

Sept. 25, 1956

H. E. DONOHUE

2,764,228

BODY-SUPPORTING FURNITURE AND METHOD OF MAKING THE SAME

Filed Oct. 17, 1952

2 Sheets-Sheet 1

FIG. 1.

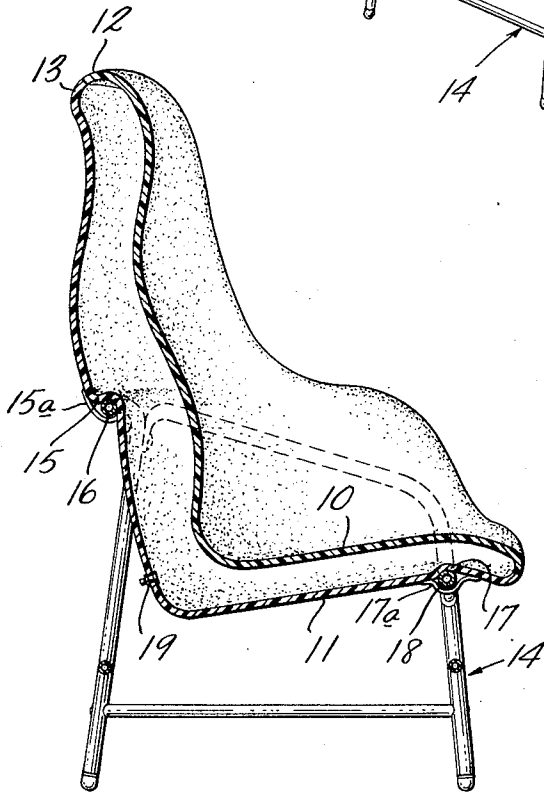
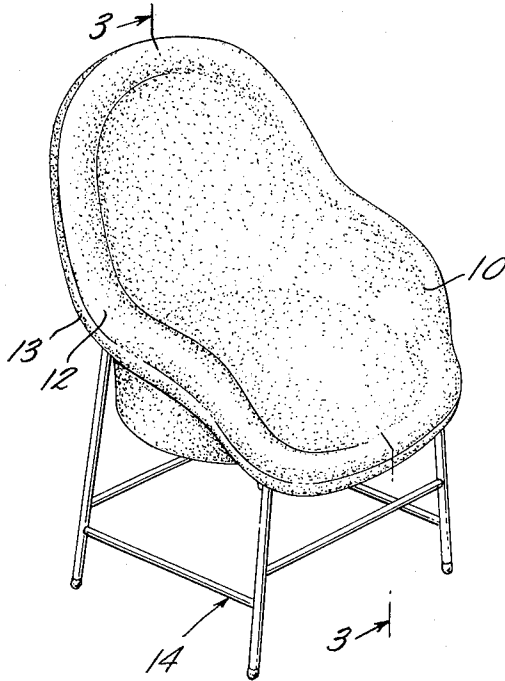


FIG. 3.

INVENTOR.  
HARRY E. DONOHUE.

BY  
*Campbell, Bramblett, Rice & Graves*  
HIS ATTORNEYS

Sept. 25, 1956

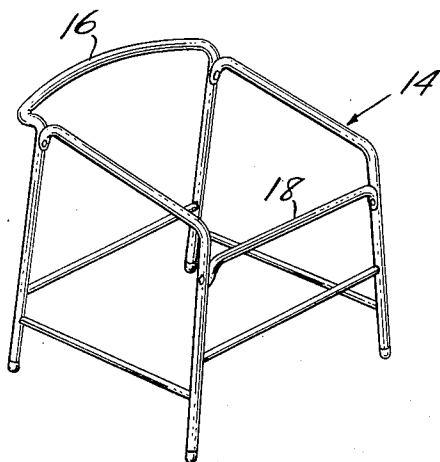
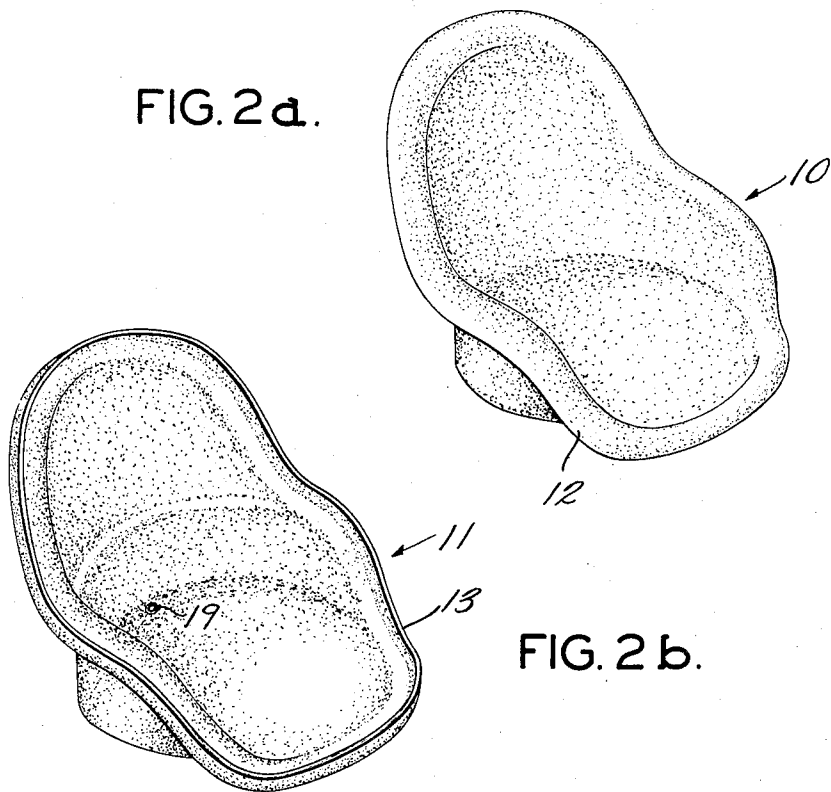
H. E. DONOHUE

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Filed Oct. 17, 1952

2 Sheets-Sheet 2



INVENTOR.  
HARRY E. DONOHUE

BY  
*Campbell, Brambaugh, Price & Graves*  
his ATTORNEYS

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2,764,228

**BODY-SUPPORTING FURNITURE AND METHOD OF MAKING THE SAME**

Harry E. Donohue, Ossining, N. Y.

Application October 17, 1952, Serial No. 315,248

2 Claims. (Cl. 155—179)

This invention is concerned with furniture and more particularly with body-supporting furniture such as chairs and seats and methods of fabricating the same.

Improvements and discoveries in fabricating materials and in molding techniques have resulted in the development and commercial success of radically contoured objects such as form-fitting seats and the like which are not necessarily limited in their external geometry by internal framing requirements. In such objects the external shell is used to a large extent to afford the structural rigidity normally imparted by the internal supporting frame. Seats formed by these techniques, however, have tended to lack resilience and softness in their body-engaging portions. Further, their fabrication has tended to require the use of costly and elaborate equipment such as heavy duty presses, for example.

It is, therefore, one object of this invention to provide new and improved furniture, particularly furniture having body-engaging portions such as chairs, seats and the like.

It is another object of this invention to provide contoured furniture, light in weight but having high durability and aesthetic appeal, and which may be fabricated by relatively inexpensive manufacturing techniques.

It is still another object of the invention to provide furniture such as chairs, seats and the like having form-fitting or form-accommodating portions affording softness and resilience.

These and other features may be attained in accordance with the present invention by forming the body-engaging portion of furniture of a sheet material such, for example, as plastic impregnated fabric, which may be initially softened to permit molding or shaping under low pressures into a desired form. The sheet material is then caused to set or harden so as to maintain the established form. A complete unit may be formed by a combination of two or more contoured sheet portions which are adapted to be mated to form a self-supporting unit having certain of the appearances and characteristics of deep upholstered furniture of the type built over an internal frame. Preferably the individual sheet portions are so shaped that when mated they define a substantially closed air space which may impart resilience to the body-engaging portions somewhat in the manner of a pneumatic cushion but without requiring the supplementary supporting structure normally used with pneumatic or other cushions.

In a preferred embodiment of the invention the body-engaging portion may be made of sheet material which is less hard relative to the other portions. Thus a back portion may be fully hardened and a front or body-engaging portion made to preserve certain flexibility. When mated to define an internal air space, the back portion will impart rigidity, with the weight of the seated person being transmitted thereto partly through the confined air and partly through the connection between the front and back portions. The relatively softer front portion may assume to a certain degree the shape of the seated person.

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The unit may be supported on any desired leg assembly which may or may not be permanently attached, and if desired, a suitable covering material such as conventional upholstery fabric may be bonded to the exposed surfaces of the unit for decorative appeal or to meet particular service conditions.

The invention as well as other features and objects thereof may be better understood from the following detailed description of a preferred embodiment thereof, having reference to the accompanying drawings in which:

Figure 1 is a view in perspective of a chair assembly formed in accordance with the present invention;

Figure 2a is a view in perspective of a body-engaging section of the chair of Figure 1 shown isolated from the chair assembly;

Figure 2b is a view in perspective of the back section of the chair shown isolated from the chair assembly and which is adapted to be mated with the section of Figure 2a;

Figure 2c is a view in perspective of a typical leg assembly which might be used to support the chair; and

Figure 3 is a view in vertical section taken on the line 3—3 of Fig. 1, looking in the direction of the arrows.

In accordance with the present invention a piece of furniture may be provided comprising a plurality of cooperating sections each imparting a particular mechanical characteristic to the finished unit. A representative embodiment of the invention as illustrated in the drawing, for example, comprises a chair which may be formed of contoured front and back sections identified by the numerals 10 and 11, respectively. The back section 11 is preferably formed of a single contoured sheet of material, the details of a preferred form of which are described below, which is relatively rigid in its established shape. The front or body-engaging section 10 may be formed in part or totally of somewhat softer and less rigid sheet material than the back section so as to afford limited flexibility and resilience under body weights.

As one means of effecting a union between the two sections, the front section 10 may be formed along its periphery with a rounded and rearwardly directed lip 12, the edge of which is adapted to closely abut the edge of a forwardly directed lip 13 along the periphery of the back section 11. The mated edges of the front and back sections may be sealed the full way around as by bonding, gluing or sealing with a supplemental tape, for example, to provide a substantially closed air space between the sections, which are preferably imperforate.

The assembled unit is adapted to be supported on any suitable frame such as the leg assembly 14. To facilitate the seating of the unit on the leg assembly 14, the back section 11 may be formed, for example, in its vertical surface with a transverse shelf portion 15 adapted to rest on a cross member 16 of the leg assembly, as best seen in Fig. 3. The under portion of the horizontal surface may be formed with a recess 17 to receive a cross member 18 of the leg assembly. If desired, suitable latch means 15a and 17a may be provided to secure the chair unit to the leg assembly, either permanently or separably, as desired. The air space within the mated front and back sections of the chair is preferably closed, as stated, to afford a cushioning effect simulating more conventional soft chairs, and if desired, an air valve fitting 19 may be provided whereby the air content of the space may be conveniently varied to control the firmness and resilience of the seat. The thickness imparted to this frameless chair by the mated sections gives the appearance of a more conventional deep upholstered chair having the usual complex internal framing and cushioning structure.

As a preferred means of fabricating the chair assembly a cloth fabric impregnated with plastic may be used as

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the basic sheet material. When treated with a plasticizer the plastic becomes soft and pliable and while in this state the sheet material may be conveniently and easily shaped over a suitable mold or frame into the desired contours. The plastic in the sheet material subsequently sets and holds the sheet material in the established shape. The ratio of the plastic to the fabric and the nature of the base fabric itself determine the rigidity of the finished product. In most cases the back section should be made sufficiently rigid as to substantially maintain its pre-established shape under loadings normally imparted to such objects of furniture. The front section may of course be less rigid, as described below. A particular material which has been found to be useful in the fabrication of chairs in accordance with the present invention is double napped felted cotton flannel impregnated with cellulose nitrate and a suitable fire retardant. After softening with a suitable solvent, such for example as acetone, the material will harden, usually within 12 to 24 hours, to a strong, lightweight material which may be made as hard as wood. Sheet thickness can of course be varied and it is possible to laminate two or more sheets using, if desired, the plastic impregnant as the bonding agent.

In the illustrated embodiment of the invention two different molds are used, one for the front which preferably conforms more or less to the contours of the seated body (as best seen in Fig. 3), and one for the back formed, as desired, with suitable means for attaching the chair unit to a supporting frame. The contouring of the front and back sections if of course such that when the two parts are mated an air pocket will exist therebetween.

It has been found that highly desirable results are achieved using a combination of chair sections wherein the front section is formed of a lighter material having less plastic, and the back section is formed of a heavy material more heavily impregnated with plastic. The back section thus will be highly rigid to sustain the basic shape and the front section will be yieldable to a certain degree to provide the softness and resilience of a conventional upholstered chair without any need for supplementary cushions and the like.

It will be seen, therefore, that a self-supported chair assembly is provided in accordance with the invention which does not require a complex internal supporting frame and which affords many of the characteristics of a deep, upholstered chair. The chair so formed is highly durable, extremely light in weight, a full arm-chair formed in accordance with the invention having been found to weigh about five pounds, and is susceptible of use either indoors or outdoors due to the extreme durability and weatherproof characteristics of the basic materials.

The chair may be covered with conventional upholstery fabrics, leather or the like, by adhesive or other securing means, for example, and if desired this may be

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accomplished before the basic sheet material is molded. Alternatively, it may be accomplished at the time the plastic impregnant is softened and the molding operation carried out, in which case the adhesive may comprise the plastic impregnant of the basic sheet material. The chair may also be painted, varnished or lacquered.

It will be understood that various numbers of molded sections might be used to form a completed unit. Thus, for example, the front section might be comprised of two or more pieces using a relatively softer center section and relatively harder sections for the arm and peripheral regions. In certain cases satisfactory results may be attained using a back section formed of rigid sheet material other than plastic impregnated fabric. Thus, for example, pressed plywood or molded, solid plastic may be used. It will be understood, therefore, that the particular form of the invention here described and illustrated in the accompanying drawings is presented as an example of how the invention may be applied. Other forms, embodiments and applications of the invention coming within the proper scope of the following claims will readily suggest themselves to those skilled in the art.

I claim:

1. An article of furniture comprising a backing section which is substantially rigid under normal loadings and having substantially vertical and horizontal portions, a body-engaging section of sheet material joined to said backing section to form an integrated unit having a substantially closed air space therein, means forming a horizontal shoulder at the vertical portion of said backing section, and a supporting frame including a member adapted to engage said shoulder and a member adapted to underlie the horizontal portion of said backing section for supporting said unit.

2. An article of furniture as set forth in claim 1, said body-engaging section being flexible at least in part to yield under body weights.

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