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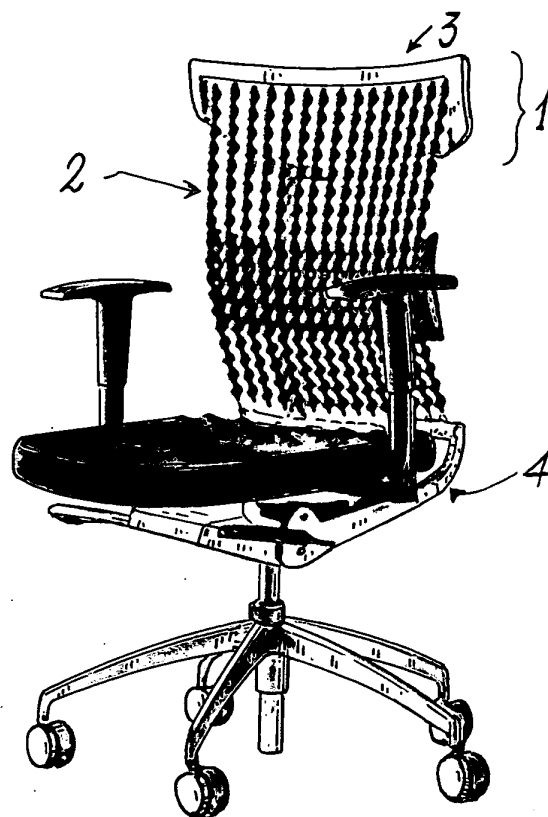
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(54) **Back-rest with elastic chains of spherical bodies**

(57) A back-rest (2) for chairs, armchairs and the like, presenting a framework with crosspieces (3,4) at its top and base between which there extend springs (7) on which bodies (8) similar to spheres are mounted free

to rotate on said springs (7), so as to form elastic chains in an intermediate position along the height of the back-rest (2) there being provided a height-adjustable transverse bearing element (10) which exerts a thrust deforming the elastic chains towards the occupant.



*FIG. 1*

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## Description

[0001] The present invention relates to the back-rest of chairs, armchairs and the like, for both domestic and office use, the back-rest satisfying the most advanced ergonomic requirements and current regulations.

[0002] The back-rest of the invention is distinguished by presenting a plurality of rows of bodies similar to spheres mounted on springs in such a manner as to form independent elastic chains. These elastic chains of substantially spherical bodies are coupled at their ends to rigid crosspieces pertaining to a structure which, in an intermediate position between said crosspieces, carries a transverse bearing element, preferably adjustable in height, which exerts a deforming thrust on the elastic chains in a direction towards the occupant.

[0003] The substantially spherical bodies are free to rotate about the springs, the elastic chain assembly forming a uniform elastic resting support surface which follows the different configurations of the human body, to exert a pleasant and healthy massaging action thereon.

[0004] The invention will be more apparent from the following detailed description provided by way of indicative example with reference to the accompanying drawings, in which:

Figure 1 is a front three-quarter perspective view of a chair provided with the back-rest of the invention;  
 Figure 2 is a three-quarter rear view of the same chair;  
 Figure 3 shows the same chair in profile;  
 Figure 4 shows the back-rest of the invention almost in profile;  
 Figure 5 is a section through the back-rest on the line V-V of Figure 3.

[0005] In the figures, the reference numeral 1 indicates overall an office chair presenting the back-rest of the invention, indicated by 2.

[0006] The back-rest 2 comprises a metal lattice structure, for example of aluminium, comprising an upper composite crosspiece 3 and a lower composite crosspiece 4; it also comprises two parallel uprights 5 and 6 joining the crosspieces together.

[0007] Specifically, the upper composite crosspiece 3 comprises a side 3a in the form of a bar or rod slightly concave towards the occupant, i.e. towards the seat of the chair; at the ends of this side there downwardly extend, arched towards the rear, two sides 3b joined to an arched lower crosspiece 3c which is concave towards the seat and spaced rearward from the side 3a. The lower crosspiece 4, formed from rod-like parts or bars, presents, where it strictly concerns the back-rest, a quadrilateral shape similar to that of the upper crosspiece 3, presenting different suitably chosen curvatures. The upper rod-like side 4a of the lower crosspiece 4 is relevant to the invention.

[0008] The two said uprights 5, 6 are connected respectively to the lower side 3c of the upper composite crosspiece 3 and to the upper side 4a of the lower composite crosspiece 4. To these two sides there are coupled in known conventional manner the ends of a series of springs 7 on which substantially spherical bodies 8 provided with tubular spacing appendices 9 are rotatably mounted. In this manner, mutually independent elastic chains are obtained on which the back of the occupant rests.

[0009] In an intermediate position between the two frame-like composite crosspieces 3 and 4 there is provided a composite transverse element 10 arched in two directions (horizontal and vertical), it being of small height but transversely involving all the elastic chains (7, 8, 9) and bearing on them to confer on them a required deformation projecting towards the occupant.

[0010] The transverse element 10 is composite in that it presents an elastically deformable expanded layer 11 on the side that bears on the elastic chains and is joined to a rigid load-bearing part 12, for example of polypropylene.

[0011] On its rear, the rigid part 12 presents a pair of parallel fins 13 which are elastically deformable by being provided with a longitudinal intermediate slot. The fins in question provide the overhang to the transverse element 10 which bears on the elastic chains (7, 8, 9), their end part, bounded by stop shoulders 15, penetrating with a certain force into through apertures 16 present in the two said connecting uprights 5, 6. The through apertures 16 have a length greater than that of the fins 13 to enable the transverse element 10 to be manually adjusted in height, by means of a certain force. The through apertures 16 are closed at their outer end by plugs 17 snap-fitted into said apertures.

[0012] Advantageously, there are also provided a pair of fins 18 which extend rearwards from the rigid part 12, in contact with the inner (or outer) side of the uprights 5, 6 to improve the stability of the rigid part 12 against lateral movements.

[0013] As will be apparent from the foregoing description and from the accompanying drawings, the load-bearing metal structure allows the elastic chains (7, 8, 9) of spherical bodies to freely deform under the thrust of the occupant but without preventing the spherical bodies 8 from rotating as the natural movements of the occupant vary, so exerting a useful, favourable and pleasing massaging action.

## Claims

1. A back-rest for chairs, armchairs and the like, for domestic and office use, **characterised by** comprising a plurality of independent elastic chains formed from an elastic core on which substantially spherical bodies are rotatably mounted, said chains being connected at their ends to a rigid structure

shaped such that the spheres remain free to rotate even when the occupant leans on them, on said chains there resting an intermediate bearing element in such a manner as to confer on the chain assembly a non-rectilinear pattern.

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2. A back-rest as claimed in claim 1, wherein the intermediate bearing element is projectingly supported by uprights of the rigid structure.

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3. A back-rest as claimed in claims 1 and 2, wherein the intermediate bearing element presents elastically deformable fins partially insertable with a certain force into longitudinal apertures in the uprights.

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4. A back-rest as claimed in claims 1, 2 and 3, wherein the intermediate bearing element is adjustable in height.

5. A back-rest as claimed in claims 1, 2, 3 and 4, wherein for the purposes of the height adjustment the length of the apertures is greater than that of the fins.

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6. A back-rest as claimed in claims 1, 2, 3, 4 and 5, wherein the intermediate bearing element is profiled and presents an elastically deformable covering on that side facing the elastic chains.

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7. A back-rest as claimed in claims 1, 2, 3, 4, 5 and 6, wherein the intermediate bearing element presents a pair of fins which extend rearwards, in contact with the inner or outer sides of the uprights.

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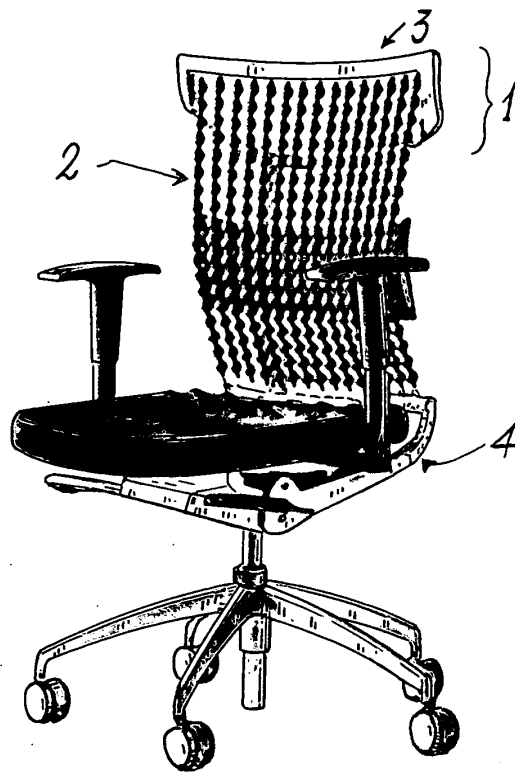


FIG. 1

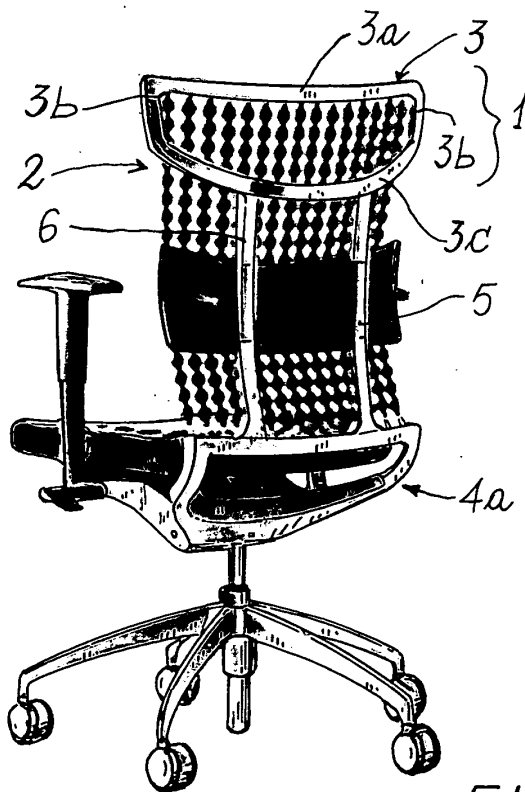


FIG. 2

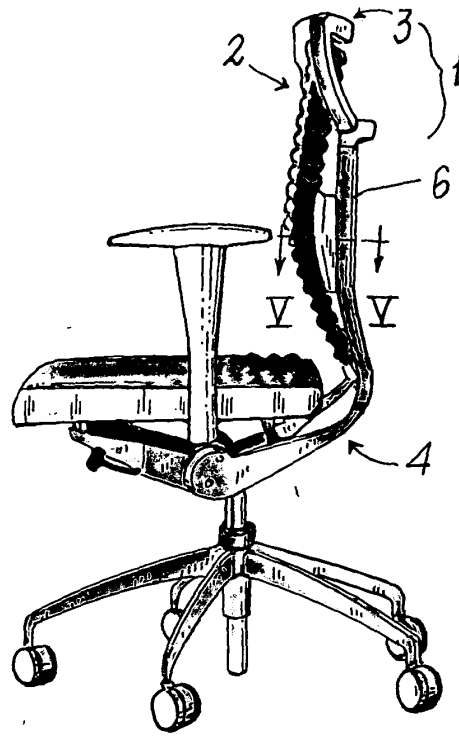


FIG. 3

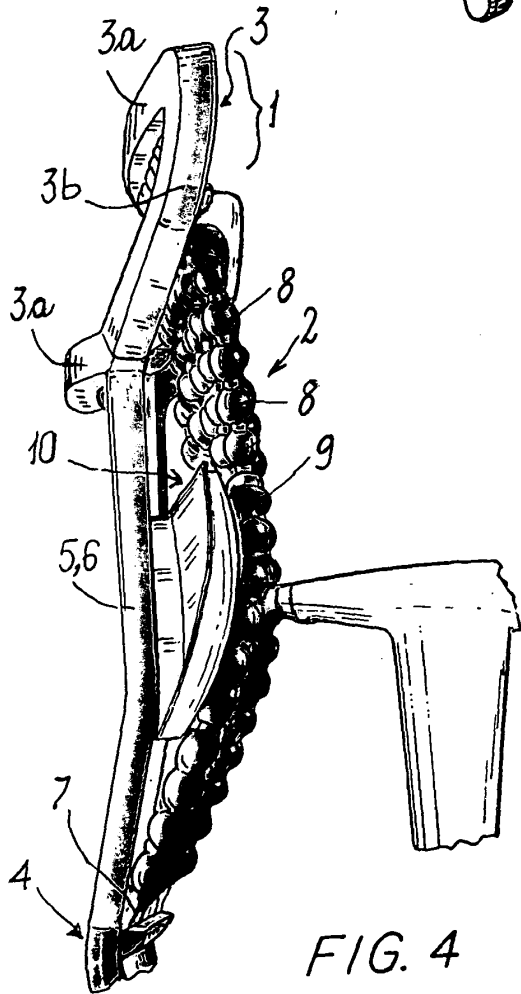


FIG. 4

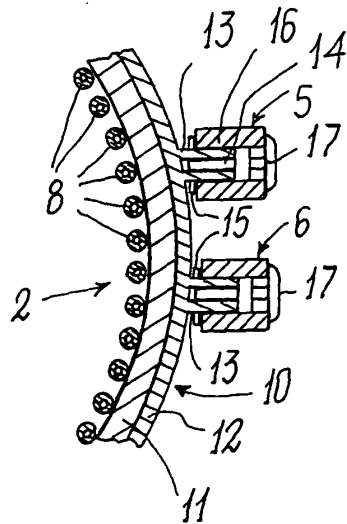


FIG. 5



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EUROPEAN SEARCH REPORT

Application Number  
EP 03 02 3323

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
Y	DE 202 07 665 U (VAJA MOEBEL GROSHANDEL IMP EXP) 10 October 2002 (2002-10-10) * the whole document *	1-7	A47C7/40 A61H1/00
Y	US 6 334 650 B1 (CHIEN-CHUAN CHENG) 1 January 2002 (2002-01-01) * column 2, line 44 - column 4, line 59; figures 1-13 *	1-7	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			A47C A61H
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 4 February 2004	Examiner Klintebäck, D
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**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 03 02 3323

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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04-02-2004

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82