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(54) Improvements in and relating to chairs.

(57) A mechanism (7) for connecting a chair seat (4) to a base (2,3) to permit tilting of the seat relative to the base, comprises a body (7a) for attachment to the base and mounting members (17) extending from the body (7a) for attachment to the seat. The mounting members are pivotally connected to the body for pivotal movement between limit positions about an axis (16) which in use extends generally parallel to the front of the seat and is positioned between the regions of attachment of the body and mounting members to the base and seat respectively. Biasing means (22) in the form of an elongate leaf spring assembly are arranged to act between the mounting members and the body to bias the mounting members towards one of the limit positions and advantageously extends generally in the plane of the mounting members with the pivot axis (16) extending through the assembly in all relative positions of the mounting members and body.

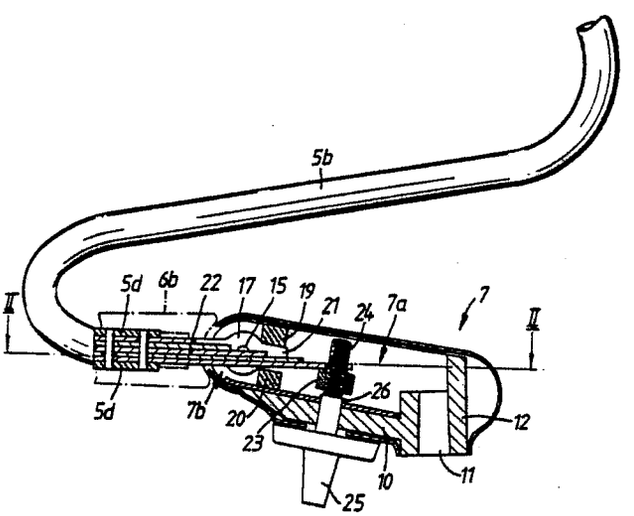

FIG. 3.

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Improvements in and relating to Chairs

The present invention relates to improvements in chairs and to mechanisms for connecting a chair seat to a base for permitting tilting of the seat relative to the base.

According to one aspect of the present invention there is provided a mechanism for connecting a chair seat to a base for permitting tilting of the seat relative to the base, comprising a body having a portion adapted for attachment to the base, mounting means comprising a mounting member extending from said body and having a portion adapted for attachment to the seat, pivot means pivotally connecting said mounting member to said body for pivotal movement of said mounting member relative to said body about the axis of said pivot means between first and second limit positions for, in use, permitting tilting of the seat relative to the base, and biasing means for biasing said mounting member about said pivot axis towards one of said limit positions, said pivot axis being positioned between said attachment portions of said mounting member and of said body.

The mounting member may extend from the body generally perpendicularly to the pivot axis and the biasing means may be arranged to act between the mounting member and the body to bias the mounting member towards the one limit position. The biasing means may for example comprise a generally elongate leaf spring means which may be substantially unstressed in the one limit position.

The biasing means may extend generally parallel to the mounting member and one end portion may be fixed to one of the mounting member and the body, the other end portion bearing on the other of the body and the mounting member. Preferably the other end portion of the biasing means bears on the body.

The mechanism preferably comprises a plurality of mounting members extending generally parallel to each other and perpendicular to the pivot axis. The mounting members may be independently pivotally mounted on the body and the biasing means may be arranged between a pair of adjacent members. The mounting members may be fixed relative to each other by a transversely extending member to which the one end portion of the biasing means may also be fixed, the transversely extending member either forming part of the seat or seat frame or forming part of the mounting means to be fixed to the seat or seat frame.

According to a further aspect of the present invention there is provided a chair comprising a seat, a base and a mechanism as described above. The body of the mechanism is attached to the base with the or each mounting member extending from the body in the direction of the front of the seat to which it is attached. The pivot axis extends generally parallel to the front of the seat and is located between the front of the seat and the portion of the body attached to the base.

Advantageously, the seat comprises a portion which extends from the front of the seat downwardly and rearwardly, the mounting means being fixed to the extension portion of the seat so that the seat is cantilevered on the base.

An embodiment according to the present invention will now be described by way of example only, with reference to the accompanying drawings.

In the drawings:

Figure 1 is a perspective view of an embodiment of chair according to the present invention and incorporating an embodiment of a mechanism according to the present invention;

Figure 2 is a horizontal section through the mechanism shown in Figure 1 and on the line II-II of Figure 3;

Figure 3 is a vertical section on the line III-III of Figure 2, showing the mechanism and chair in one condition; and

Figure 4 is a vertical section similar to that of Figure 3 but showing the mechanism and chair in another condition.

The chair shown in Figure 1 comprises a base 1, a seat 4 and a mechanism 7 for connecting the seat to the base to permit tilting of the seat on the base. The base 1 comprises a ground support portion 2 and an upwardly extending support member 3. The seat 4 comprises a seating portion, a backrest portion and a downwardly and rearwardly extending portion extending from the front edge of the seating portion and to which the mechanism is connected so that the seat 4 is in effect cantilevered on the base 1. The seat may, as shown, comprise a frame 5 provided with rigid or resilient elements 6a which may be covered by upholstery as indicated by the dotted line 6b in Figure 1.

As shown, the frame 5 of the seat comprises a pair of tubular members 5a,5b which extend laterally of the seating portion and backrest portion and are interconnected by the transverse elements 6a at appropriate intervals along their length. At the front of the seating portion, frame members 5a,5b extend downwardly and then rearwardly to create the downwardly and rearwardly extending portion of the seat, and at their ends are connected by a pair of transversely extending members 5d which may form part of the frame 5 and/or of the mechanism 7.

The mechanism 7 is shown in greater detail in Figures 2 to 4 and comprises a body 7a for attachment to the base and mounting means 7b for attachment to the seat, the mounting means 7b being pivotally connected to the body 7a.

The body 7a comprises a generally triangular base plate 10 having a portion adapted for attachment to the base. As shown, the portion is located at one apex of the triangle of the base plate 10 and comprises an opening 11 surrounded by a collar 12 for receiving the upper end of the support member 3 of the base. As shown, the collar 12 defines a generally frusto-conical opening, the upper end of the support member 3 being correspondingly frusto-conical.

The mounting means 7b comprise a plurality of, as shown two, mounting members or arms 17 extending from the body 7a generally parallel to each other. The arms 17 are pivotally mounted on the base plate 10 for pivotal movement about an axis 16 extending generally perpendicular to the arms 17 and are fixed relative to each other and to the seat by the transversely extending members 5d to which end portions of arms 17 are fixed by, for example, welding, bolting or riveting.

The mounting arms are independently pivotally mounted on the base plate and, to this end, in the regions of the other two apices of the triangle of the base plate, two pairs of upstanding generally parallel walls 13,14 are provided, the walls 13,14 being apertured and receiving opposite ends of pivot pins 15 on which the arms 17 are mounted. Spacers 18 are provided on the pins 15 for correct location of the arms 17. The pivot pins 15 are coaxial and together define pivot axis 16 which in use of the mechanism and, as shown, is positioned between the portion of the plate 10 by which it is attached to the base and the portions of the arms 17 by which they are attached to the seat.

The extent of pivotal movement of the arms 17 and the seat 4 relative to the base plate 10 and base 1 is determined by stops 19 and 20 mounted between the walls 13 and 14 above and below a projecting portion 21 of each mounting arm 17. The stops define first and second limit positions as shown in Figures 3 and 4.

The mechanism also includes biasing means for biasing the mounting arm 17 and seat 4 towards one of the limit positions and providing a bias against movement towards the other limit position. The biasing means may be provided by torsion means associated with, or in place of, the pivot pins 15, or by tension or compression springs acting between the arms 17 and base plate 10. Preferably, as shown, the bias is provided by a leaf spring assembly 22 which acts between the arms 17 and the base plate 10. As shown, the assembly 22 comprises a plurality of generally elongate leaf springs which are arranged between the mounting arms 17 with one end of the leaf spring assembly being fixed, e.g. bolted or riveted, to the transverse frame members 5d and the other end of the leaf spring assembly extending over the base plate 10 to bear on the base plate through means for adjusting the bias provided by the leaf spring assembly. The bias adjusting means is operative to vary the spacing between the other end of the spring assembly and the base plate 10 and comprises a bar 23 on which the leaf spring assembly bears and which extends across the base plate 10 and is carried by a pin 24. The pin 24 is threadedly engaged in the bar 23, extends through the base plate 10 and is held axially fast relative to the base plate 10 by a circlip or flange 26. The end of the pin emerging below the base plate 10 is provided with a manually engageable knob 25 for rotation of the pin in the bar 23.

The mechanism is arranged so that, when the chair is not in use, the spring assembly 22 maintains the seat in the limit position shown in Figure 3 with the seating portion of the seat inclined slightly forwardly. In this condition, the spring assembly is substantially unstressed and is then stressed as the seating portion is tilted rearwardly by the user to the other limit position shown in Figure 4. Rearward tilting of the seat is achieved by the user leaning back in the seat to transfer his centre of gravity rearwardly. The bias provided by the leaf spring assembly is adjusted by the user, by operation of knob 25, in dependence on the weight of the user of the chair, to ensure that the chair will tilt rearwardly as and when required.

Advantageously, as shown, the leaf spring assembly 22 is arranged so that the pivot axis 16 extends through the leaf spring assembly in substantially all relative positions of the seat and base permitted by the mechanism.

Although in the illustrated embodiment, the mechanism is shown as comprising two mounting arms 17, it will be appreciated that one or more than two mounting arms may be employed.

Additionally, it will be appreciated that the above described mechanism may be used with other constructions of the seat 4 than that as shown with a peripheral frame. For example the seat 4 may be provided by a frameless seat, for example moulded of a suitable plastics material which may then be upholstered and it or elements connected to it may provide the downwardly and rearwardly extending extension portion to which the mounting means of the mechanism are attached so that the seat is in effect cantilevered on the base.

Claims

1. A mechanism (7) for connecting a chair seat (4) to a base (2, 3) for permitting tilting of the seat relative to the base, comprising a body (7a) having a portion (12) adapted for attachment to the base (2, 3), mounting means (7b) comprising a mounting member (17) extending from said body (7a) and having a portion adapted for attachment to the seat (4), pivot means (15) pivotally connecting said mounting member (17) to said body (7a) for pivotal movement of said mounting member (17) relative to said body about the axis (16) of said pivot means (15) between first and second limit positions for, in use, permitting tilting of the seat relative to the base, and biasing means (22) for biasing said mounting member (17) about said pivot axis (16) towards one of said limit positions, said pivot axis (16) being positioned between said attachment portions of said mounting member and of said body.

2. A mechanism as claimed in claim 1, wherein said mounting member (17) extends from said body generally perpendicularly to said pivot axis (16).

3. A mechanism as claimed in either claim 1 or claim 2, wherein said biasing means (22) is arranged to act between said mounting member (17) and said body (7a) to bias said mounting member (17) towards said one limit position.

4. A mechanism as claimed in any one of the preceding claims, wherein said biasing means (22) is substantially unstressed in said one limit position.

5. A mechanism as claimed in any one of the preceding claims, wherein said biasing means (22) comprises generally elongate leaf spring means.

6. A mechanism as claimed in any one of the preceding claims, wherein said biasing means (22) extends generally parallel to said mounting member (17).

7. A mechanism as claimed in any one of the preceding claims, wherein one end portion of said biasing means (22) is fixed relative to one of said mounting member (17) and said body (7a) and the other end portion of said biassing means bears on the other of said mounting member and said body.

8. A mechanism as claimed in claim 7, wherein said other end portion of said biasing means (22) bears on said body (7a).

9. A mechanism as claimed in claim 8, comprising adjustment means (23-26) for adjusting the bias of said biasing means (22), said other end portion of said biassing means bearing on said body (7a) through said adjustment means.

10. A mechanism as claimed in any one of the preceding claims, wherein said pivot axis (16) extends through said biassing means (22) in at least one relative position of said mounting member and said body.

11. A mechanism as claimed in claim 10, wherein said pivot axis (22) extends through said biassing means (22) in substantially all relative positions of said mounting member and said body.

12. A mechanism as claimed in any one of the preceding claims, comprising a plurality of said mounting members (17) extending generally parallel to each other and spaced apart in the direction of said pivot axis (16).

13. A mechanism as claimed in claim 12, wherein each of said mounting members (17) is independently pivotally mounted on said body (7a).

14. A mechanism as claimed in either claim 12 or claim 13, wherein said biassing means (22) is arranged between a pair of adjacent mounting members (17).

15. A mechanism as claimed in any one of claims 12 to 14, wherein said mounting members (17) are fixed relative to each other by a transversely extending member (5d) forming part of the frame of the seat and to which one end portion of said biassing means (22) is also fixed.

16. A mechanism as claimed in any one of claims 12 to 14, wherein said mounting means (7b) comprises a transverse member (5d) for fixing to the frame of the seat, extending transversely of said mounting members (17) and to which said mounting members and one end portion of said biassing means (22) are fixed

17. A mechanism as claimed in any one of claims 12 to 16, wherein said pivot means (15) comprises a plurality of pivot pins (15) for pivotally connecting said mounting members (17) to said body, and said body (7a) comprises a plate (10) having a plurality of pairs of upstanding walls (13, 14), each pair of walls supporting opposite ends of a respective said pivot pin.

18. A mechanism as claimed in claim 17, when dependent on claim 9, wherein said adjustment means (23-26) are mounted on said plate and are adjustable to vary the spacing between said other end portion of said biassing means and said plate.

19. A chair comprising a seat (4), a base (2, 3) and a mechanism (7) as claimed in any one of the preceding claims for connecting said seat to said base, wherein said body (7a) is attached to said base, the or each said mounting member extends from said body in the direction of the front of said seat and is attached thereto, and said pivot axis (16) extends generally parallel to said front of said seat and is positioned between said front of said seat and said portion (12) of said body attached to said base.

20. A chair as claimed in claim 19, wherein said seat (4) comprises a portion which extends from said front of said seat downwardly and rearwardly, said mounting means (7b) being fixed to said extension portion of said seat (4) such that said seat is cantilevered on said base (2, 3).

21. A chair as claimed in either claim 19 or claim 20, wherein said body is attached to said base for pivotal rotation about a generally vertical axis.

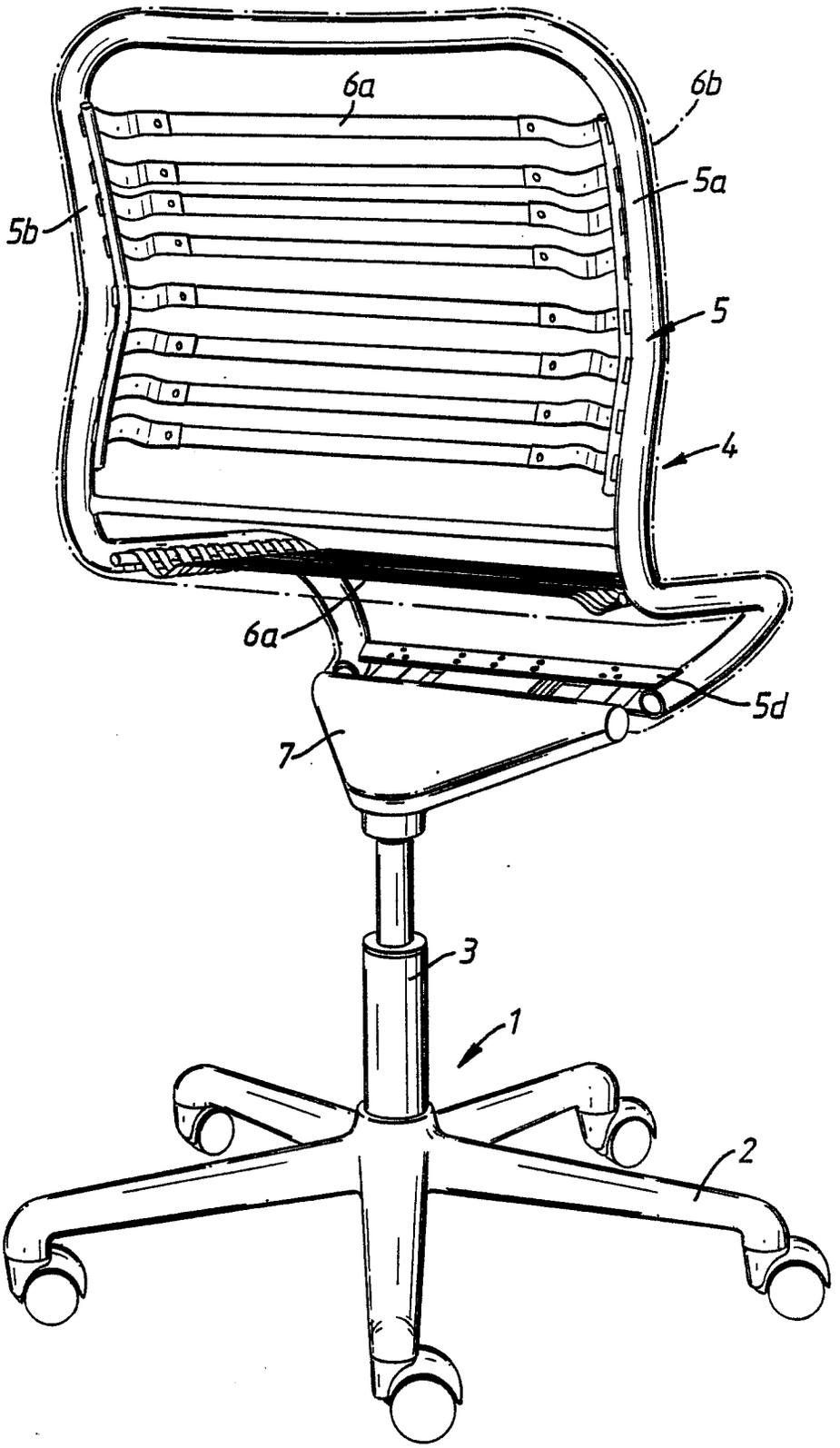
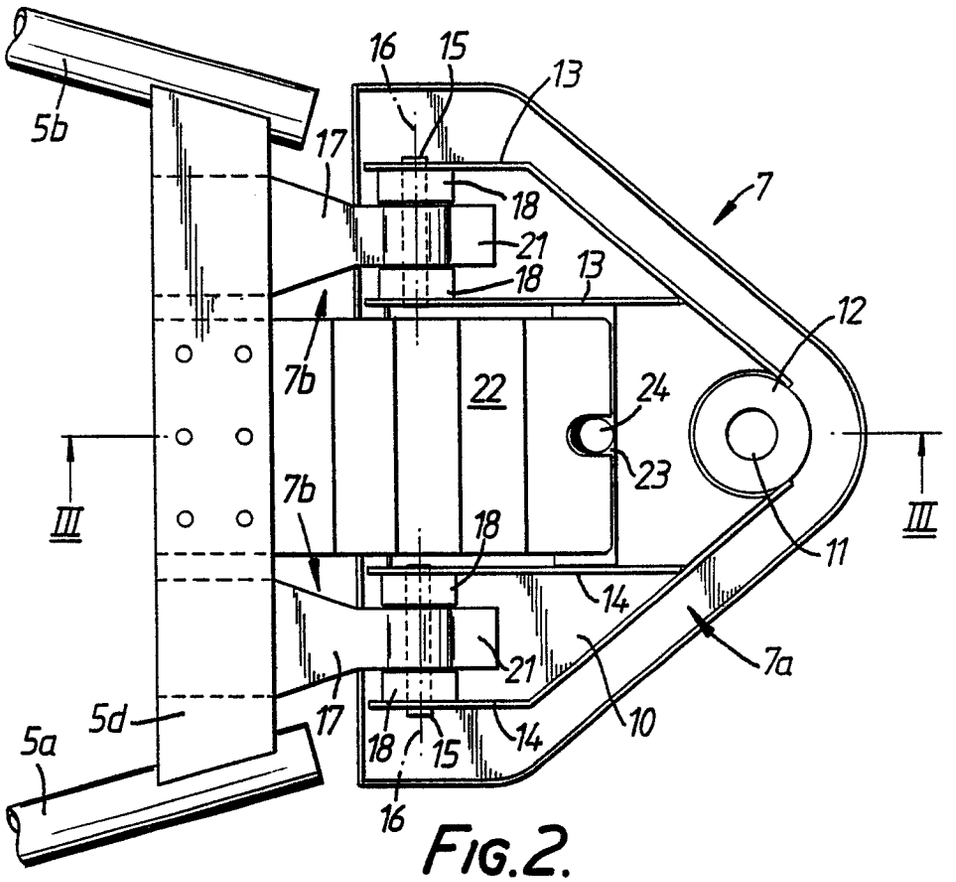


FIG. 1.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16
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13
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7
12
7b
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24
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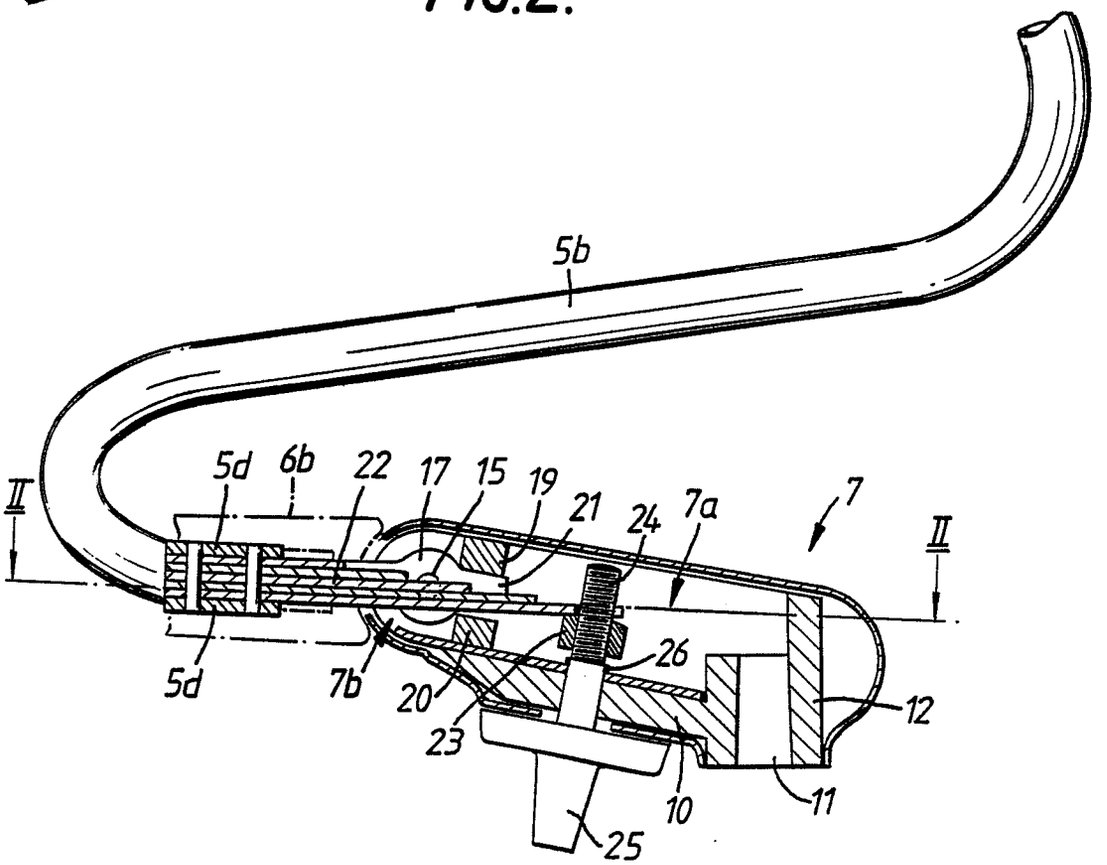
16

FIG.2.


5b
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6b
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FIG.3.

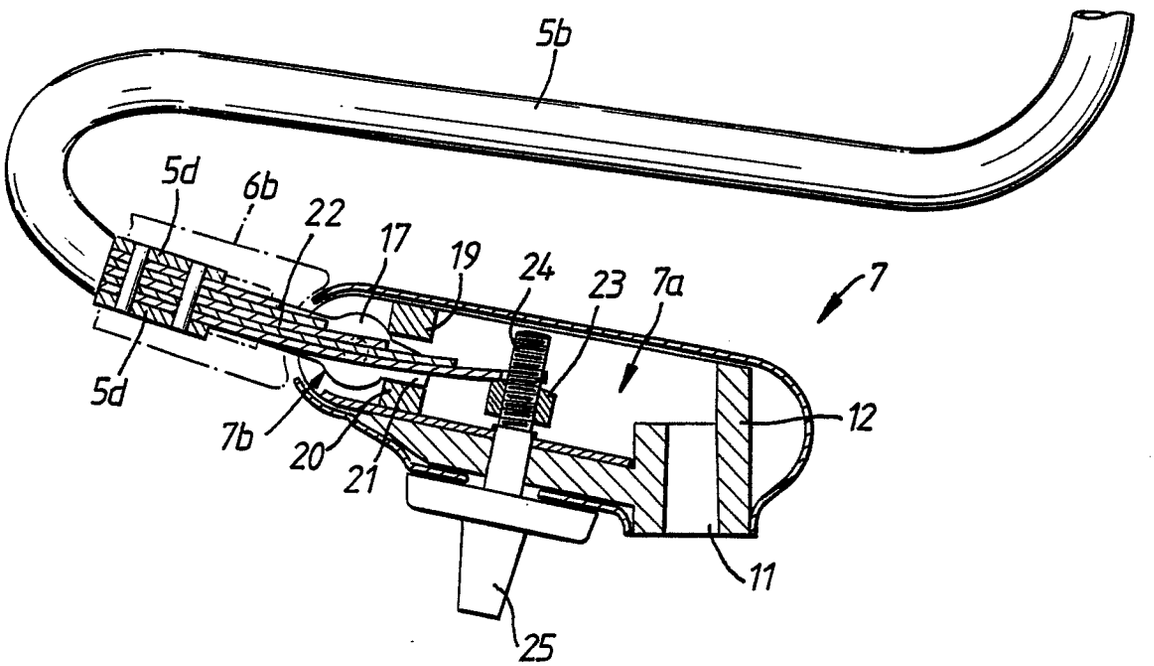

FIG.4.

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EUROPEAN SEARCH REPORT

Application Number

EP 88 30 2240

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.4)
Y	FR-A-2 267 068 (CARMET) * Pages 3-5; figures 3,5 *	1-9	A 47 C 3/026
A		18,19, 21	
Y	GB-A- 154 061 (A.HOWLETT) * Page 2, lines 14-78; figure 1 *	1-9	
A		19,21	
A	US-A-3 070 342 (J.F.BABBITT) * Whole document *	1,19	
A	US-A-4 529 247 (W.E.STUMPF et al.) * Figures 1,2; claim 1 *	20	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

A 47 C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	14-06-1988	BIRD,C.J.

CATEGORY OF CITED DOCUMENTS

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