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(54) **Upholstered furniture.**

(57) An article of upholstered furniture, such as a chair, settee or bed, is constructed by forming a frame as an assembly comprising a pair of end members (11) and a plurality of spacer members (13, 14, 15) adapted to be loosely assembled with the end members without forming a rigid frame, and the frame (10) is rigidified by tensioning means (20) comprising resilient elements which draw the end members (11) onto the spacer elements (13, 14, 15). Preferably the tensioning means comprises a suspension (21-28) which, in use, supports the weight of a person resiliently.

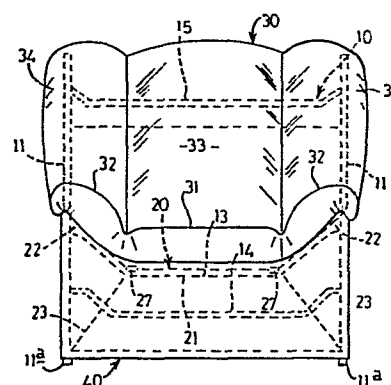


FIG 1

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Title: "Upholstered Furniture"

This invention concerns upholstered furniture of the kind comprising a frame portion formed from substantially rigid members and an upholstered or support portion on which a person may sit or lie, formed from flexible material.

Conventionally, such upholstered furniture comprises a rigid frame structure formed from a substantial number of pieces, traditionally made of wood, fitted together by means of rigid joints, whilst the support portion typically includes a number of springs and/or a cushion, with suitable padding and a fabric cover. In some cases, a resilient foamed material may be used instead of springs.

However, the construction and assembly of such upholstered furniture requires skill and often craftsmanship, with the result that the product is on the one hand expensive, and on the other hand not suitable for supply in a knock-down form for self-assembly by the purchaser.

In such conventional constructions, the frame portion is necessarily an independently rigid structure which serves to carry the support portion and the load imposed thereon when it is in use. By contrast, the present invention provides such upholstered furniture wherein the frame portion is constructed as an inherently non-rigid assembly which is held in a substantially rigid condition by resilient tensioning means.

More specifically, the frame portion may comprise a pair of end members and a plurality of spacer members adapted to be loosely assembled therewith to maintain the end members in spaced relation without forming a rigid frame, and the tensioning means may comprise one or more resilient elements which are maintained in a state of tension to draw said end members onto said spacer members and thereby hold the frame portion as a whole in a rigid condition.

In this context, "rigid" means sufficiently rigid for normal use. By utilising a frame structure which is not inherently rigid to the degree normally required, the various components can be made less expensively to relaxed tolerances and can if desired be assembled easily by the purchaser rather than by expensive skilled factory labour or craftsmen.

In addition to said end members, the frame portion may incorporate one or more intermediate members in spaced parallel relation thereto, and in this case the spacer members may extend between a respective end member and such an intermediate member, and also between such intermediate members as necessary.

Preferably, the tensioning means is tensioned after it is assembled with the end members. For this purpose, one or more of the spacer members may comprise two elongate elements connected hingedly together in an over-centre manner so as to apply tension to the resilient elements as the elongate elements are brought into alignment and lock in position on continued movement over centre to maintain said resilient elements in a tensioned state, but preferably the tensioning means is simply tensioned as the spacer members are assembled with the end members.

In a preferred arrangement, the tensioning means is afforded by the support portion itself. This may comprise at least one web of material, all or part of which is resiliently extensible, at least in one direction, such web being firmly attached to the end members at its margins. More conveniently, in this case the or each web is a composite comprising at least two panels of a substantially non-extensible fabric joined together in side-by-side relation by means of a resiliently extensible strip. Preferably, a single web is employed and comprises a central panel of said substantially non-extensible fabric having respective strips of said resiliently extensible material at opposed lateral edges thereof, each such resilient strip having two further, outer panels of said substantially non-extensible material attached at its outermost edge, the outer panels being attached to the end members at positions spaced apart transversely relative to the plane of the central panel.

The outer panels are preferably arranged to extend over and around the edges of the end member to which they are attached. Additionally, such outer panel may have a rigid member secured along at least part of its free edge, which rigid member is, in use, disposed in face-to-face engagement with the outermost lateral face of the end member to facilitate assembly of the spacer members with the end members. This arrangement may be employed where the web requires special shaping for example to give a rounded contour which extends in a transverse direction between the two end members, for example at the upper edge of an upright chair back, or at the forward edge of a chair seat. Thus, for example, the upper outer panel may have a rigid semi-circular or D-shaped member secured to an end portion

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thereof so that such end portion is pre-shaped to fit over a similarly shaped part of the end member.

The web may also incorporate suitable padding or foam material as an integral cushion shaped as appropriate to give any desired contour to the upholstered part, and such padding may extend wholly or partially over the edge of the end members to which the web is attached. Alternatively, such padding or foam material may be provided as a separate cushion component located on the web.

Instead of utilising the support portion to serve as the tensioning means for holding the frame in a rigid condition, it is alternatively possible to employ tensioning elements which are separate from the support portion. Thus the end members may be drawn onto the spacer members by means of coiled tension springs which may act between the end members or between the end members and the spacer members themselves. Instead of tension springs, strips of rubber or other similar resilient material may be arranged to extend between the end members to draw them onto the spacer members, or between the end members and the spacer members to draw them together.

In this case, the support portion may be loosely assembled with the frame portion, or secured by suitable fastening elements. Alternatively, the support portion may be constructed as previously described so as to be tensioned when assembled with the frame portion and thereby assist the tensioning means in rigidifying the frame.

The support portion and frame portion collectively may be enclosed in an outer cover, which may itself include suitable padding or foam material in addition to, or instead of, such material on the web of the support part.

The invention may be applied to the construction of chairs and settees having a generally upright backrest, without arms or with one or two arms, or to the construction of items of furniture without backrests such as stools, footrests or bed or divans.

The invention also resides in a kit of parts for assembly into such an article of furniture in which the tensioning means are secured to the end members, and the spacer members are not assembled with the end members, and a method of constructing such an article of furniture in which the tensioning means are tensioned by assembling the spacer members with the end members after the tensioning means are assembled with the end members.

The invention will now be described by way of example, with reference to the accompanying drawings, wherein:-

FIGURE 1 shows one embodiment of completed armchair in front elevation;

FIGURE 2 shows the armchair in side elevation, omitting an outer cover;

FIGURE 3 shows a rear perspective view of a frame portion and seat suspension of the armchair when partly assembled; and

FIGURE 4 shows a transverse section illustrating an intermediate support used in a modification for the construction of a settee.

Referring firstly to Figures 1 to 3, the armchair shown therein comprises four main parts, namely a frame 10, a support portion in the form of a seat suspension 20, a shaped cushion 30 and an outer cover 40.

The frame includes two identical generally L-shaped end members 11 which are spaced apart by means of three rails 13 to 15. The frame members 11 to 15 are not themselves adapted to form a rigid frame structure by virtue of the clearances afforded to their interfitting parts, but they are held together in an effectively rigid manner by means of the seat suspension 20 as hereinafter described in more detail.

The end members 11 may be formed as panels of wood, chipboard, plywood, metal, or plastic materials, or any combination of such materials, preferably affording integral feet 11a. As shown, the end members 11 may be substantially flat, or they may be curved in one or both dimensions. The rails 13 to 15 may be made of any similar materials having the necessary strength and rigidity. Each rail terminates in two or more spigots 13a to 15a which are received within corresponding sockets formed in the end members 11, in the manner of a rather loose-fitting mortice and tenon joint. It is particularly to be noted that the spigots and sockets are not made to such close tolerances that they can be assembled accurately to form a rigid joint. By contrast, such "joints" are designed to be relatively loose so as to facilitate assembly, and whilst rectangular section spigot and socket connections are illustrated, any other appropriate form of male/female fixing may be employed for this purpose.

Whilst the embodiment illustrated in Figures 1 to 3 employs three such rails, it will be appreciated that this number may vary. Where appropriate, some or all of the rails may be of curved, rather than straight, form and may be in the form of solid, or hollow, rods, or as shown boards or panels, as most appropriate for the particular design under construction.

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It will be seen that the frame structure 10 is of particularly simple construction, especially when compared with the traditionally constructed frame normally utilised for an armchair of this general type.

The end members 11 as previously mentioned are held in effectively rigid association with the rails 13 to 15 by means of the seat suspension 20. In the illustrated embodiment, the suspension comprises a seat portion and a back portion each formed similarly from a web of material comprising five flexible panels. In each case, a central panel 21, 24 is formed from a substantially non-extensible material, such as a woven polypropylene material. At the lateral margins each panel 21, 24 is bonded into respective resilient strips 27, 28 which may be made of a synthetic rubber, for example as described in British Patents 1,443,826 and 1,500,725 of Pirelli Limited.

At the laterally opposed edges of each central panel 21, 24, the respective resilient strips 27, 28 each carry two further outer panels 22, 23, or 25, 26. These panels diverge relative to one another in the direction away from the central panel and are secured at their outer edges by any suitable means to opposite edges of the end members 11. For example, as illustrated, marginal portions 22a, 23a, 25a, 26a of the panels are folded over the edges of the end members and be secured to the outer face of the end members by means of staples or the like.

At least the in-use uppermost lateral panels 22 and 25 are preferably made of a substantially non-extensible material similar to that of which the central panels 21 and 24 are made, and are attached to the upper and forward edges of the horizontal and upright limbs of the end members.

The lowermost outer panels 23 and 26 are similarly attached to the lower and rear edges of the horizontal and upright limbs of the end members 11, but may be made of either substantially non-extensible material, or resilient material.

The panels which make up the seat suspension 20 are so dimensioned that when secured to the end members 11 as spaced apart by the rails 13-15 the seat suspension 20 is under tension, by virtue of the resilience of the strips 27, 28 to an extent sufficient to draw the end members 11 firmly onto the rails 13 to 15 and thereby render the frame structure effectively rigid despite the relatively loose fit afforded by the connections between the rails and the end members as previously described.

The edges 22a, 23a, 25a and 26a of the outer panels of the seat suspension may be secured to the end members 11 by staples or other suitable

means during manufacture before the rails 13 to 15 are assembled with the end members. The construction can be completed in the factory or the chair can be packed in an unassembled condition for final assembly by the purchaser.

For the purpose of tensioning the seat suspension 20, some or all of the rails 13 to 15 may comprise two separate pieces hingedly connected together in the mid-region of the rail in such a manner as to enable the pieces to adopt an over-centre relationship in which the rail is effectively rigid. In this case, the rail may initially be assembled with the end members 11 while it is in its "broken" condition. The two pieces may then be straightened, thereby applying the necessary tension to the seat suspension 20 as the rail approaches its "centre" condition, and finally the pieces may be moved past centre into an over-centre condition in which they lock together so that the rail is then rigid at least with respect to forces in the longitudinal direction. If necessary, the two pieces of each rail may then be fixedly connected together in that condition, for example by means of a rigid connection plate attached to both pieces across the hinge. However, in practice it has been found satisfactory simply to use rigid rails and to stretch the seat suspension as the rails are assembled with the end members and seat suspension.

The seat suspension 20 carries the shaped cushion 30 which may be made of any suitable material, such as padding or resilient foamed plastics material. In the case of the illustrated armchair, the cushion 30 defines a seat portion 31 flanked by arm portions 32 and a back portion 33 flanked by wings 34, but other designs may readily be developed.

However, to facilitate the shaping of the upper end of the seat back, the uppermost outer panels 25 include flaps 29 which engage over the appropriately shaped upper end portions 19 of the upright limbs of the end members 11 in face-to-face contact with the outer faces thereof. Such flaps are conveniently secured to the end members by any suitable kind of releasably fasteners. In particular, it is possible to employ on the flaps 29 and end members 11, patches 19_a, 29_a of a fabric material of the kind presented hooked filaments whereby the patches may readily be secured together detachably in face-to-face relation. Alternatively, in some cases, the panels 25 may have a rigid D-shaped member attached instead of the flaps 29, such D-shaped member fitting over the upper end 19 of the end member 11.

To complete the chair, an external cover 40 is adapted to fit over at least the frame 10 and optionally over the cushion 30 if this is not itself finished with a suitable covering. Alternatively, the cover could contain the cushion.

Instead of securing the pairs of outer panels 22, 23 and 25, 26 at their free edges 22a, 23a, 25a, 26a to the end members 11, it would alternatively be possible to join the panels of each pair together either by means of an intermediate panel of non-extensible material or by extending one or both panels and joining their edges directly to form a tube or sleeve in which the appropriate end member is received, so that in use, the outer face of the end panel would be covered by said panels.

Alternatively, particularly but not exclusively in the case of chairs without arms or other similar articles of furniture, the whole of the suspension may be formed as a tube or sleeve with spaced upper and lower webs extending respectively between the upper and lower edges of the end members. As a further alternative, two separate webs could be used.

Whilst the seat suspension as illustrated consists of one single unit incorporating both seat and back portions, it would alternatively be possible in some cases to employ two separate suspensions, one for the seat and one for the back of the chair.

By omitting the raised back entirely, a footrest or stool could also be manufactured in a similar manner, and by extending the length of the end members as appropriate, it would be possible to construct a bed or divan in a similar manner with the end members of the frame portion extending along the length of the bed.

Some or all of the outer panels 22, 23, 25, 26 could be replaced by webbing or by substantially rigid, non-extensible board. In some instances, at least the uppermost outer panels could be replaced by rubber strips or springs to serve as the means for tensioning the frame 10.

A settee may be constructed in a generally similar manner, but as illustrated in Figure 4, one or more intermediate members 12 are provided at positions between the end members and in parallel relationship therewith. In Figure 4, the same references are used as for corresponding parts shown in Figures 1 to 3. At the division between adjacent seat places in such a settee, a generally L-shaped intermediate member 12 extends in a plane parallel to the end members 11 and affords an horizontal limb 16 and an upright limb 17. In this case, rails 13, 14 and 15 are duplicated on either side of the

intermediate member so as to act between the latter and the respective end member. In the case of a three-seater or four-seater settee, similar intermediate members could be provided at each seat division, with sets of rails 13-15 extending between them.

Alternatively, full length rails could extend between the two end members and be braced at the division between seat places by struts equivalent to the limbs 16 and 17. One or more of each intermediate members 12 or any equivalent horizontal struts may if required be formed with floor-engaging feet similar to feet 11a.

Above the horizontal limb 16, the seat suspension 20 incorporates an intermediate support assembly 35 comprising an upper member 36 which is semi-flexible, such as a strip of plywood, a lower rigid member 38 which engages the upper edge of the stretcher 29, and between the members 36 and 38 a resilient member 37, such as a block of foamed material. Alternatively, the semi-flexible member may be embedded within the foamed material. A similar support assembly may be provided, if desired, on the seat back in engagement with the upright limbs 17.

Instead of utilising the seat suspension 20 to serve as the tensioning means for holding the end members 11 and rails 13 to 15 in a rigid condition, together with any intermediate members 12, it is alternatively possible to employ separate tensioning elements. Thus, for example, the end members 11 may be drawn onto the spacer members 13-15 by means of coiled tension springs which act directly between the end members. However, to reduce the required length of such springs, it is preferable for such tension springs to be arranged to be connected between the end members 11 and points in the respective spacer members at positions spaced from the ends thereof. Instead of utilising coiled springs, it would alternatively be possible to use lengths of resiliently extensible material such as rubber in a similar manner. However, more preferably, each of the spacer members 13 to 15 would be provided with transversely extending strips secured thereto at positions adjacent to, but spaced inwardly from, the ends thereof which engage the inner faces of the end members 11. Such strips could be made of a similar material to the resilient strips 27 which form part of the seat suspension previously described. The free edges of such strips would then be secured to the inner faces of the end members in any appropriate manner so as to place the strips in tension and draw the end members and spacer members together.

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In a case where such separate tensioning means is provided, the seat suspension need not be tensioned between the end members 11, but could simply be assembled loosely with the frame, or secured thereto by suitable fastening means. However, a seat suspension 20 of the type shown in Figures 1 and 2 may be employed so as to provide additional tensioning for the frame members.

It will be appreciated that the constructions described above are much simpler than the conventional framework used in the construction of upholstered chairs and the like, such framework being constructed rigidly and often requiring the use of a large number of different members assembled together by means of rigid joints into a load bearing framework. By contrast, in accordance with the invention, an armchair or the like can be constructed from two identical end members and a set of cross rails. By the use of differently contoured cushions, the same framework can be used to provide a wide range of different styles of upholstered chair and of course the range of styles can further be extended by the use of a comparatively small number of different end members and rails. In this way, it is possible to produce chairs, as illustrated with arms and wings on both sides, or on only one side for use as an end unit, or without arms for use as a centre unit which can be placed adjacent to similar units in various combinations selected by the user or in some cases used as a separate chair. By simple modification of the shape of the end members, similar chairs can be formed without wings. Instead of employing generally L-shaped end members, the upright limbs thereof may be omitted in order to make items of furniture such as stools, beds and divans.

Castors or gliders could be fitted at the lower edges of the end members, instead of forming the latter with feet 11a as illustrated.

Instead of enclosing the whole chair in an outer, loose cover, it would alternatively be possible to finish the outer faces of the end members 11 in an appropriate manner or to face them with decorative panels. A similar decorative panel could be attached to the rail 13 at the forward edge of the seat, or alternatively a cushion could be extended downwardly over the rail 13. The cushion would then be covered with a suitable material which may be formed as a separate cover, or an integrally formed surface layer. The open back and underside of the chair may be covered by any suitable fabric, which, if made from a non-extensible material, will reduce the risk of accidental displacement of the end members from the spacer members, for example if the chair is dragged sideways across the floor. For a similar purpose a strap

or web of non-extensible material could be secured between the opposed end members.

The essential feature of the invention is that tension obtained from the seat suspension and/or separate tensioning means, draws the end members onto the rails and thereby makes the frame effectively rigid, despite the absence of inherently rigid joints between the frame members. This is preferably achieved by the use, in combination, of non-extensible material, for example panels 21 and 22 and resilient elements, such as strips 27, the materials used being so chosen that the seat suspension is preferably extensible only in one dimension, namely cross-wise relative to the end members. Alternatively, separate or additional tensioning members, such as springs, may be used as previously described.

Furniture in accordance with the invention can utilise parts manufactured to relaxed tolerances as compared with traditional frame components, can be assembled using less skilled labour, and can afford a wide range of designs based on a limited number of different parts, thereby making the manufacturing process less expensive.

Additionally, such furniture is suitable for sale as a kit of parts for self-assembly by a purchaser.

CLAIMS:

1. An article of upholstered furniture comprising a frame portion formed from substantially rigid members and a support portion on which a person may sit or lie, characterised in that the frame portion (10) is constructed as an inherently non-rigid assembly including a pair of end members (11) and a plurality of spacer members (13,14,15) adapted to be loosely assembled therewith to maintain the end members in spaced relation without forming a rigid frame, and tensioning means (20) which comprises one or more resilient elements (27,28) which are maintained in a state of tension to draw said end members (11) onto said spacer members (13,14,15) and thereby hold the frame portion (10) as a whole in a rigid condition.
2. An article according to Claim 1 wherein the frame portion (10) incorporates one or more intermediate members (12) in spaced parallel relation to said end members (11).
3. An article according to Claim 2 wherein respective sets of spacer members (13,14,15) extend from a respective end member (11) to an intermediate member (12) and one or more further sets of spacer members extend between intermediate members (12) when there is more than one such intermediate member.
4. An article according to any one of the preceding claims wherein said tensioning means (20) is afforded by said support portion.
5. An article according to Claim 4 wherein said support portion comprises a web of material, all or part of which is resiliently extensible, at least in one direction, such web being firmly attached to the end members (11) at its margins.
6. An article according to Claim 5 wherein said web is a composite comprising at least two panels of substantially non-extensible fabric (21-26) joined together in side-by-side relation by means of a resiliently extensible strip (27,28).

7. An article according to Claim 6 wherein said composite web comprises a central panel (21,24) of said substantially non-extensible fabric having respective strips (27,28) of said resiliently extensible material at opposed lateral edges thereof, each such resilient strip having two further, outer panels (22,23;25,26) of said substantially non-extensible material attached at their outermost edges, the outer panels engaging the end members (11) at positions spaced apart transversely relative to the plane of the central panel (21,24).

8. An article according to Claim 7 wherein said outer panels (22,23;25,26) have marginal portions (22_a,23_a;25_a,26_a) which extend over and around edges of the end members (11) to which they are attached.

9. An article according to any one of Claims 4 to 8 wherein the web supports a cushion (30) of padding or foam material shaped to give a desired contour to the support portion.

10. An article according to any one of Claims 1 to 3 wherein said tensioning means comprise a plurality of tensioning elements which are separate from and additional to said support portion.

11. A kit of parts for assembly into an article of upholstered furniture as claimed in any one of the preceding claims wherein said tensioning means are secured to said end members and said spacer members are not assembled with said end members.

12. A method of constructing an article of upholstered furniture as claimed in any one of the preceding claims wherein said tensioning means are assembled with said end members in an untensioned condition before said spacer members are assembled with said end members and then tensioned by assembly of said spacer members with said end members.

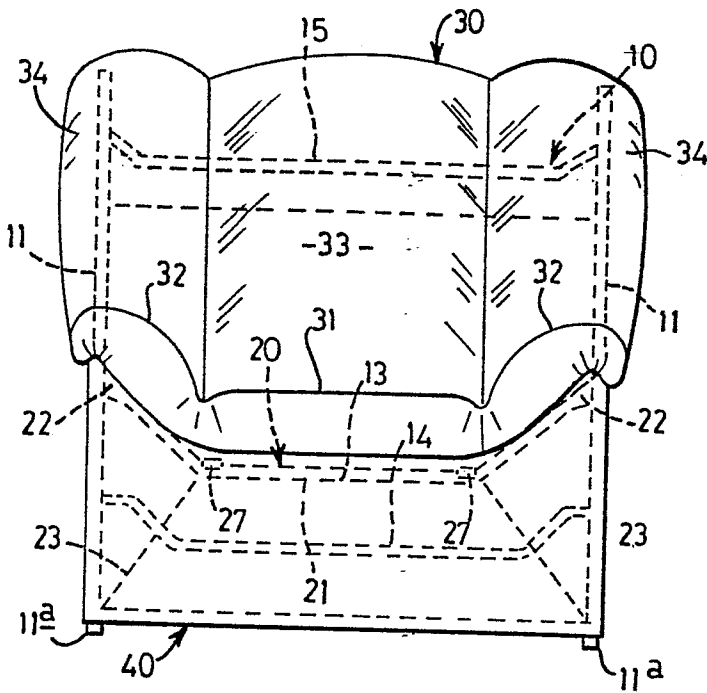


FIG 1

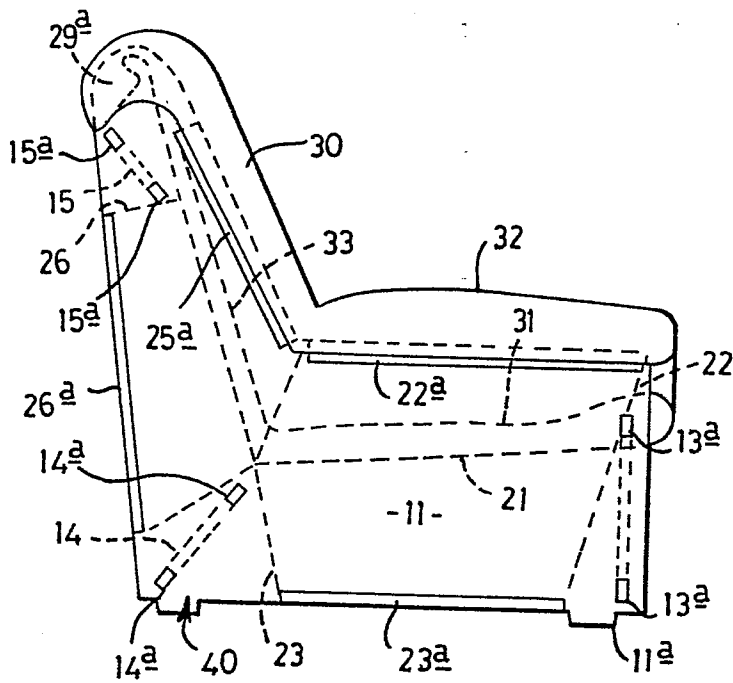
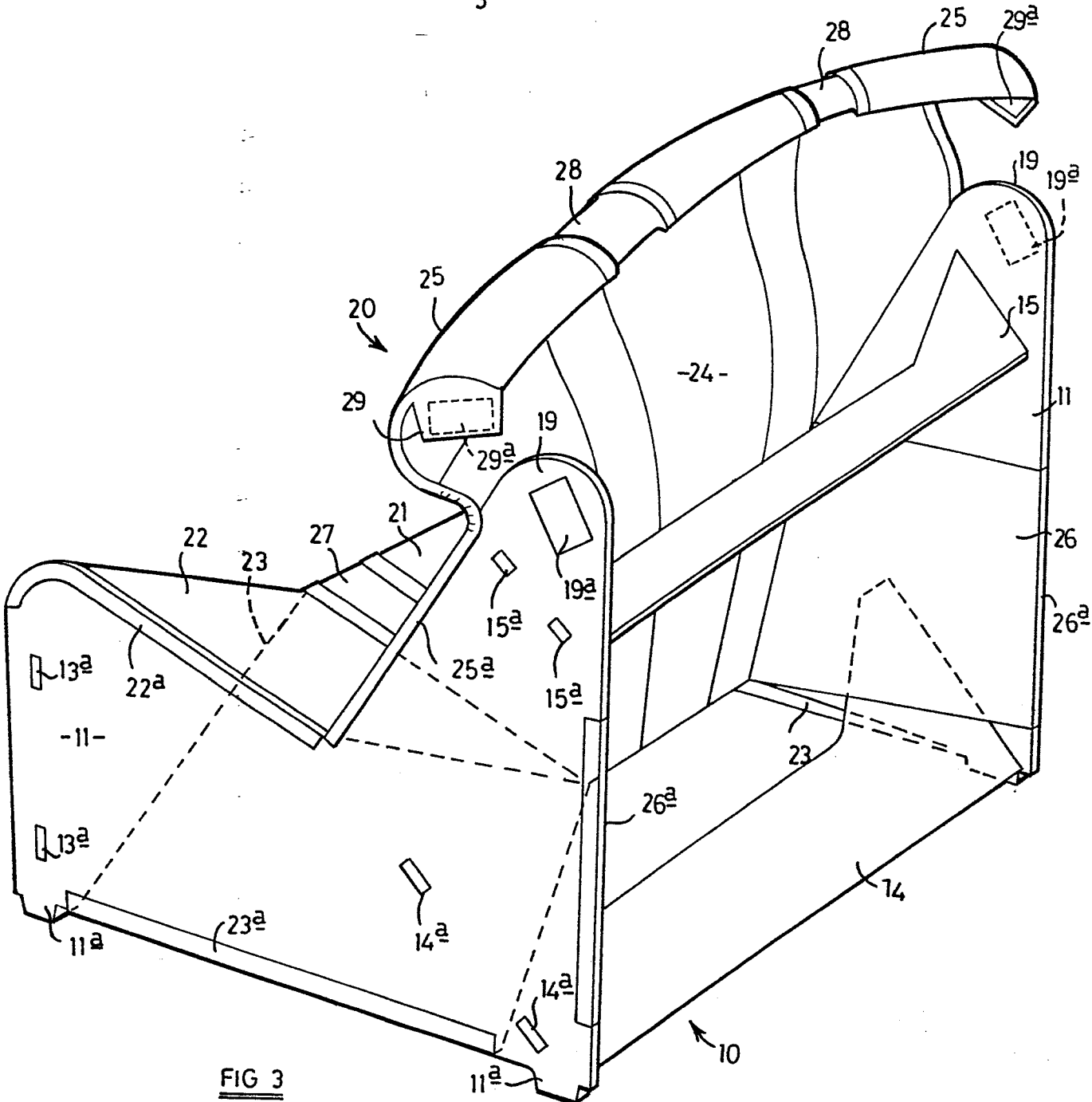
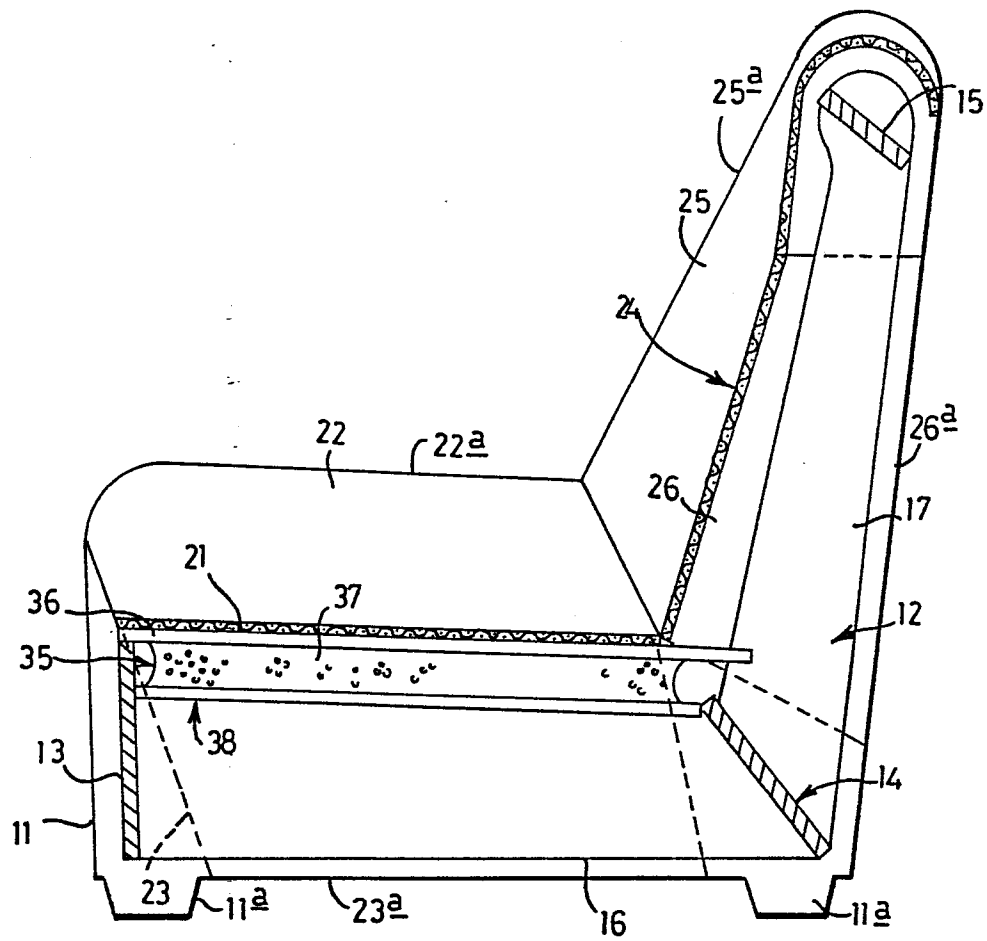


FIG 2

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FIG. 4.



European Patent
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EUROPEAN SEARCH REPORT

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Application number

EP 84 11 3788

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)
X	US-A-4 092 049 (SCHOBLOM) * Abstract; column 2, lines 18-68; figures *	1	A 47 C 4/02
A	---	2-5, 9, 11, 12	
X	US-A-3 643 997 (GILBERT) * Column 1, line 43 - column 2, line 9; figures *	1	
A	---	8	TECHNICAL FIELDS SEARCHED (Int. Cl.4) A 47 C
A	FR-A-2 157 204 (MARIUS GUETAT) * Page 3, line 2 - page 4, line 2; figures 1, 2 *	1, 6	
D, A	GB-A-1 443 826 (CHUBB) * Page 1, line 59 - page 2, line 34; figure *	7	
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
THE HAGUE		13-02-1985	MUTTOCK
CATEGORY OF CITED DOCUMENTS 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 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			