

(19)



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11)

EP 0 819 397 A1

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

21.01.1998 Bulletin 1998/04

(51) Int Cl.⁶: **A47C 23/06**

(21) Application number: **97202130.7**

(22) Date of filing: **09.07.1997**

(84) Designated Contracting States:

**AT BE CH DE DK ES FI FR GB GR IE IT LI LU MC
NL PT SE**

(30) Priority: **16.07.1996 NL 1003613**

(71) Applicant: **Kwakernaat Bedding
3274 LH Heinenoord (NL)**

(72) Inventor: **Kwakernaat, Herman
3274 LN Heinenoord (NL)**

(74) Representative: **de Bruijn, Leendert C. et al
Nederlandsch Octrooibureau
P.O. Box 29720
2502 LS Den Haag (NL)**

(54) **Sitting or lying element**

(57) The invention relates to a sitting or lying element with a bearing frame and at least two bearers. The bearers (3,3') are provided with a coupling element at each end. The coupling elements (9) rest in a resilient manner in accommodation recesses (17) in the supporting members of the bearing frame. The part of the coupling element situated in the accommodation recess (17) rests against the wall of the accommodation recess, which ensures that it is positioned in an operationally

safe manner during the spring movement. The bearers (3,3') can rotate about the coupling elements (9). With the sitting or lying element according to the invention, very good pressure distribution is possible, and the contours of a person sitting on the element can be followed accurately. The shape of the lying element is also such that the contours of a person lying down are followed and very good muscle relaxation is possible. The bearers are preferably made relatively rigid.

EP 0 819 397 A1

Description

The invention relates to a sitting or lying element, comprising a bearing frame with at least two supporting members placed at a distance from each other, and at least two bearers, each with a longitudinal axis, which rest with their ends on the supporting members, the bearers comprising at each end a coupling element with a first end, by means of which the respective bearer is connected so that it tilts about its longitudinal axis, and with a second end which rests in a resilient manner on a resilient element accommodated in an accommodation recess in the supporting members.

It is known to use flexible slats as bearers, for example in the case of beds, in order to support the body well and follow its contours. These so-called "slatted bases", on which a mattress is placed, comprise as resilient bearers curved slats which are connected to the longitudinal sides of the bed. A disadvantage of such slatted constructions is that optimum pressure distribution is not possible when they are under load from a person lying on the slatted base. Compensation is then sought in the mattress, by providing parts of differing density therein. This can cause pinching of the nerve paths, disturbance of blood circulation, or bedsores, in particular in people who are confined to bed for long periods, for example the elderly or hospital patients.

EP-A-0,337,828 discloses a slatted base in which the slats are resiliently supported by way of coupling elements in spring containing bushes of the longitudinal sides of a bed. In this case, in one embodiment the coupling element comprises a ball hinge around which the slats can tilt about their longitudinal axis. Although an advantageous pressure distribution of the weight of a person lying on such a slatted base can be obtained with the known construction, the stability and operational safety of the known connections leave something to be desired.

One object of the present invention is to provide an operationally safe sitting or lying element in which a good distribution of the pressure of a person sitting or lying thereon is possible, in the case of which good blood circulation remains possible and the contours of the body can be followed well, and in the case of which a stable resilient guide is obtained.

To this end, the sitting or lying element according to the invention is characterized in that the second end of the coupling element accommodated in the accommodation recess of the supporting members rests for the greater part of its length against the wall of the accommodation recess.

Owing to the fact that the bearers can rotate about their longitudinal axis and at the same time can spring relative to the frame, a very good adaptation to the body contours of a person lying or sitting on the bearer can be obtained. Problems in connection with pinching nerve paths, blood circulation and the like are avoided in this way. Even if a relatively thin mattress or seat is

used, the sitting or lying element according to the invention supports the user comfortably. Owing to the fact that the second end of the coupling element rests for the greater part of its length against the wall of the accommodation recess, a stable spring movement is obtained, and when lateral forces are exerted on the coupling elements the latter are prevented from bending outwards.

The bearers of the sitting or lying element preferably show very little give or no give at all when placed under load. Good adaptation to the body contours is obtained by using rigid bearers, instead of the known flexible slats. What is meant by "little give" is that a bearer with a length of 90 cm does not give more than 1 mm when under normal load from a person.

The resilient element preferably comprises a coil spring, so that the resilient capacity thereof is retained. The use of resilient materials such as, for example, rubber leads to deterioration in the elasticity, so that the resilient capacity thereof is reduced in the course of time.

A clamping bush with a predetermined outside diameter and provided with a bottom edge is preferably accommodated in the recess. The second end of the coupling element projects beyond the bottom edge and is provided with detachable locking means which are situated below the bottom edge and within the outside diameter of the clamping bush. Such a construction is relatively cheap and can be assembled in a simple manner. Prior to placing of the clamping bush in the accommodation recess of the supporting members, the second end of the coupling element is inserted through the clamping bush. The locking element is then fitted, so that the coupling element can no longer be removed from the bush. The spring element is then placed on the bottom of the accommodation recess, and the clamping bush and the coupling element are fixed simultaneously in the accommodation recess.

The sitting or lying element according to the invention preferably forms a bed in which the bearing frame comprises a first part which slopes downwards relative to a horizontal, connecting thereto a second part which forms an obtuse angle with the first part, so that a recess is formed between the first and the second part, and connecting to the second part a third part which forms an obtuse angle therewith, in which case an elevation is formed between the second and the third part. The mutual position of the segments of the bearing frame ensures that very good support of the body is obtained during sleeping on the side or on the back. In this case the pressure on the hip joint, which exerts high surface pressure (point pressure on the hip joint or the sacrum) when a person is sleeping on a flat base, is uniformly distributed. This greatly reduces the risk of bedsores.

A lying element which is very suitable for sleeping on the stomach and brings about uniform pressure distribution is characterized in that the bearing frame comprises a first part and a second part, which parts form an obtuse angle between them, so that an elevation situated near the centre of a common length dimension of

the two parts is formed.

An embodiment of a sitting or lying element according to the invention will be described further with reference to the appended drawing.

In the drawing:

Figure 1 shows a diagrammatic perspective view of a lying element according to the present invention; Figure 2 shows a partial section on an enlarged scale of a first embodiment of a supporting member, a coupling element and a bearer according to the present invention;

Figure 3 shows a partial section of a second embodiment of a supporting member, a coupling element and a bearer according to the invention;

Figure 4 shows a side view of a preferred embodiment of a lying element according to the invention; and

Figure 5 shows a side view of a preferred embodiment of a lying element according to the invention for sleeping on the stomach.

Figure 1 shows diagrammatically a lying element 1 according to the present invention, in the form of a bed. The bed 1 comprises a multiplicity of bearers 3, 3', each with a longitudinal axis 5 extending at right angles to the longitudinal sides 7, 7' of the bed 1. In this case the longitudinal sides 7, 7' of the bed 1 form supporting members on which the bearers 3, 3' rest. Each bearer 3, 3' is provided with two coupling elements 9, 11. The coupling elements 9, 11 comprise a vertical part which is resiliently connected to the longitudinal sides 7, 7' and a horizontal part which is rotatably connected to the bearers 3, 3'. The bearers 3, 3' are consequently rotatable about their longitudinal axis 5 and resiliently movable in a direction perpendicular to the lying face of the bed 1.

As can be seen clearly from Figure 2, the first end 13 of the coupling element 9 is rotatably connected to a fixing part 15 on the end of the bearer 3. A second end 14 of the coupling element 9 is accommodated in a bush 17 which is placed vertically along the longitudinal sides 7, 7' of the bed 1. A coil spring 19 is situated on the bottom of the bush 17. The spring constant of the coil spring 19 is, for example, 5 N/mm. The stroke of the coupling element 9 in the bush 17 can be limited by means of a set screw 18, and the coupling element is confined in the bush 17. Bush 17 is also fixed to the longitudinal sides 7, 7' by set screw 18. An alternative is to provide the coupling element 9 with a threaded pin at the second end 14. Said pin projects through a hole on the underside of bush 17 and goes into a cavity in the bearing member. A nut is placed on this bearing end. This fixes the coupling element, on the one hand, and a slight adjusting facility is produced by it, on the other hand. Bush 17 is fixed in the bearing member by means of conventional techniques (screw thread, gluing, bayonet closure, pressing).

The fixing part 15 in which the first end 13 of the coupling element 9 is accommodated has a plastic protective cap 21, under which a cylindrical accommodation recess for the end 13 is situated. The coupling element 9 does not project laterally from underneath the protective cap 21, so that when the bearer 3 is rotated about its longitudinal axis 5 parts of the person lying on the bed cannot go between the bearer 3 and the longitudinal sides 7 of the bed.

Figure 3 shows an embodiment in which the first end 13 of the coupling element 9 comprises a ball hinge 20. The ball hinge 20 is accommodated in a protective cap 21 of the bearer 3, so that said bearer can tilt about its longitudinal axis around the ball 20. The second end 14 of coupling element 9 is placed in a clamping bush 21 which acts with a toothed outer periphery on the inside wall of the accommodation recess 17. In this case the second end 14 extends beyond the bottom edge 24 of the clamping bush 21. The coupling element 9 is fixed relative to the clamping bush 21 by means of a spring clip 22 which acts upon the bottom edge 24. The spring clip 22 does not extend beyond the outside diameter of the clamping bush 21. Prior to the insertion of the clamping bush 21 in the accommodation recess 17, the second end 14 is inserted in the clamping bush 21, and the spring clip 22 is fixed around it. The coupling element 9 and the clamping bush 21 are then placed together in the accommodation recess 17, on the bottom of which the coil spring 19 is fitted.

Figure 4 shows a diagrammatic side view of a preferred embodiment of a bed 23 having along a longitudinal side 25 the bearers, of which only the bushes 27, 27' are shown diagrammatically. The bed 23 comprises a first part 29 which forms the head end and extends at an angle α of 4-4.5° relative to the horizontal. The length of the first part 29 is, for example, approximately 81.5 cm. Connecting to the first part 29 is a second part 31 with a length of approximately 47.5 cm which forms an obtuse angle β of approximately 168-169° relative to the first part and is directed again towards the horizontal. A recess 33 is formed between the first part 29 and the second part 31, which recess 33 is situated approximately 60 mm below the horizontal. A third part 35, forming the foot end, extends at an obtuse angle γ of approximately 167-168° relative to the second part 31 and is directed away from the horizontal, so that an elevation 36 is formed between them. The length of the third part 35 is approximately 65.4 cm.

The distance between adjacent bearers is approximately 8 cm. The width of each bearer is, for example, 2 cm.

Figure 5 shows a lying element suitable for sleeping on the stomach. A first part 37 is connected at an angle δ of approximately 165-170° to a second part 38. This forms an elevation which is situated at a distance of approximately 55-60% of the total length of the parts 37 and 38 from the end 39 of the bed. Such a bed shape gives optimum pressure distribution during sleeping on

the stomach.

Although the sitting or lying element according to the present invention is described in the figures with reference to a bed, the element can likewise be used advantageously in the seat and/or the backrest of a chair, a recliner and the like. The embodiments according to Fig. 3 or Fig. 4 can also be used advantageously with bearers in the form of a slatted base or spring mattress known per se.

Claims

1. Sitting or lying element (1), comprising a bearing frame with at least two supporting members (7, 7') placed at a distance from each other, and at least two bearers (3, 3'), each with a longitudinal axis (5), which rest with their ends on the supporting members (7, 7'), the bearers (3, 3') comprising at each end a coupling element (9) with a first end (13), by means of which the respective bearer is connected so that it tilts about its longitudinal axis (5), and with a second end (14) which rests in a resilient manner on a resilient element (19) accommodated in an accommodation recess (17) in the supporting members (7, 7'), characterized in that the second end (14) of the coupling element (9) accommodated in the accommodation recess (17) of the supporting members (3, 3') rests for the greater part of its length against the wall of the accommodation recess.
2. Sitting or lying element according to Claim 1, characterized in that a clamping bush (21) with a predetermined outside diameter and provided with a bottom edge (24) is accommodated in the recess (17), the second end (14) of the coupling element (9) projecting beyond the bottom edge (24) and being provided with detachable locking means (22) which are situated below the bottom edge and within the outside diameter of the clamping bush (21).
3. Sitting or lying element according to Claim 1 or 2, characterized in that the first end (13) of the coupling element (9) is ball-shaped.
4. Sitting or lying element according to Claim 1 or 2, characterized in that the first end (13) of the coupling element (9) is square and extends partially along the longitudinal direction (5) of the respective bearer (3, 3').
5. Sitting or lying element (1) according to one of the preceding claims, characterized in that the bearers (3, 3') are provided at each end with a fixing part (15) with a protective cap (21) and a cylindrical accommodation recess situated in or under the protective cap (21), for rotatably accommodating the first end (13) of the coupling element (9).
6. Sitting or lying element (1) according to one of the preceding claims, characterized in that the element comprises a bed in which the bearing frame comprises a first part (29) which slopes downwards relative to a horizontal, connecting thereto a second part (31) which forms an obtuse angle with the first part, so that a recess (33) is formed between the first (29) and the second part (31), and connecting to the second part (31) a third part (35) which forms an obtuse angle therewith, in which case an elevation (36) is formed between the second (31) and the third part (35).
7. Lying element with a bearing frame for fixing a number of bearers situated at right angles to the bearing frame, characterized in that the bearing frame comprises a first part (29) which slopes downwards relative to a horizontal, connecting thereto a second part (31) which forms an obtuse angle with the first part, so that a recess (33) is formed between the first (29) and the second part (31), and connecting to the second part (31) a third part (35) which forms an obtuse angle therewith, in which case an elevation (36) is formed between the second (31) and the third part (35).
8. Lying element according to Claim 7, characterized in that the parts (29, 31 and 35) are not adjustable relative to each other, and the first part extends at an angle between 1 and 10° to the horizontal, and the angle between the first part (29) and the second part (31) and between the second part (31) and the third part (35) is between 150 and 180°.
9. Lying element with a bearing frame for fixing a number of bearers situated at right angles to the bearing frame, characterized in that the bearing frame comprises a first part (37) and a second part (38), which parts form an obtuse angle (δ) between them, so that an elevation situated near the centre of a common length dimension of the two parts is formed.

fig - 1

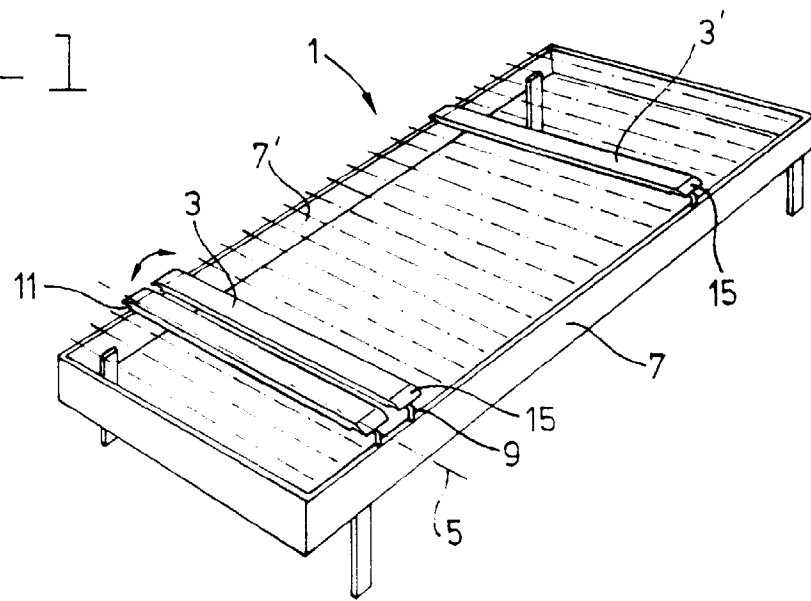


fig - 2

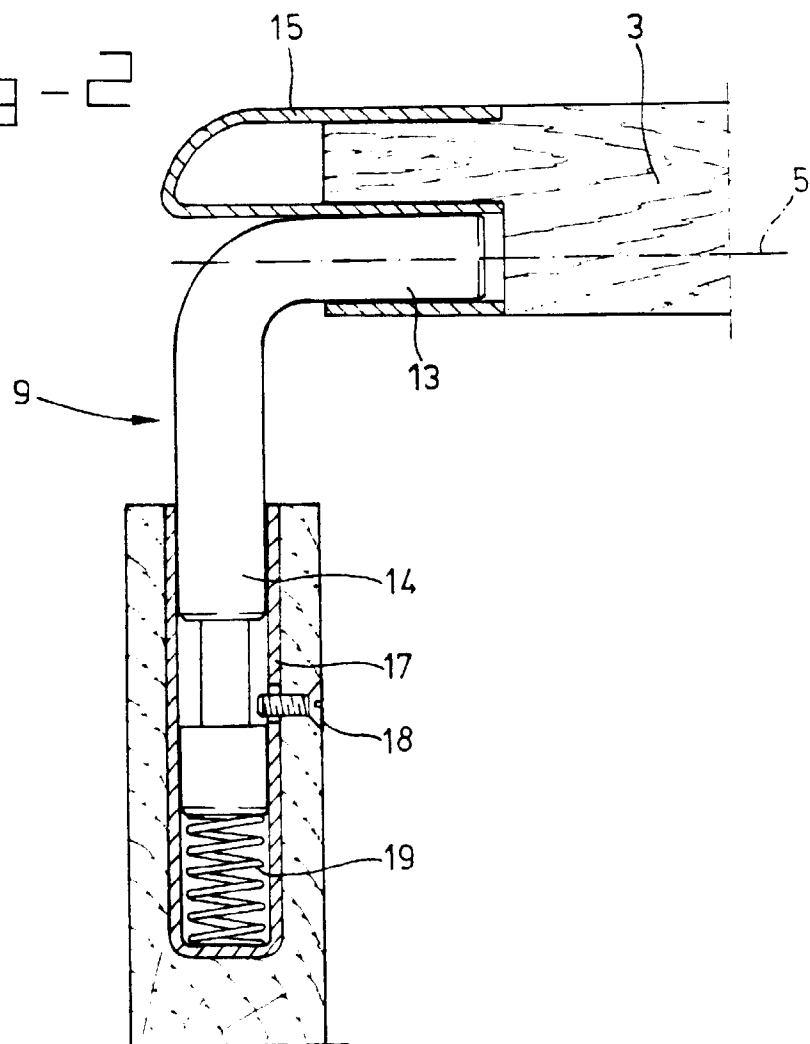
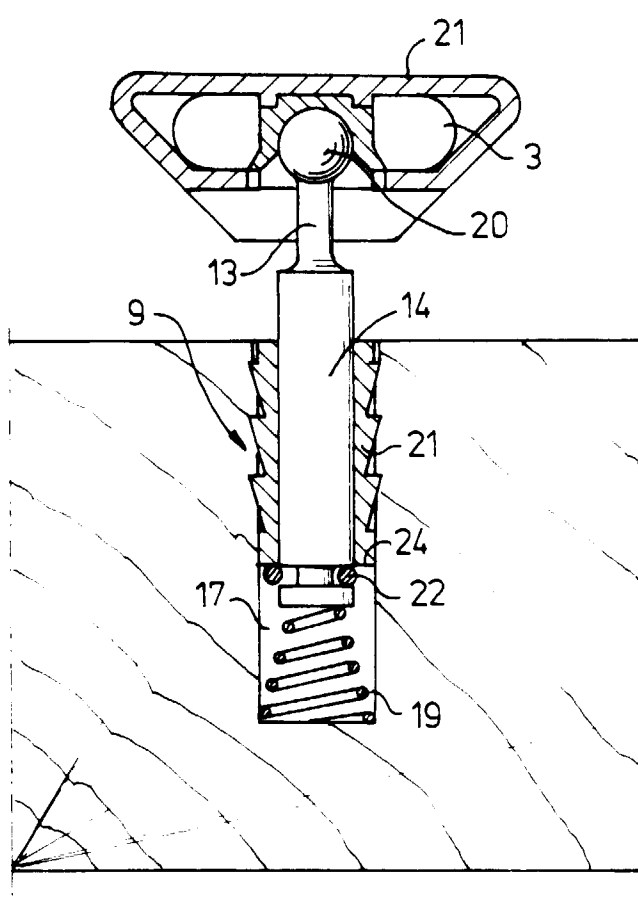
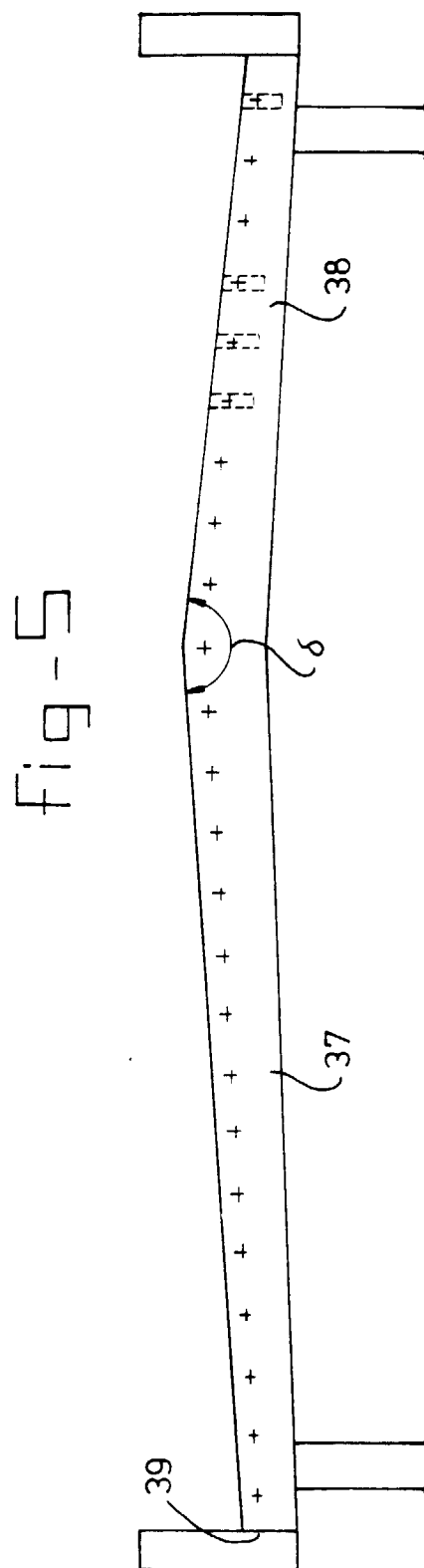
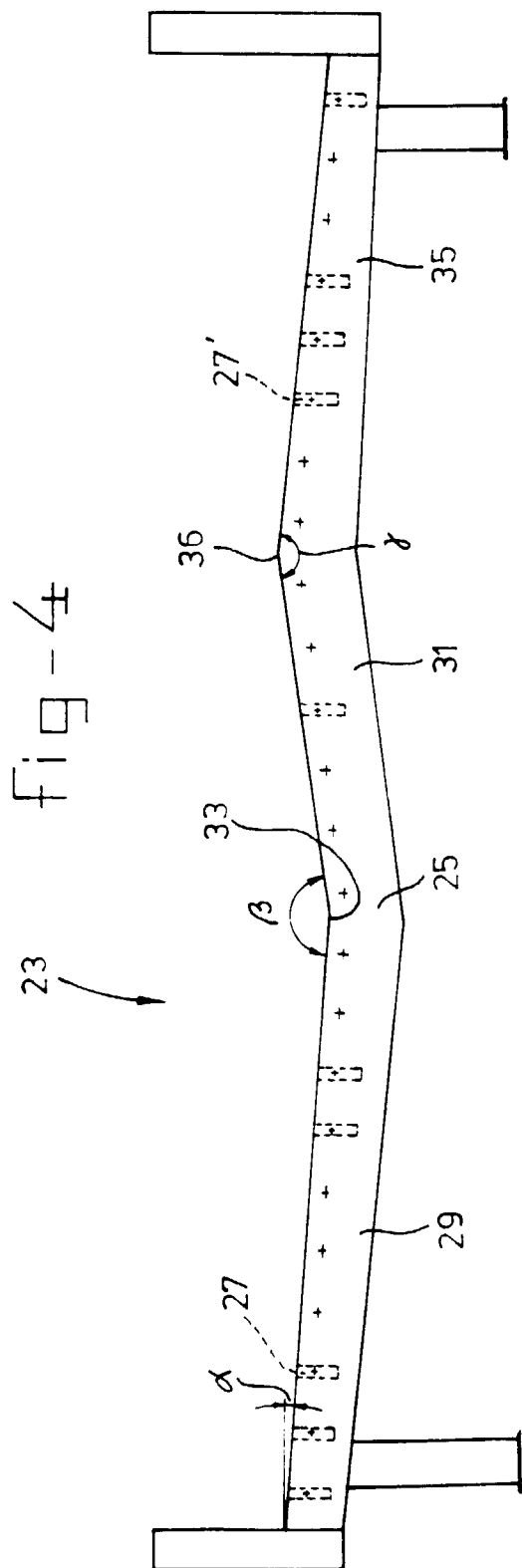


fig - 3







European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 20 2130

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.6)
Y	EP 0 586 367 A (OPTIMO HOLZ- UND DRAHTBEARBEITUNG GES.)	1	A47C23/06
A	* the whole document *	5	
Y	FR 2 442 031 A (FERRER MARTINEZ)	1	
	* page 3, line 7 - page 4; figures *		
D,A	EP 0 337 828 A (TRACE)	1,3	
	* column 3, line 24 - column 6, line 53; figures *		
A	DE 93 02 728 U (WILLI NEUBAUER BETTRAHMEN)	6-9	
	* the whole document *		
A	WO 91 07895 A (SCHAERRER)		
A	EP 0 716 822 A (DAVERO)		
A	EP 0 273 438 A (HARTMANN)		
A	FR 526 164 A (PAPIN)		TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	DE 91 05 644 U (HARTMANN)		A47C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 14 October 1997	Examiner Vijverman, W
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

EPO FORM 1503 03.82 (F04C01)