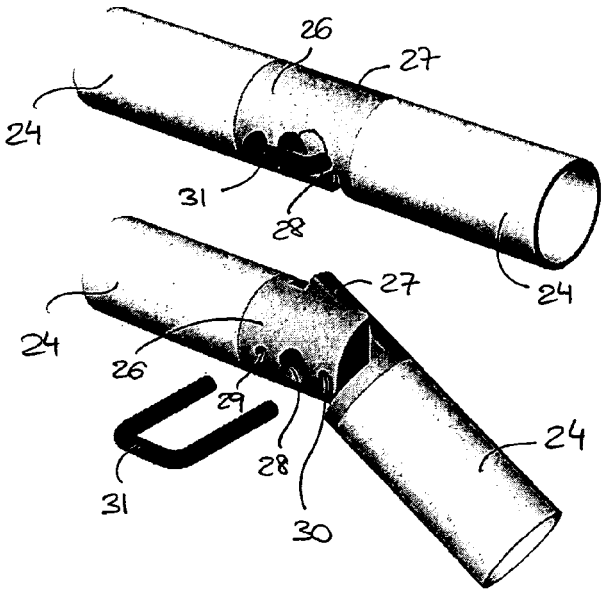


FIG.8

FIG.9

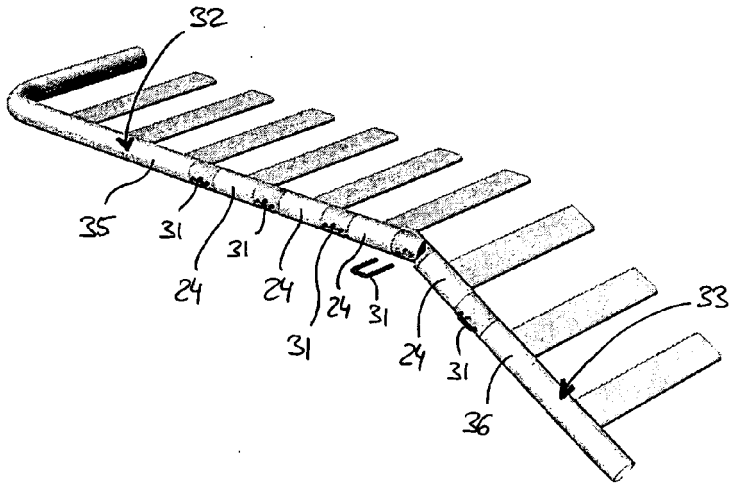
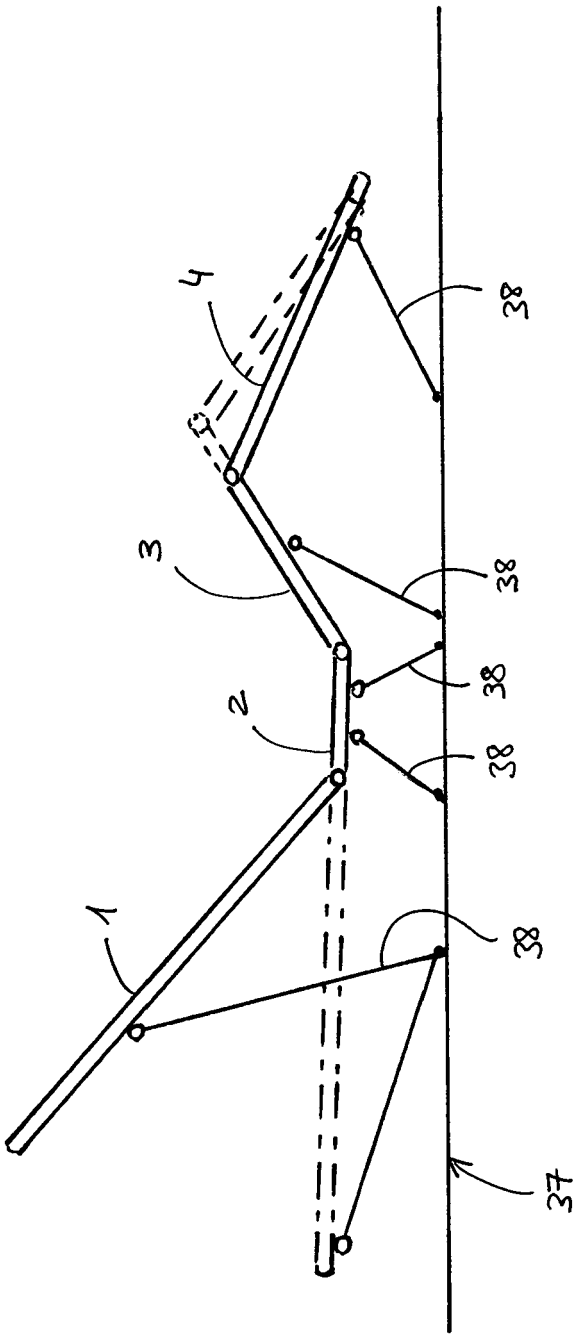


FIG.10



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EUROPEAN SEARCH REPORT

Application Number
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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
Munich	16 June 2006	MacCormick, D

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