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(54) Item of furniture for sitting.

(57) Item of furniture for sitting, consisting of a rear casing (1) and a forward padded element (2). The casing is composed of a continuous wall provided on its internal surface with a reinforcing element (8-9), this wall being subdivided into a seat zone (5), a back zone (6) and an intermediate transition zone (7). The zone (6) is elastically deformable in the transverse direction and under torsion. The reinforcing element includes a rigid frame (8) and certain straps (9) that are elastically deformable in the transverse direction and which are secured at the bottom to the rigid frame, while at the top they are connected to the back zone (6), with partial freedom of displacement. The padded element includes an intermediate portion (18) with a lenticular transverse cross-section, coinciding with the transition zone (7) of the casing.

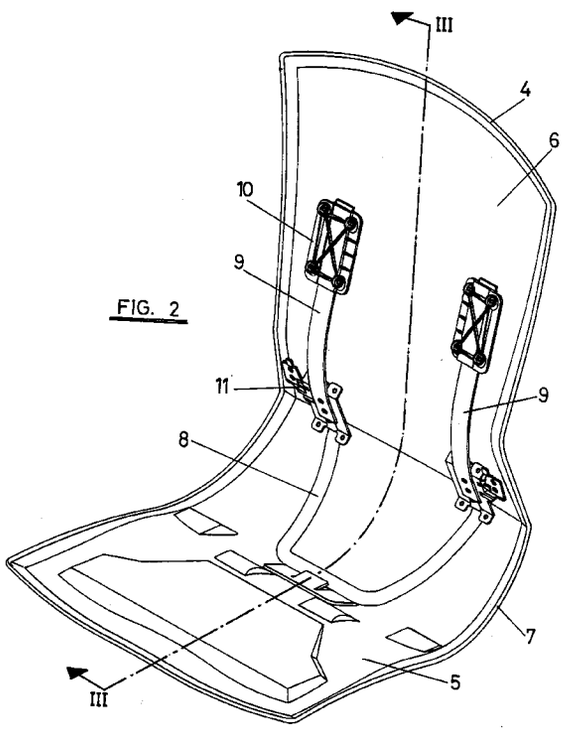

FIG. 2

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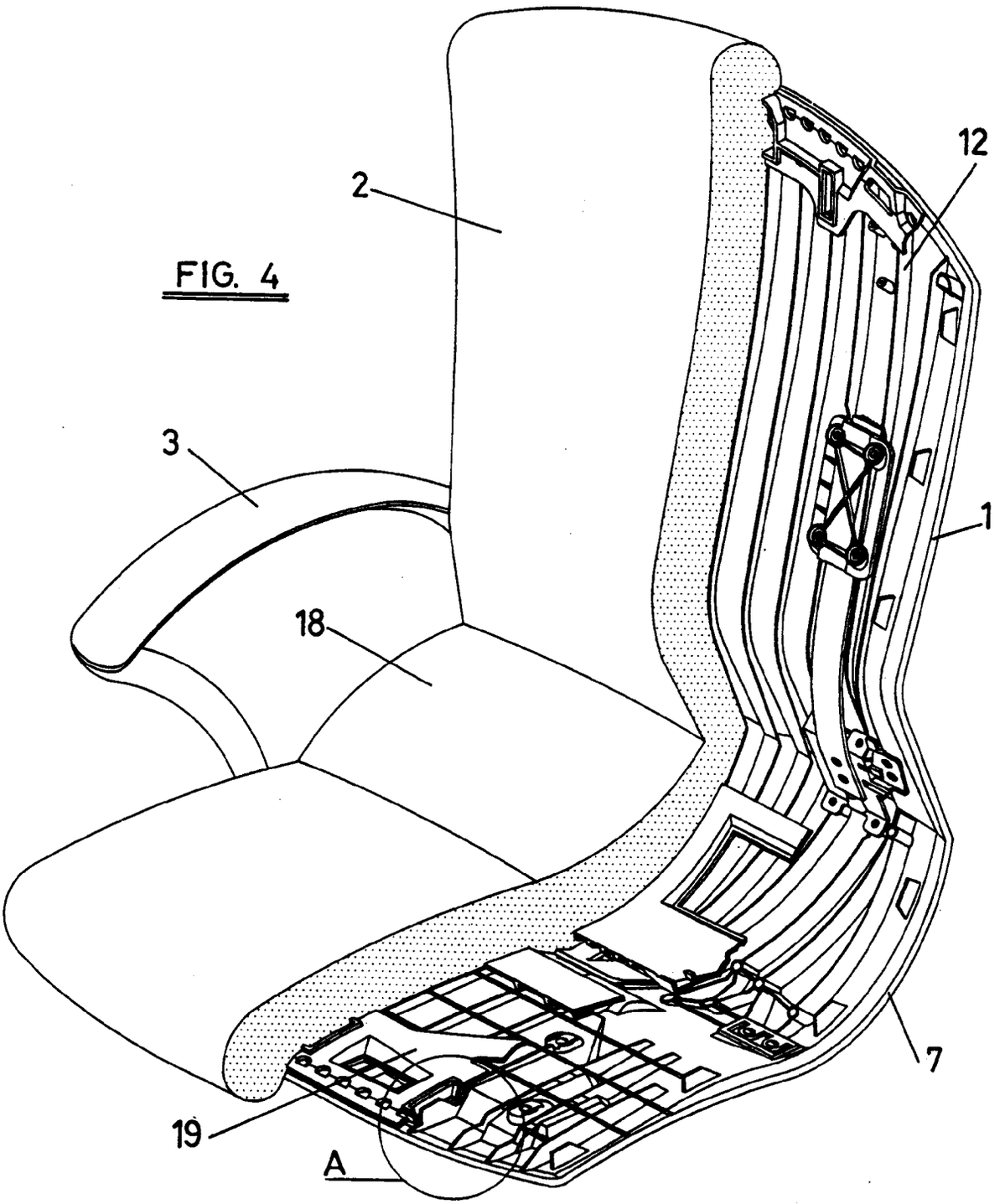
FIG. 4



This invention concerns an item of furniture for sitting, composed of a rear casing or shell of a plastic material, a forward padded element backing on to and secured to the internal surface of the casing or shell, and a lower support element, which can take the form of a central column, support legs or runners, etc.

More specifically, the invention's item of furniture for sitting is of the type known as "ergonomic", generally used in work places, whether in the form of an armchair or ordinary chair, in any of their variants. Encompassed within this type of furniture for sitting are all those offering excellent support anatomy and which also allow easy adjustment of that anatomy and of its position in accordance with the movements or wishes of the user.

The adjustments in position and anatomy of the surfaces of the seat and the back are generally achieved by combining the capacity for partial deformation of the body defining the seat and back of the chair with the action of an adjustment mechanism linking the seat body with the lower support element.

The present invention is directed towards the body defining the seat and back, which can be used for creating any kind of armchair or ordinary chair and which can also be combined with an adjustment mechanism for obtaining excellent conditions of support and comfort.

More specifically, the invention concerns an item of furniture for seating in which the body defining the seat and back, hereafter referred to as the seat body, is composed of a single-piece rear casing and a forward padded element, the whole unit having a certain capacity for deformation in particular zones, allowing elastic balancing of the back to be obtained.

An armchair or ordinary chair that includes a seat body composed of a rear casing or shell and a forward padded element is already known from European patents Nº 309.368 and 309.369. The rear shell or casing, obtained from a single piece of plastic material, has a virtually rigid nature except in an intermediate zone of the back, where there is longitudinal flexibility allowing deformation of the back to be obtained only in the longitudinal direction of the back. This flexibility is achieved by means of the formation in the said intermediate zone of the back of a structure consisting of parallel rigid transverse blocks, consecutively connected among themselves by means of internal membranes with greater flexibility. The capacity for deformation of the structure thus formed will depend on the number of blocks and membranes, as well as on the width and nature of these membranes. The shell or casing includes a metallic structure that extends below the rear part of the seat, crosses the shell and is prolonged over the internal surface of the back as far as the region of the flexible intermediate zone of that back.

This solution presents the problem that the deformation of the back can exceed the desired limits if a relatively large force is applied to it.

Moreover, the formation of the stated structure considerably increases the manufacturing costs of the shell or casing and requires the use of materials capable of withstanding high cycles of deformation, since otherwise premature breakage could take place of some of the membranes forming part of that structure.

The metallic structure of the casing only has rigidization functions and, moreover, it crosses the casing, which requires complicated assembly processes.

The present invention has as its object an item of furniture for sitting, in which the shell or casing of the seat body is made from a single piece, without sharp discontinuities or interruptions, and with controlled flexibility sufficient for obtaining a capacity for elastic deformation in certain zones and in a magnitude and direction such that allow certain excellent conditions of support and comfort to be attained. With the casing of the invention an elastic balancing of the back is achieved, while a situation of comfortable and secure support is maintained, whatever might be the position of the occupant.

In accordance with the present invention, the casing of the seat body is composed of a continuous, transversely flexible wall to which is fixed on its internal surface a reinforcing element designed in such a way that it provides rigidity for certain parts of the casing and allows a certain controlled flexibility in other parts of that casing.

Moreover, in accordance with the invention, the wall of the casing is subdivided into three zones, a lower seat zone, an upper back zone and an intermediate transition zone.

The reinforcing element mentioned above includes a rigid frame and certain straps that are elastically flexible in the transverse direction. The rigid frame runs over the transition zone and is slightly extended over the seat zone on one side and over the back side on the opposite side. The straps run longitudinally over the middle part of the back zone, to which they are connected at their upper ends with partial freedom of longitudinal displacement, while at their lower ends they are secured to the rigid frame. The straps will have a resistance to upper transverse flexion of the casing, and will preferably be made of steel.

With the design mentioned above, in order to cause deformation of the back towards the rear, it will be necessary to apply a relatively small force initially, sufficient for overcoming solely the resistance of the casing or shell, until the capacity for relative longitudinal displacement between that shell and the straps is exhausted. From that moment on, greater effort will be required for being able to carry on deforming the back, sufficient for achieving elastic deformation of the straps, which ensures that the initial rest position

of the back is recovered when the effort causing its deformation ceases.

The capacity for deformation of the casing can in addition be controlled by means of rigidizing ribs of variable height that project and run along the internal surface of the casing.

The characteristics of the invention's item of furniture, as contained in the patent claims, as well as the advantages deriving from them, will be able to be understood more easily with the following description, made with the aid of the attached diagrams, in which in shown a non-restrictive example of the design.

In the diagrams:

Figure 1 is a side elevation view of a seat body designed in accordance with the invention.

Figure 2 is a forward perspective view of the casing or shell of the seat body of figure 1.

Figure 3 is a vertical cross-section taken along the line of cut III-III of figure 2.

Figure 4 is a forward perspective view of the seat body, in partial cross-section.

Figure 5 is a perspective view on a larger scale of the securing for the upper end of one of the straps to the casing.

Figure 6 is a cross-section of the upper securing for the straps, taken along the line of cut VI-VI of figure 5.

Figure 7 corresponds to detail A of figure 4, on a larger scale.

Figure 8 is a cross-section taken along the line of cut VIII-VIII of figure 7.

The seat body represented in figure 1 is composed of a rear semi-rigid casing or shell, referenced with number 1, and of a forward padded element 2 which backs on to and is fixed to the internal surface of the casing 1. This seat body will be mounted on a lower support element, not represented here, which can take the form of a central column, support legs or runners, etc., and which can also include a mechanism for adjusting the inclination of the seat body. The seat body can also have side arms 3 for taking the form of an armchair, or it can lack them.

In accordance with the invention, the casing or shell 1, represented in figures 2 and 3, is composed of a transversely flexible continuous wall 4. This wall can be provided on its internal surface with longitudinal ribs of variable height with the aim of controlling its rigidity, as shall be explained below. The wall 4 shapes a lower seat zone 5, an upper back zone 6 and an intermediate transition zone 7.

Fixed to the internal surface of the wall 4 is a reinforcing element consisting of a rigid frame 8 and certain straps 9 that are elastically flexible in the transverse direction. As can be better appreciated from figure 2, the rigid frame 8 crosses the intermediate transition zone 7 and is slightly extended over the seat zone 5 on one side, and over the back zone 7 on the opposite side. The said straps 9 run longitudinally over the middle part of the back zone 6. These straps are fixed by their upper ends to the wall 4 by means of securings 10 that allow a certain capacity for relative longitudinal displacement of the straps with respect to the said wall 4, while at the lower ends these straps are fixed to the rigid frame and to the wall 4 by means of securings 11, which can also serve for fixing the arms 3, figure 1.

The straps 9, preferably made of steel, will have a resistance to transverse flexion greater than that of the upper zone of the back 6.

The reinforcing element composed of the frame 8 and the straps 9 serves to provide rigidity for the transition zone of the shell and for controlling the flexion of the back zone. The rigid frame 8 can consist of an inverted U formed from a tubular profile, with the U adopting a transverse curvature coincident with that of the internal surface of the casing to which it is applied.

As has been stated above, the wall 4 of the casing or shell is provided on its internal surface with longitudinal ribs 12, figure 4, which will act as rigidizing elements, the height of those ribs being varied in accordance with the rigidity that it is wished to achieve.

The securings 10 for the straps can include a plate 13, which is fixed to the wall 4 of the casing and which defines a longitudinal passage 14, with the strap 9 running between the bottom of that passage and the internal surface of the wall 4. The facing surfaces of the passage 14 and the wall 4 of the casing can be provided with longitudinal ribs 15 that will rest on the surfaces of the straps 9, all this as can be better appreciated from figures 5 and 6.

With the described design for the securing 10, relative displacement will be allowed between the straps 9 and the plates 13. This capacity for displacement is restricted due to the means of mutual engagement which, as can be appreciated from figure 6, can consist of an opening or window 16 formed in the strips 9 and in a facing projection 17 extending from the plate 13, by its internal surface and which is introduced via the said window. The projection 17 will have a length less than that of the window 16, the difference in this lengths determining the capacity for longitudinal displacement of the strips 9 with respect to the plates 13 and, therefore, of the passage defined between that plate and the seat zone 6 of the casing.

With the design described, when the back of the seat body is pushed to the rear, transverse flexion of it occurs thanks to the large capacity for flexion of the casing 1. This flexion causes relative displacement between the strips 9 and the passage defined between the plate 13 and the back zone 6, until the projection 17 of the plate 13 rests against the lower edge of the opening 16 of the strips 9, figure 6. From that moment on the strip and casing form a unitary deformable structure, which considerably increases the

resistance to flexion in such a way that if it is desired to increase the deformation of the back it will be necessary to overcome the elastic resistance of the straps 9 and casing 1, without relative displacement. The elastic deformation of these straps will ensure that the original rest position of the back zone 7 is recovered when the effort that caused its deformation ceases.

Moreover, the straps 9 allow the back to be able to withstand great stresses without degrees of deformation being reached that would be undesirable for the back.

A further advantage deriving from the inclusion of the straps 9 is that the back zone 7 can enjoy a certain capacity for torsional movements which can occur when the user inclines the back more towards one side than to the other, due to the possibility of independent displacement of both straps.

The inclusion of the straps 9 also allows the back zone 6 to reach the desired height, with the aim of offering complete support for the user's back as far as the shoulders.

Combining the capacity for flexion of the wall 1 of the casing and of the straps 9, the deformation of the back will include an initial phase, involving only the capacity for flexion of the back zone 6, and demanding a relatively small effort, and a second phase, starting from which the projection 17 rests on the lower edge of the window 16 of the straps 9, figure 6, in which those straps and back are involved, offering resistance to flexion greater than that of the back 6 alone.

As can be appreciated from figures 1 and 4, the casing is shaped in such a way that it admits a filling element 2, which includes a portion 18 with a lenticular cross-section coincident with the transition zone 7 of the casing. This shape will offer perfect support for the pelvic zone, allowing the spinal column to be maintained in a suitable position.

As is usual in this type of furniture, the padded element 2 includes a frame 19 via which and by means of securing clips this padded element can be attached to the casing 1.

As can be appreciated from figure 7, the casing 1 is provided on its internal surface with lugs 20, which can be shaped from the same ribs 12 of the casing. Fitted on these lugs 20 and straddling them are retaining clips 21 provided with securing studs and tabs, which can, for example, take the shape represented in figures 7 and 8. The lugs 20, with the clips 21 duly secured to them, are introduced via facing openings or windows 22 formed in the frame 19 of the padded element 2.

The securing system described above allows the padded element 2 to be fitted and removed as many times as is wished, thanks to the elasticity of the securing studs and lugs of the clips 21.

All the lugs 20 and clips 21 are orientated in the longitudinal direction along the casing 1, allowing a certain capacity for relative displacement between casing and padded element, which secures the coupling cavity whatever might be the movements of the user's body, and without creating tensions that would tend to detach the padded element.

As can be understood, clips with a different design, and even a different system of fitting the padded system, could be used.

Claims

1.- Item of furniture for sitting, consisting of a single-piece rear casing or shell, having a certain capacity for elastic deformation, and a forward padded element, backing onto and fixed to the internal surface of the casing, characterized by the fact that the said casing is composed of a continuous wall that has a reinforcing element fixed to its internal surface; which wall is subdivided into three zones, a lower seat zone, and upper back zone and an intermediate transition zone, the upper back zone being elastically deformable in the transverse direction and under torsion; and which reinforcing element includes a rigid frame running over the transition zone and extending slightly over the seat zone on one side and over the back side on the opposite side, and by certain straps which are elastically flexible in the transverse direction and which longitudinally run over the middle part of the back zone, to which they are connected by their extreme ends with partial freedom of longitudinal displacement, while at the lower ends they are secured to the rigid frame; the said flexible straps having a resistance to transverse flexion greater than that of the upper back zone.

2.- Item of furniture according to patent claim 1, characterized by the fact that the lower rigid frame consists of a U-shape formed from a tubular profile having a transverse curvature coincident with the vertical profile of the transition zone and which is fixed to the casing over the seat and back zones close to the said transition zone.

3.- Item of furniture according to patent claim 1, characterized by the fact that the upper portion of each strap is mounted with freedom of partial axial displacement in a passage defined between the internal surface of the back and a braking plate fixed to that back; the back and plate offering facing surfaces for displacement over the strip; the plate and strip also being provided with means of mutual engagement that restricts the strip's capacity for displacement with respect to the plate.

4.- Item of furniture according to patent claim 3, characterized by the fact that the facing displacement surfaces of the plate and back consist of longitudinal ribs, which rest against the strip.

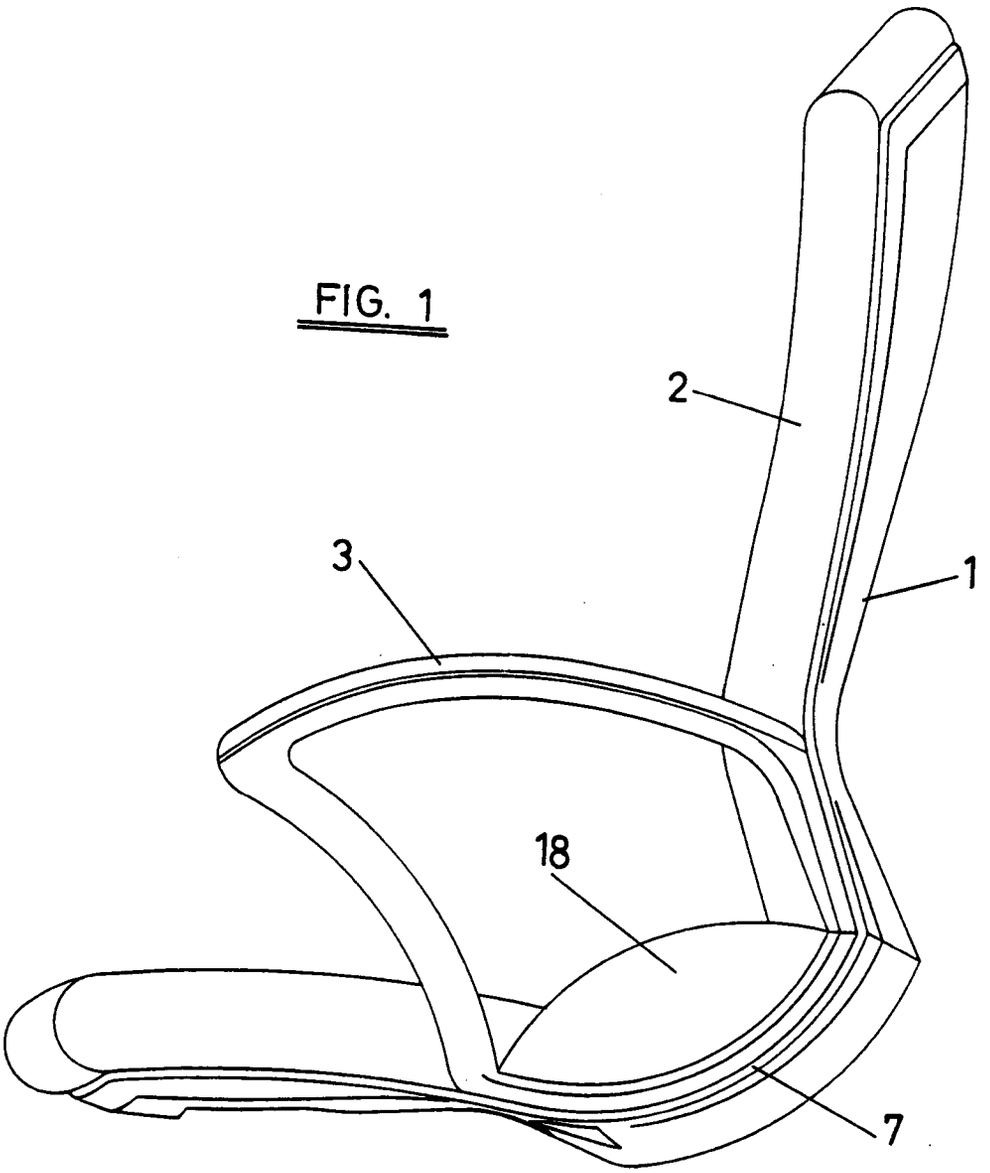
5.- Item of furniture according to patent claim 3,

characterized by the fact that the means restricting the capacity for displacement between strip and plate consist of a window offered by the strip and of a facing projection that extends from the plate and is introduced via the said window, the projection having a length less than that of the window, the difference in length between window and projection defining the capacity for displacement of the strip with respect to the plate.

6.- Item of furniture according to patent claim 1, characterized by the fact that the padded element includes an intermediate portion of lenticular transverse cross-section, coincident with the transition zone of the casing.

7.- Item of furniture according to patent claim 1, characterized by the fact that the casing is provided on its internal surface with longitudinal ribs of variable height for modifying the flexion capacity of that casing, and of lugs on which clips are fixed for attaching the padded element.

FIG. 1



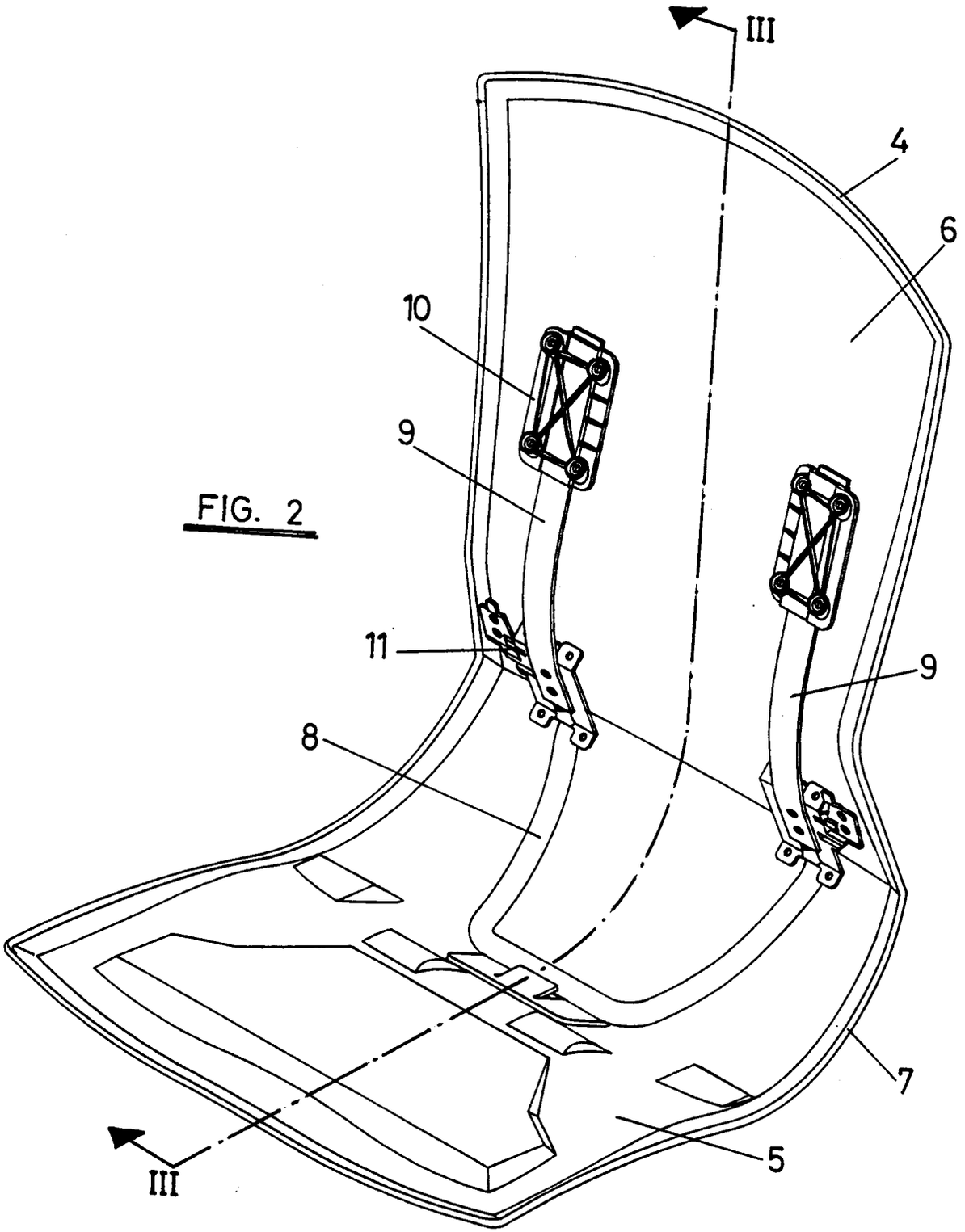


FIG. 2

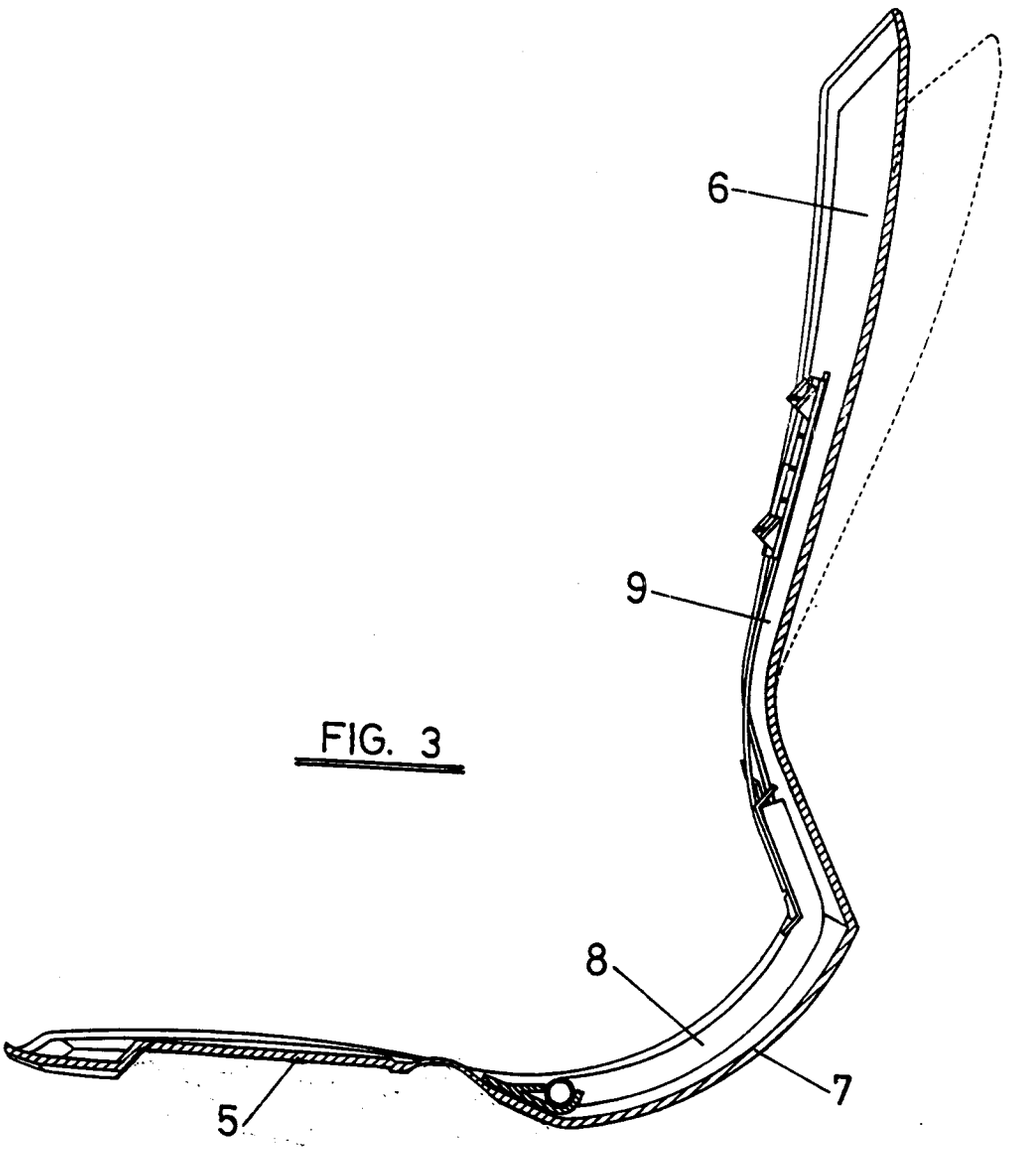
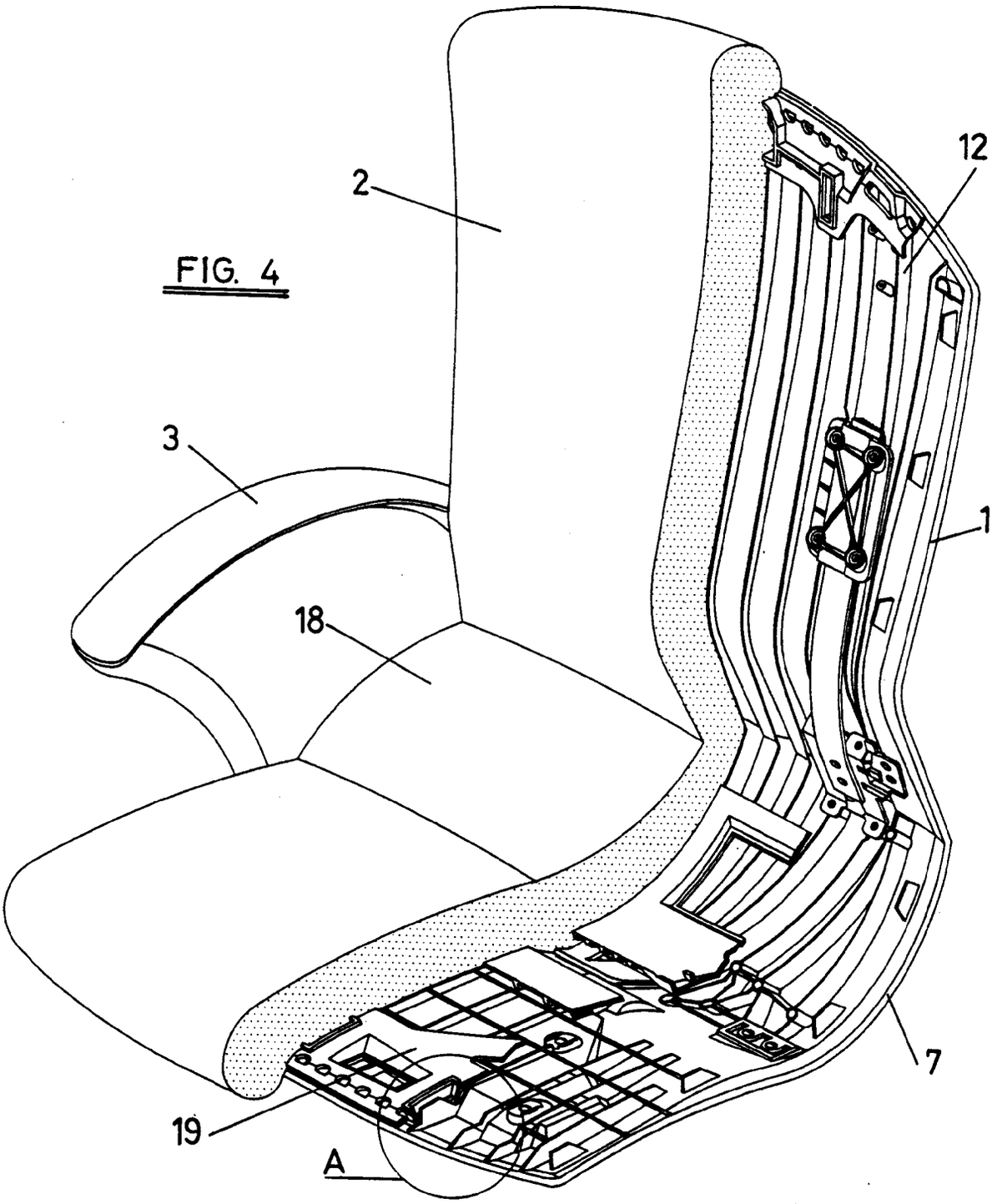


FIG. 3

FIG. 4



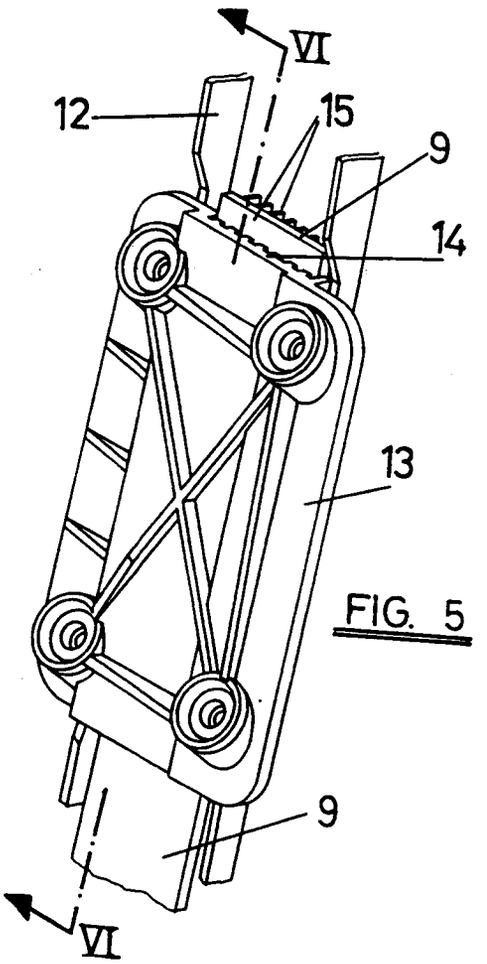


FIG. 5

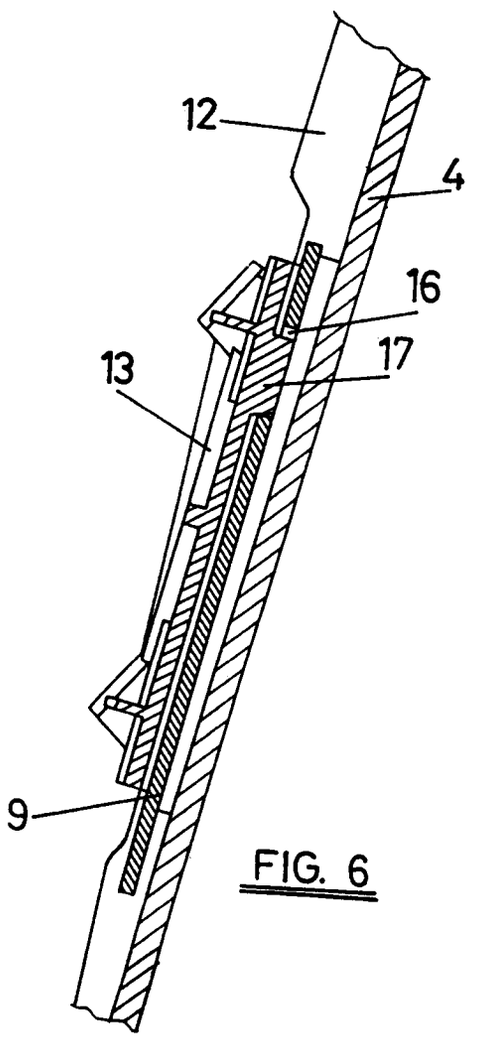


FIG. 6

FIG. 7

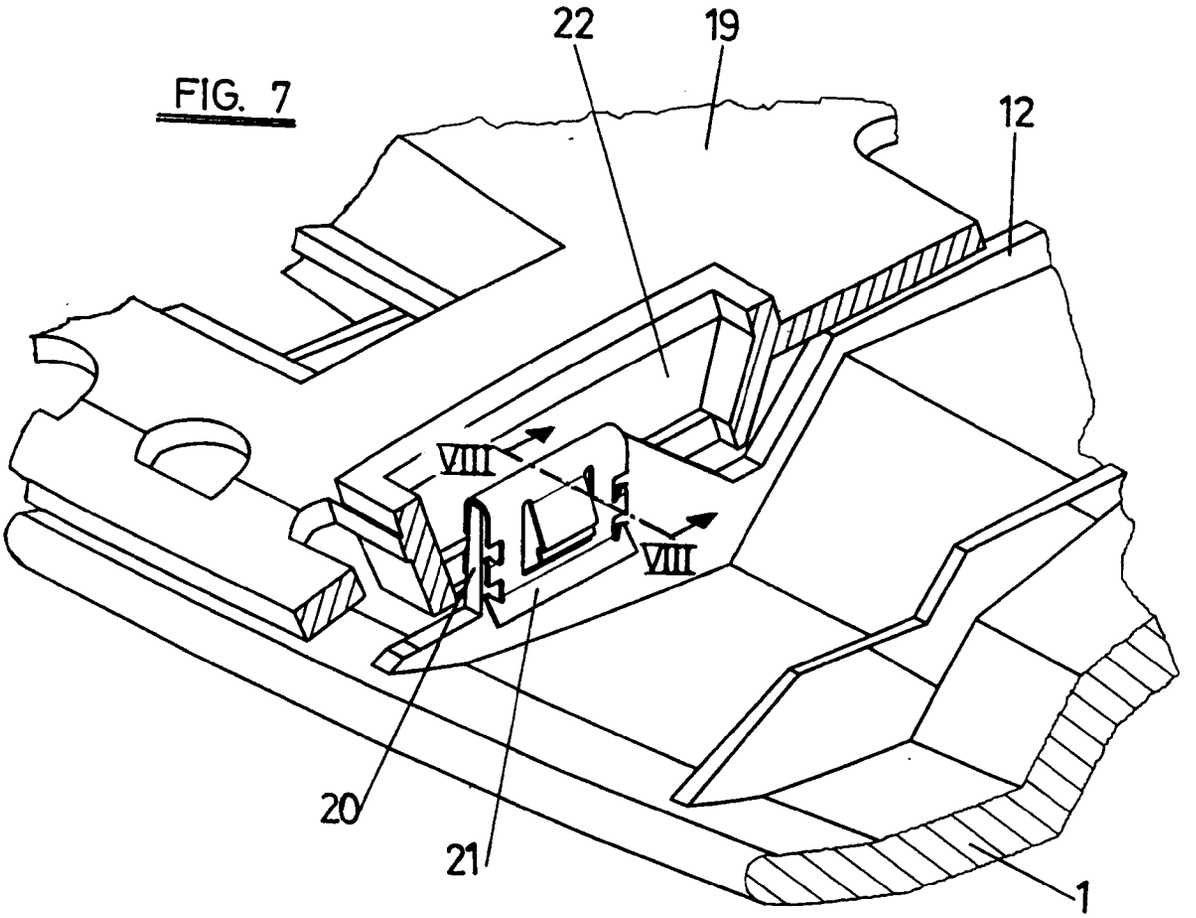
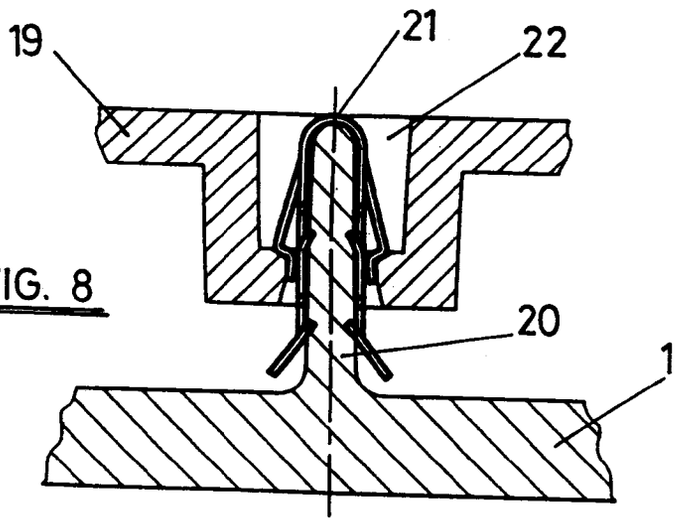


FIG. 8



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EUROPEAN SEARCH REPORT

Application Number
EP 95 50 0026

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)
A	EP-A-0 107 627 (CASTELLI) * page 20, line 3 - line 26; figures 37,38 *	1	A47C7/44 A47C3/12
A	EP-A-0 277 912 (EQUUS MARKETING)		
A	WO-A-87 04909 (LOHMEYER)		
A	AT-B-384 537 (WIESNER-HAGER)		
A	DE-U-88 06 924 (PROTONED)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A47C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	17 July 1995	VandeVondele, J

CATEGORY OF CITED DOCUMENTS

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